The International Handbook of Mobile-Assisted Language Learning

Edited by Agnieszka Palalas & Mohamed Ally
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About the Authors

Mohamed Ally

Mohamed Ally, Ph. D., is Professor in the Centre for Distance Education and Researcher in the Technology Enhanced Knowledge Research Institute (TEKRI) at Athabasca University in Canada. He was Director of the Centre of Distance Education and Director of the School of Computing and Information Systems at Athabasca University. Professor Ally obtained his Ph. D. from the University of Alberta, Canada. He was President of the International Federation of Training and Development Organizations and is a founding Director of the International Association for Mobile Learning. His current areas of research include mobile learning, e-learning, distance education, problem-based learning and use of emerging learning technologies in education and training. He has published many papers and books and has delivered speeches in many countries.

Elena Bárcena

Elena Bárcena has been an Associate Professor of English Language and Linguistics at the Spanish Distance Learning University, UNED, for the last fifteen years (and she has also been accredited by ANECA [the Spanish Agency of the Ministry of Education for Quality and Evaluation] as a Full Professor). She cofounded and has since co-directed, the ATLAS research group (Applying Technology to Languages), having worked to date in over twenty national and international projects on the application of ICT- and lately mobile technology-in teaching and processing languages. She is currently a coordinator in the European funded eLITE project. Dr. Bárcena
has been the Director of three official graduate programs: the Ph. D. Program in English Philology and Masters and Doctorate in ICT in Language Teaching and Processing. She is also the founding director of UNED’s Master in English for Specific Purposes. Among her non-formal teaching, she launched and directed the first language MOOC (LMOOCs) in her country, which had 40,000 students in its first edition. This pioneering teaching led to the edition of the first ever book on LMOOCs. She has recently won the Award for the Best Teaching Practices at her institution.

Jack Burston

Jack Burston holds the position of Honorary Research Fellow in the Language Centre of the Cyprus University of Technology. He is a language-teaching specialist with a formal background in theoretical and applied linguistics, second language acquisition and testing. Dr. Burston also has considerable expertise in computer-assisted language learning, foreign language software evaluation, language center design and professional faculty development. His current research focuses on mobile-assisted language learning. Dr. Burston was a member of the Editorial Board of the CALICO Journal for 18 years, served as Software Review Editor of the CALICO Journal for 13 years and is a former member and chair of the CALICO Executive Board. He was the Editor of the IALLT Language Center Design Kit and the Digital Language Lab Solutions volume.

Chris Campbell

Chris Campbell is a Lecturer in ICT Education in the School of Education at The University of Queensland. Her teaching areas include teaching undergraduate students how to use technology in the classroom, including mobile learning tools. She has been involved in using the TPACK framework with apps in mathematics education with her other research interests including integrating ICT as a learning tool into the classroom and
other areas of research include topics such as learning design and virtual worlds research. Dr. Campbell has also completed research on self-regulation and ICT in the classroom while her newer research includes learner response systems as well as augmented reality and how teachers can use this to enhance their teaching. She has published numerous papers that are available at http://researchers.uq.edu.au/researcher/2519.

**Carrie Demmans Epp**

Carrie Demmans Epp has over 15 years of experience in the design, development, evaluation, and use of educational technologies. Her research has two primary streams. The first focuses on the use of adaptive technologies to support language learning. The second focuses on the design and use of learning dashboards, for which she has recently received awards. She is a speaker of English, French, and Russian, and has taught English language learners in both Canada and Japan.

**Lara Ducate**

Lara Ducate is an Associate Professor of German and applied linguistics at the University of South Carolina in Columbia, SC, USA. Her research focuses on teacher education, online collaboration, and mobile-assisted language learning.

**Muhammad Amin Embi**

Mohamed Amin is Professor of Technology-enhanced Learning at the Universiti Kebangsaan Malaysia. He is well known in Malaysia as a professional educator, academic leader, and innovator in teaching and learning, especially in the area of e-Learning. Professor Amin is the recipient of the distinguished UNESCO Science Laureate 2010 for his contributions in Technology (e-Learning). He is also the first recipient of the most prestigious National Academic Award (2006) for Teaching introduced by the Ministry of Higher Education, Malaysia.
Bruno Ferreira

Bruno Ferreira has completed a Master’s degree in Science Education at the University of Brasilia. His research interests lie in the use of gamification techniques in educational software engineering process.

Elżbieta Gajek

Elżbieta Gajek, Ph. D., is Head of New Media in the Applied Linguistics Lab at the Institute of Applied Linguistics University of Warsaw. She is an English teacher and a teacher trainer. Dr. Gajek specializes in computer-assisted language learning (CALL), and methodology of computer enhanced language teaching. She participated in many European projects and she has been a national eTwinning programme expert since 2004. She is an author of many books and articles on CALL and recently on MALL, on teacher training for media and ICT-based instruction. Her publications are available at http://elzbietagajek.blog.ils.uw.edu.pl/en/.

Martie Geertsema

Martie Geertsema is an ESL teacher who has taught adults in the UK, Turkey, Australia, and South Africa from a variety of backgrounds and first languages. She is also a Cambridge CELTA teacher trainer and enjoys working with pre and in-service teachers. One of her primary interests is finding ways of bringing real life into the classroom so that learners can maximize their learning experience. She completed her Master’s in Education at the University of Queensland, Australia, in 2013.

Christina Gitsaki

Christina Gitsaki is the Research Coordinator at the Center for Educational Innovation, Zayed University, UAE. In the past, she served as the UNESCO Chair in Applied Research in Education in Sharjah and later as the Associate Dean of the Foundations program at the Higher Colleges of Technology. Dr. Gitsaki has presented her research at International Confe-
nces, has been an invited speaker at various professional events and she has published 72 papers in refereed journals and book chapters on language acquisition and pedagogy. She is the author, editor, and co-editor of twelve books on language education research. At the CEI, she oversees the Mobile Learning Research Fund, the SoTL Certification Course, the development of resources for research and she provides advice and mentorship to faculty who are interested in engaging in research on teaching and learning.

**Debra Hoven**

Debra Hoven researches and teaches in the areas of open and flexible learning and pedagogies, electronic portfolios, digital storytelling, and appropriate technologies for intercultural education and learning in the MEd and EdD programs at Athabasca University. Previously, she taught in LOTE/TESOL Education at the Queensland University of Technology, and the Applied Linguistics program at Queensland University in Australia where she was involved in teaching, research, and consultancy in the areas of language teacher education, innovative and flexible pedagogies, and the integration of technology in language teaching and learning. Dr. Hoven’s research interests include appropriate uses of technology in language learning and teaching, mobile learning, and language learning in particular, flexible pedagogies, digital storytelling in Indigenous education, learning theories for new technologies and new pedagogies, and the development of critical reflection in online environments.

**Ting-Chia Hsu**

Ting-Chia Hsu (A. K. A. Ching-Kun Hsu) is currently an Assistant Professor in the Department of Technology Application and Human Resource Development, “National” Taiwan Normal University. Dr. Hsu has fifteen years of experience in computer education. Her research interests include computer-assisted language learning, mobile learning, personalized learn-
ning, and educational technology. Dr. Hsu has published articles in several SSCI journals, including Computers & Education, British Journal of Educational Technology, Computer-Assisted Language Learning, Educational Technology & Society, Interactive Learning Environments, ReCALL, Technology, Pedagogy and Education, and so on. Dr. Hsu received the NSC Special Outstanding Talent Award from February 2013 to January 2014. She was granted the “National” Taiwan Normal University Academic Excellence Award from 2014 to 2016. The “Ministry of Science and Technology” granted her the Distinguished Young Scholars Project from 2014 to 2016. She receives the Special Outstanding Talent Award from August 2015 to July 2016 from “Ministry of Science and Technology” in Taiwan.

**Simon James**

Simon James is Senior International Technical Advisor for Education Development Center, a US-based non-governmental organization working in education, health, and economic development. Prior to moving to the US, James was Chief of Party of USAID’s Advancing Youth Project in Liberia. Before working on these projects, James spent several years in Afghanistan and Pakistan where he helped establish the American University of Afghanistan and implemented a teacher-training project. James is currently working on his doctorate of education at the University of Bristol in the UK.

**Agnes Kukulska-Hulme**

Agnes Kukulska-Hulme is Professor of Learning Technology and Communication in the Institute of Educational Technology at The Open University, UK. She is Past-President of the International Association for Mobile Learning, and serves on the Editorial Board of several journals, including the International Journal of Mobile and Blended Learning. Professor Kukulska-Hulme has been researching mobile learning since 2001, most recently as part of the European MASELTOV project on smart
and personalized technologies for social inclusion. Her original discipline
to background is in linguistics and language teaching.

Lara Lomicka

Lara Lomicka, Ph. D., is Professor of French and Applied Linguistics
at the University of South Carolina, where she currently serves as Graduate
Director for Languages. She also works as an Associate Editor for Language
Learning & Technology as well as the JALT journal. In 2009, the American
Council nationally recognized her teaching on the Teaching of Foreign
Languages (ACTFL) and Cengage Publishers as she received the Excel-
ence in Foreign Language Instruction Using Technology award. In 2011,
Dr. Lomicka was honored as a Chevalier dans l’ordre des palmes
académiques. Her research interests include teacher education, intercul-
tural learning, social media, microblogging, study abroad, service learn-
ing, and computer-assisted language learning.

Senlin Lü

Senlin Lü is the Dean of COERI as well as an expert in mobile learning
and online education. Dr. Lü has been engaged in the online education
since 2000. Equipped with 16 years’ experience in e-learning industry, he
wrote hundreds of articles and two treatises about online education, and
accepted the interviews and reports from over 30 network and TV media.
His professional research reports includes “The Research Report on China’s
Elementary and Secondary Schools’ Online Education Industry”, “The
Research Report on China’s Online Vocational Education Industry” and
“The Research Report on China’s Mobile Learning Industry”. He has also
published some books like The Blue Book on China’s E-Learning Industry
and “The Cultivation of High-Quality Classes Based on Streaming Media”,
which become the important references for China’s e-learning practitioners
and investors.
Norazah Nordin

Norazah Nordin is Professor of Information, Communication, and Technology (ICT) in Education and currently the Deputy Director at the Centre for Teaching and Learning Technology, Universiti Kebangsaan Malaysia (Malaysia National University). Her research areas include Massive Online Open Courses, Mobile Learning, Integrating ICT in Education and Lifelong Learning, and Instructional Design in Online Learning. At the national level, she is a committee member of the Critical Agenda Project (E-Learning), Ministry of Education, Malaysia, and a member of the Council of Malaysian Public Higher Education Institutions e-Learning Coordinators. Dr. Nordin is the co-editor of a book, entitled Mobile Learning: Malaysian Initiatives & Research Findings, which was published by the Ministry of Education. Her latest projects include the development of a prototype of Massive Online Open Courses (MOOCs) and its guidelines, development of the Blended Learning Standard and Rubrics, and the review of the National e-Learning Policy. She is also one of the co-founders of the Honorary Secretary of the Mobile Learning Association of Malaysia. At the university level, she is a committee member of the UKM ICT Council, which is responsible for promoting mobile learning, blended learning, and flipped classroom.

Agnieszka Palalas

Agnieszka (Aga) Palalas, Ed. D., is an Assistant Professor in the Centre for Distance Education at Athabasca University, Canada. She is a mobile-assisted language learning expert with a formal background in applied linguistics, second language acquisition, technology-assisted teaching and learning, online education, as well as instructional design. In her over-20-year experience as an educator, she has taught in the classroom and online, reviewed and designed curriculum, provided professional
development, worked as a programmer and instructional designer for mobile, online, F2F, and blended learning programs. Dr. Palalas has designed and developed numerous mobile apps and artifacts, including apps for English pronunciation. She is President of the International Association for Mobile Learning (IAmLearn) and the International Association for Blended Learning (IABL). She is also on editorial review boards of several journals in the field of m-learning, distance education, educational technology, and language learning. Her current research interests include MALL, the pedagogy of m-learning, formal and informal learning, m-learning design principles, and m-learning in diverse educational and cultural contexts. Further details can be found on her website at http://epluslearning.com/.

**Mark Pegrum**

Mark Pegrum is an Associate Professor in the Faculty of Education at The University of Western Australia, where he specializes in mobile learning and, more broadly, e-learning. His current research focuses on mobile technologies and digital literacies. His recent books include *Brave New Classrooms; Democratic Education and The Internet* (co-edited with Joe Lockard; Peter Lang, 2007); *From Blogs to Bombs: The Future of Digital Technologies in Education* (UWA Publishing, 2009); *Digital Literacies* (co-authored with Gavin Dudeney & Nicky Hockly; Pearson/Routledge, 2013); and *Mobile Learning: Languages, Literacies and Cultures* (Palgrave Macmillan, 2014). He is an Associate Editor of the *International Journal of Virtual and Personal Learning Environments*, a member of the Editorial Boards of Language Learning & Technology and System, and a member of the Review Panel of the *International Journal of Pedagogies and Learning*. He is also a member of the Advisory Committee for the Virtual Institute for Research into Online Language Learning (VIROLL), a member of the
Advisory Board for the Digital Education Show Asia, and a member of the Programme Committee for the International Mobile Learning Festival. Dr. Pegrum currently teaches in Perth, Hong Kong, and Singapore, and has given presentations and run seminars on e-learning and m-learning in Australia and New Zealand, Asia and the Middle East, the UK and Europe, and South America. Further details can be found on his wiki at http://e-language.wikispaces.com/mark-bio.

**Thomas Petit**

Thomas Petit is a French teacher and Ph. D. student in Science Education at the University of Brasilia. His research interests include the use of mobile and digital technologies for education and language learning.

**Petra Poulova**

Petra Poulova is a Vice-Dean of the Faculty of Informatics and Management at the University of Hradec Kralove, president of Hradec IT cluster and chairperson of the Board Technological Centre of Hradec Kralove. She received her Ph. D. in Educational Science from Charles University, Prague, and doctorate in Systems Engineering and Informatics from the University of Hradec Kralove, Czech Republic. She works as an Associate Professor in the Department of Informatics and Quantitative Methods at the Faculty of Informatics and Management, University of Hradec Kralove. Her research interests include IT in teaching and learning, learning/teaching styles, social networks, and database and information systems. She has published over 120 referred journal articles, book chapters and conference papers. She is actively involved in academic and professional communities and has been a member of the Czech Association of Distance University Education Board, a member of EUNIS-CZ (European Organization for University Information Systems), as well as a program and organizing chair of international conferences and a member of committees for
e-learning awards.

**Kan Qian**

Kan Qian is a Lecturer in Chinese and Head of Chinese at The Open University. Her research interest is technology-enhanced language learning at a distance, mainly the use of online forums in assisting the learning of Chinese language, the use of reflective forums for intercultural learning and mobile language learning.

**Timothy Read**

Timothy Read is a Senior Lecturer in the Department of Computer Languages and Systems at UNED. He has held a range of positions in the university government at UNED, including Joint Pro-Vice Chancellor of Technologies in Study Centres, Managing Director of the Centre for Technological Innovation and Development (CINDETEC), Joint Pro-Vice Chancellor of Emergent Technologies and Director of Open UNED. He is an EDEN Fellow and the cofounder of the ATLAS research group and has directed national and international funded projects on applying TIC to LSP. In particular, Dr. Read has researched the development of collaborative tools and systems for the distance learning of LSP and is currently working in the area of mobile-assisted language learning and massive open online courses for languages (LMOOCs). He is currently exploring the use of mobile technology in the context of digital humanities and the edition of enriched fictional and non-fictional texts. He has also been a member of the scientific committee of many international conferences and has collaborated as an evaluator of national and international research project proposals.

**Fernando Rosell-Aguilar**

Fernando Rosell-Aguilar is a Lecturer in Spanish and Open Media Fellow at The Open University, United Kingdom. His research focuses on online language learning, mainly podcasting and mobile apps as teaching
and learning tools, CMC learning environments (such as audio and video conferencing) and digital literacy.

**Gilberto Lacerda Santos**

Gilberto Lacerda Santos, Ph. D., is an Associate Professor at the University of Brasilia in the field of educational technologies. He is the leader of Ábaco Group, which studies impacts on education of new technologies in general, and Informatics in particular.

**Yinjuan Shao**

Yinjuan Shao is an e-learning practitioner. She was a researcher in Nanyang Technological University, Singapore and East China Normal University, China. She obtained her Ph. D. degree in 2010 from School of Computer Science/Learning Sciences Research Institute, University of Nottingham, UK. She has been a member of the International Association for Mobile Learning (IAMLearn) since 2007. Yinjuan has given a number of national and international publications, including reports, conference papers, journals, and books on e-learning Industry, CSCL, and mobile learning. She has also extensive solid experience in e-learning (including mobile learning) practices in and out of classrooms for primary schools, high schools, universities (colleges) and adult professional training in enterprises. Dr. Shao’s research interest also includes personalized learning, MALL, adaptive and responsive learning, augmented reality, corporate e-learning, as well as gamification in learning.

**Ivana Simonova**

Ivana Simonova has been working at the University of Hradec Kralove, Faculty of Informatics and Management, Department of Applied Linguistics since 1997. She gained her Ph. D. in Technology of Education, Faculty of Education, Constantine the Philosopher University, Nitra, Slovakia and doctorate in English Didactics at the same institution in 2012. Her research
activities focus on ICT in education, ESP, distance education, learning, and assessment preferences. She has published three monographs and more than 100 referred journal articles, book chapters, and conference papers. Dr. Simonova is actively involved in academic and professional communities, currently working as a Vice-President of the International Monitoring Committee of IGIP (International Society for Engineering Pedagogy), and a member of programme committees and editorial boards of conferences.

**Jeong-Bae Son**

Jeong-Bae Son, Ph. D., teaches Applied Linguistics and TESOL courses and supervises Ed. D. as well as Ph. D. students at the University of Southern Queensland, Australia. His areas of specialization are computer-assisted language learning and language teacher education. Dr. Son has developed a number of CALL applications, published extensively in the field of CALL and conducted seminars and workshops on CALL around the world. He is currently the President of the Asia-Pacific Association for Computer-Assisted Language Learning (APACALL), Co-Chair of the GLoCALL Conference, Director of Technology-Enhanced Language Learning Research Network (TELLRN), Editor of the APACALL Book Series and Co-Editor of CALL-EJ.

**John Traxler**

John Traxler was Professor of Mobile Learning (the world’s first) and is now Professor of Digital Learning in the Institute of Education at the University of Wolverhampton, UK. He is a Founding Director and current Vice-President of the International Association for Mobile Learning, Associate Editor of the International Journal of Mobile and Blended Learning and of Interactive Learning Environments. Professor Traxler has co-written a guide to mobile learning in developing countries for the Commonwealth of Learning and is co-editor of the definitive book, Mobile Learning: A
Handbook for Educators and Trainers, with Professor Kukulska-Hulme. They have also co-authored another book, Mobile Learning: The Next Generation. He is co-authoring a book, *Key Issues in Mobile Learning: Research and Practice*, with Professors Norbert Pachler and John Cook, and *Mobilizing Mathematics: Case Studies of Mobile Learning* being used in *Mathematics Education and Mobile Learning and STEM: Case Studies in Practice* with Helen Crompton. He has written more than 30 book chapters on mobile learning. Professor Traxler is currently developing the world’s first online masters course in mobile learning, working on the UNRWA ICT for Education Strategy, a UNESCO mobile learning policy/research publication and an ITU on a mobiles and skills development publication.

**Stephe Tsourounis**

Stephen Tsourounis has been working in the area of adaptive mobile-assisted language learning since 2012. He is a computer and cognitive scientist whose work has focused on the use of gamification to support learner motivation. His work has been presented to both the language learning and artificial intelligence communities.

**Liwei Wang**

Liwei Wang is an English teacher for 8 years and got M. A. TESOL from U. C. (University of Canberra) in 2006. She has taught college English from 2006-2009 in Zhengzhou University and then came to teach Nursing English in Changzhou Hygiene Vocational Technology College in Changzhou, Jiangsu Province, China. She is a passionate and creative teacher who always tries various teaching methods and technologies in her class, applies and develops active student centered pedagogy that effectively integrates learning environment. Liwei Wang enjoys designing and developing resources for unique mobile learning environments. She believes innovative and transformative potential of mobile-assisted language learning
and seeks to collaborate and work with colleagues around China for this endeavor. Liwei Wang has been recognized as an innovator using MALL in vocational college in Jiangsu province.

**Karen Woodman**

Karen Woodman is a Senior Lecturer in TESOL in the School of Cultural and Professional Learning at Queensland University of Technology (Australia). She has worked in the area of TESOL and CALL for over 25 years in Canada, the US and Australia. She has developed and led a number of graduate programs in TESOL, Linguistics and Education, including being Coordinator of the Master of Education (TESOL) and Master of Education (TEFL) at the Queensland University of Technology (Australia), and the online Master of Arts (Applied Linguistics) at the University of New England (Australia). She was the Chair of the Teacher Education Interest Section (TEIS) for the International TESOL Organization (2008-2009), and co-edited the TEIS Newsletter. Dr. Woodman is a member of many professional associations, and she is involved with the promotion and development of the fields of ESOL teacher education. Her research interests also comprise issues in second language acquisition, including learning disabilities in ESL, online teaching and learning, CALL and MALL, and the experience of international students in graduate studies. Karen has given numerous national and international invited conference papers, workshops, and public lectures, and won national and international awards, grants, and fellowships. She has also extensive experience in educational consultancy and the ESL classroom, in both private and public sectors.

**Nicholas Yates**

Nicholas Yates is an Instructional Designer in the Center for Educational Innovation at Zayed University in Abu Dhabi, UAE. He is a
passionate instructional designer who works with teachers designing and
developing active student-centered pedagogy that effectively integrates
content, 21st century skills, and technology in face-to-face, blended,
mobile, and online learning environments. He has been teaching and
designing instruction with mobile devices for four years for a variety of
mobile learning environments. Over this time, he has been involved in the
strategic planning of a university’s mobile learning implementation in facets
including pedagogical innovation and faculty development initiatives. He
believes in the innovative and transformative potential of mobile-assisted
language learning and seeks to collaborate and work with colleagues around
the world for this endeavour. He has been recognized as an Apple
Distinguished Educator (Class of 2013) and is certified as an Apple
Education Trainer. He has presented, contributed to discussion panels, and
published on a range of topics, including mobile-assisted language learning,
mobile learning, instructional design, second language teaching, digital
pedagogy, and faculty development.

**Melor Md Yunus**

Melor Md Yunus is an Associate Professor of Technology-enhanced
Language Learning at the Faculty of Education, Universiti Kebangsaan
Malaysia. She has great interest and passion in using the Internet, including
mobile as an alternative medium for teaching and learning. In 2014, Dr.
Yunus received Higher Education e-Learning award for creativity category
(Blended Learning, Flipped Learning, and Problem Based Learning). On
the research front, she is active in scholarly journals and she has published
more than 100 papers in international citation-indexed journals and several
book chapters.

**Yusma Yusof**

Yusma is currently a doctoral student in the area of mobile learning for
English language, specializing in technical and vocational education. She has over 20 years of experience in the area of English for specific purposes. She has been involved in the design and development of English language curriculum, as well as teaching material development for higher education at the Ministry of Education, Malaysia. She is currently involved at the Polytechnic Education Department, Ministry of Education, as a Senior Principal Assistant Director. She is responsible for the graduate employability as well as industry liaisons.
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Agnieszka Palacios, Ed. D.
Mohamed Ally, Ph. D.
Introduction to the Handbook

Agnieszka Palalas

Athabasca University, Canada

Why a Book on MALL

This is a practical resource book on mobile-assisted language learning (MALL). This handbook is about a new understanding of language teaching and learning—a perspective enriched by voices of educators from diverse cultural and educational backgrounds. It introduces mobile-assisted language learning, or more precisely mobile language learning (MLL)\(^1\), as a new phase of second and foreign language learning, a successor of computer-assisted language learning (CALL) and a subset of the larger field of mobile learning. MLL leverages new, previously unexperienced, mobile digital technologies and language-rich contexts to offer an innovative approach to untethered language learning that meets the needs and preferences of the 21st century learner. The book is intended for second and foreign language teachers, academics, researchers, instructional designers, and other professionals in education and the workplace. It will also benefit school administrators, technology staff, directors of Teaching and Learning

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\(^1\) Mobile-assisted language learning (MALL) and mobile language learning (MLL) are used hereby interchangeably. The term MALL has become popular amongst practitioners and researchers; however, mobile language learning tends to reflect more accurately the true meaning of learning that spans time, place, and contexts and involves mobile learners.
Centers, and other stakeholders interested in integrating mobile technologies to promote the development of second and foreign language skills amongst their students and employees.

MALL has to be founded on the body of systematic theory, research, and practice that provides evidence and reflects a multitude of potential educational circumstances. This volume is a forum for mobile language learning practitioners from around the globe to report on how they implemented MLL, what strategies and designs worked and what approaches did not provide desirable outcomes, and what that subsequently means to learners, teachers, and to creators of mobile language learning. There have been many small-scale and even bigger MALL projects that have not been appreciated for the knowledge they can contribute to the field and the community of practice. Many of them are described in this handbook. Case studies presented hereby have been carefully selected to accurately represent the current MALL practices and demonstrate a variety of problems and solutions through the practitioner’s lens. Only by sharing their expert perceptions, practices, findings and conclusions, can the authors truly contribute to the progress of mobile language learning and inform future MLL decisions. This international perspective is needed to promote a widespread adoption of MLL and the corresponding pedagogical shifts that it brings about (Chapter 2). The contributing authors further enrich the message of this book by reporting on the realities, possibilities and limitations specific to their individual educational contexts, which represent a wide range of developmental stages of MLL – from SMS-based learning solutions used to improve literacy in low resource environments in Liberia (Chapter 17) to the use of gamification principles in the design of an English-as-a-second-language vocabulary app for smartphone users in Canada (Chapter 13). Overall, this handbook compiles theory essentials and practical examples of
MLL. It distills them into recommendations on how to integrate mobile pedagogy and technology to teach and support learning of second and foreign languages in educational institutions, in the workplace and in informal learning. It weaves together m-learning explorations and experiences from diverse cultural and educational contexts to provide a broad understanding of the many facets and possibilities of MALL. Thirty-five authors representing thirteen countries contributed twenty-two chapters that refer to the study of foreign and second language at various levels of language proficiency, starting with basic literacy skills, all the way through academic English training programs to providing training in MALL to student teachers of languages. Each chapter enriches the reader’s understanding of the diverse language learning needs and contexts. To further enhance its authenticity, the dialect of English (e.g., Canadian vs. British) in which each chapter was originally authored has been maintained.

As mentioned above, one of the key objectives of this publication is to demonstrate a variety of MLL solutions and how the design of MLL strategies and applications is contingent on the unique characteristics and requirements of individual educational contexts. While specific cultural, educational, and technological environments call for different applications and approaches, MALL offers to all learners an unprecedented range of learning possibilities that expand outside the limitations of traditional learning spaces. Using their personal or loaned mobile devices, learners can engage in meaningful learning through improved access to people, resources, activities, linguistic models, and other learning supports. Innovative mobile-enabled communicative activities and authentic language tasks, cemented by adaptive assessment tools, can facilitate language practice both in and out of the classroom. When designed appropriately, MALL activities can support individual and collaborative learning that spans time and place.
boundaries to facilitate seamless language learning practice. Case studies and discussions in this volume illuminate the potential of m-learning to offer discrete language skills and competencies practice (such as listening, reading, vocabulary, and spelling) as well as a more holistic integrative approach targeting the four language skills and their application in real-world social contexts. In all scenarios, mobile technology serves as an enabler, accelerator, and mediator of learning.

The role of mobile technology in MALL is fundamental and it certainly brings about a redefinition of language learning as it enables innovative learning approaches and strategies in new physical and virtual contexts. According to Parsons (2014), the first vision for a mobile learning device, namely Alan Kay’s visionary Dynabook, dated back to 1972. The first attempt to make learning truly mobile and take it out of the classroom was the Apple Classrooms of Tomorrow (ACOT) project in 1991. The very first MALL studies were published a couple of years later and “reported on the use PDA-based word processing programs to improve the L1 English writing skills of Canadian secondary school students (Callan, 1994) and Australian primary school pupils (Schibeci & Kissane, 1995)” (Burston, Chapter 1 in this volume). Burston continues that MALL studies in L2 followed a year later and at that time they focused on the use of pocket bilingual dictionaries (see Chapter 1 and 2 for a more detailed discussion of the history of MALL studies).

**Defining MALL**

Two decades later, m-learning researchers are still debating the definition of mobile learning; however, they appear to agree that m-learning should not be equated to merely learning with mobile devices. Moving away from the technological determinism of the earlier definitions of mobile
learning, mobile language learning can be viewed as learning across physical and virtual contexts which is enabled and supported by highly portable devices (both handheld and wearable) as well as communication and social network technologies. The mobility of the learner across contexts (Kukulska-Hulme et al., 2011) combined with access to people and resources (both these residing locally on the device and those on the Web), to digital tools (including built-in device capabilities, native and web-based apps), as well as supports and scaffolds mediated by mobile devices, form the core of mobile language learning. MLL goes beyond learning on the go, anytime anywhere, or the benefit of more productive use of the learner’s downtime. The usage of personal devices connected to a shared network affords learning that can be customized to the needs of a particular group of learners and even an individual learner. This allows combining individual m-learning activities with participatory learning experiences. MLL reaches audiences that could not be reached by any other technology (see Chapter 17 for a case study in Liberia). It also supports practice that blends formal and informal learning episodes. Most importantly, it takes language learning into the real-life environment, both physical and virtual, where the language studied is modelled and applied.

Access to mobile device tools, such as location awareness, communication features, and apps, undeniably, enriches such an embedded learning experience. The learner can finally go away from a tethered computer, with a complete digital toolbox in his/her hand, and practice language in authentic language situations and a variety of settings conducive to language acquisition. The blend of these digital tools and new flexible learning contexts opens opportunities for new teaching and learning methodologies, for creation and use of new types of materials, and for innovative design of learning activities and environments. None of that would be possible,
however, without sound pedagogical foundations.

Computers, including handheld computers, such as mobile phones, do not automatically lead to better learning processes or outcomes, just like paper or print, when they first emerged as new technologies, did not result in better learning for all in all circumstances. Mobile technologies, indeed, offer a potential to enhance access and interaction with people, resources, and learning supports, but that potential has to be realized through proper m-learning design and delivery that ensures learners’ preparedness and engagement. The mere availability of mobile technologies does not eliminate the need for MALL experts (including fellow students) to guide learners, at least in the initial stages, through the process of first acquiring digital skills to benefit from the use of technology and then progressing in their mobile language learning practice. Nor does it eradicate the need for students to make a genuine effort to learn, to systematically engage, to complete challenging learning activities and invest the time that is required to improve their language proficiency.

While the use of mobile technology alone does not produce successful mobile learning, its ever-growing capabilities and functions have to be considered when designing mobile learning. MALL experts and designers should be familiar with affordances of mobile technologies and what possibilities they open to teachers and learners today and in the near future. For instance, location awareness functions can enhance how learners interact with the environment and contextualize their learning; more specifically, the use of RFID tags and the Internet of Things may facilitate vocabulary learning by naming on touch objects selected by learners in their surroundings. Augmented Reality (AR) applications can further enrich those in-situ MLL experiences, as can wearable devices that are gradually entering the world of mobile learning. Technologies do change rapidly and in ten
years from now, SMS and Skype might appear old-fashioned and obsolete. Nevertheless, the mobility of the learner and context of learning will remain the base of m-learning. As discussed in more detail in Chapter 2, a pedagogical framework that leverages this mobility and can accommodate the ongoing advancements in technology is needed. The reader is invited to contribute to the development and discussion of such an MLL framework by joining our MALL Handbook Twitter and Facebook groups that can be accessed through the following website: http://epluslearning.com/.

Summary of the Handbook Chapters

The chapters in this handbook address the above-mentioned aspects of MALL. Much has been learned in the recent years with regard to what works best in various circumstances, how best to make effective use of mobile learning approaches and technologies, and what pitfalls to avoid. With each chapter providing a unique vantage point on mobile language learning, the handbook reflects diverse perspectives on MALL from across the globe. The chapters are not only conceptual in nature but also discuss research and application, thus providing the reader with the essential knowledge of MALL pedagogy, design, development, and practice. While presenting the big picture, these carefully selected chapters offer sufficient detail for the reader to draw their own conclusions and implications for their personal and professional practice.

The twenty-two chapters are divided into three sections, namely (1) Part I: Theoretical Foundations of MALL, (2) Part II: Practical Applications, and (3) Part III: Research from Case Studies. Part I introduces key concepts and notions underpinning mobile language learning. In Chapter 1, Burston provides an overview of published MALL implementation studies, followed by a comparative analysis of MALL
applications, and a discussion of the issue of its curricular integration. Burston concludes that the existing technological infrastructure and pedagogical expertise are sufficient to bring MALL to the forefront of language teaching. Chapter 2, authored by Palalas and Hoven, discusses the key pedagogical shifts introduced by mobile language learning and how they affect foreign and second language teaching and learning. MALL, which both differs from and builds upon CALL, has been emerging as a new field offering new possibilities. The authors posit that the unique affordances and challenges of MALL, when compared to those of CALL, necessitate a shift in language pedagogy. Consequently, MLL transforms the role of the language learner and teacher who now have access to innovative strategies and tools that better meet the needs of the 21st century learner. Likewise, Pegrum (Chapter 3) addresses the importance of digital and language skills in the contemporary era. Pegrum emphasizes the centrality of language and literacy skills across many areas of life-working and civic life, personal and social life, both locally and globally. Chapter 3 examines the significance of different levels of mobility in MALL and three major agendas for promoting MALL: transforming teaching and learning; developing 21st century skills; and promoting social justice. With the new contexts and possibilities for learning enabled by mobile technologies, comes the need for a theoretical framework or theory of learning that can describe, explain, and predict how such learning occurs. Such theory of learning, namely Ecological Constructivism (EC), is proposed and outlined by Hoven and Palalas in Chapter 4. Ecological Constructivism derives from aspects of flexible, distributed, and mobile learning approaches as well as other theories from fields as diverse as ecology, biology, geology, physics, architecture, mathematics, and linguistics. Chapter 4 introduces derivations, concepts, definitions, and explanations of terms related to EC along with some
practical examples of how the theory is realized in MLL. In the following chapter, Kukulska-Hulme takes a closer look at the notion of assistance in MLL. She observes that mobile assistance may be incorporated into mobile systems, environments, and application designs, and also provided by people. Chapter 5 reviews relevant literature focusing on individual learner requirements and the importance of supporting informal learning among migrants so that they can both benefit from assistance and be empowered to help others. In addition, a classification of assistance for MLL and communication support is proposed. In Chapter 6, Son introduces the concept of educational apps and stresses the need to carefully evaluate and select mobile apps for language learning. A language learning app review form is presented to guide language teachers to critically evaluate pedagogical and technical aspects of MALL apps. The chapter also presents a selection of apps for ESL/EFL reading, writing, listening, speaking, vocabulary, grammar, pronunciation, and culture learning activities. Chapter 7 concludes Part I with a discussion of selected design principles and strategies for mobile language learning design. This chapter offers a list of principles and strategies that underpin pedagogically sound design of MLL resources. Yates and Palalas substantiate these guidelines with relevant literature and illustrate them with practical examples.

Part II explores practical applications of MALL in diverse language learning settings in Germany, Senegal, Australia, Greece, Spain, Brazil, Canada, and the UK. Chapter 8, authored by Ducate and Lomicka, addresses how students can engage in MLL to increase their awareness and intercultural competence. It reports on two study-abroad trips to Germany and Senegal being part of research investigating whether having learners pay more attention to their surroundings, by taking and categorizing photos, helps them notice and learn more about the local culture. Ducate and
Lomicka conclude that students became increasingly aware of the target culture and were forced to notice and reflect more on linguistic features and cultural items, consequently increasing their intercultural awareness and competence. Campbell and Geertsema (Chapter 9) explore using the voice recognition app Dragon Dictation as an immediate feedback tool to improve pronunciation amongst adult English language students at The University of Queensland in Brisbane, Australia. The study suggests that voice recognition software can help language learners increase their pronunciation accuracy and provide effective feedback. It also serves as a practical example of bringing real life into the classroom, making learning more authentic, concrete, and practical. Chapter 10 also examines the potential of a mobile app, more precisely a MALL listening app designed by the authors. Read and Bárcena explore whether mobile-based peer interaction in social media can motivate, support, and scaffold the individual student experience in a listening comprehension learning process. This research study, involving the app that offers news recordings and is connected to Facebook, suggests that such interaction could foster a longer and more frequent exposure to the app, especially when combined with a particular student profile (e-LS). Similarly, Chapter 11 reports on a study exploring the use of Facebook in the field of MLL. Woodman presents the findings of an international tele-collaboration study using Facebook, in which in-service language teachers from eight different countries enrolled in MEd programs in Australia and Greece examined the use of ICT and MALL in the language classrooms in their home countries. Findings reveal many similarities between the situations and perceptions of the diverse participants, including the critical need for professional development in the area of ICT, especially MALL. The chapter also proposes strategies to support teachers in implementing MALL in their classrooms. In Chapter 12, Petit, Santos, and Ferreira
describe the process of their Design and Development Research (DDR) study aiming at developing MapLango — an innovative smartphone application that promises to transform local contexts into immersion environments for Brazilian language learners on the go. The design proposed in this study takes into account the unique affordances of smartphones, the use of time and space, and digital networking in order to propose a support for mobile language learning that promotes creativity, participation, collaboration, authenticity, and personalization. Chapter 13 explores yet another mobile app, namely VocabNomad — an adaptive communication support tool that also supports vocabulary acquisition. Tsourounis and Demmams Epp report on a study conducted at University of Toronto, Canada, which explored the design of a gamification feature of the app that allows English language learners to set their own goals and monitor their progress through its learning dashboard. According to the authors, both learning dashboards and gamification have been shown to support learner self-regulation and maintain learner motivation when used appropriately.

The authors conclude with a set of related design recommendations. Rosell-Aguilar and Qian from The Open University (UK), further contribute to the reader’s understanding of MALL apps, their design, and effectiveness in Chapter 14. They present both the pedagogical design principles and the challenges faced during the development of a mobile app, Chinese Characters First Steps, designed to assist language learners with recognizing, learning, and practicing writing Chinese characters at a beginners’ level. The chapter also presents profiles of users of language learning apps and their usage habits.

Part III of the handbook commences with Chapter 15, in which Gitsaki presents a case study of a large-scale iPad adoption in an ESL program in a multilingual society in The United Arab Emirates. The planning process and
implementation of the project are outlined along with a teachers’ account of
the enablers and barriers experienced in the process. Lessons learned from
this longitudinal project are summarized in a set of principles suitable for
similar large-scale institution-wide projects. Student teachers’ opinion on
MALL is presented in Chapter 16, which reports on a mobile technologies
component in a pre-service language teacher academic course at University
of Warsaw, Poland. Respondents in the study identified a number of
advantages of the use of mobile technologies in language learning from the
learners’ perspective and disadvantages from the teachers’ perspective.
Gajek observes that pre-service language teachers are open to and positive
about mobile technologies when applying them as learners but much more
conservative when evaluating them from the teachers’ perspective. In their
teaching capacity, they opt for traditional materials, tools, and processes
and are not willing or, perhaps, not prepared to introduce MLL innovations
in their practice. Chapter 17 takes the reader to Liberia, a low-resource
educational context, where a study was conducted to assess whether using
SMS text messages could improve the English literacy skills of learners
enrolled in an Alternative Basic Education program. Learner and facilitator
response to learning through mobile phones was also examined. James
observes that the overall reaction to the introduction of m-learning was
positive. He also stresses the importance of adequate access and familiarity
with the mobile hardware and software in any m-learning project. Some
recommendations for promoting learning gains in an efficient manner are
given. In Chapter 18, Simonova and Poulava present a research study that
was conducted at the Faculty of Informatics and Management, University of
Hradec Kralove, Czech Republic. The study identified mobile device
ownership and use habits amongst students and how they applied those
devices in learning English for specific purposes. The authors reflect that

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while mobile learning is in its initial stages in the Czech Republic, the vast majority of both learners and teachers are ready to engage not only in mobile language learning but also to use mobiles to learn other disciplines. Rosell-Aguilar revisits the topic of mobile apps for language learning in Chapter 19. He reports on a case study exploring the way adult learners of Spanish (taking a Higher Education qualification at The Open University, UK) engage with apps for language learning. The chapter reviews relevant research, highlights the potential of mobile apps for MALL, presents the results of the study, and provides a comparison between app users and app non-users. Amongst other findings, the results indicate that learners use MLL apps mostly for vocabulary development, translation, and grammar practice. In Chapter 20, Shao, Wang, and Lü describe a MALL case study in a nursing college in China. A mobile app was developed to increase motivation amongst freshmen to learn English and to provide wider accessibility and availability of learning resources and practice. The research findings reveal that not only did the learners’ engagement and motivation levels increased but so did the overall interest in learning English. The authors recommend that stakeholders and practitioners seriously consider mobile learning when creating any vocational English language curriculum, which should include in and out of the classroom MALL practice. In addition, they observe that teachers and students should be offered training on how to incorporate mobile technologies in foreign language learning. Chapter 21 presents research comprising two studies with EFL students (in primary and secondary school in China’s Taiwan) that explored the use of captions in video played on handheld devices. Hsu concludes that listening comprehension and vocabulary recall are positively affected when EFL learners are given only keywords and more advanced vocabulary instead of full captions or subtitles. Such compressed captions are also more
appropriate for the small screen of any handheld device. The final chapter provides a more technical perspective on the use of mobile devices for English for Technical Purposes, as exemplified by students of four polytechnics in Malaysia. Nordin, Yunus, Yusof, and Embi observe that certain features of mobile devices, such as small screens and limited download capacity, may negatively affect the value of content and interaction with the content in MALL. The chapter examines learners’ responses towards mobile language learning through usability analysis. The authors conclude that more attention should be given to the design and development of mobile-assisted English language learning modules, including careful planning of proper technology integration and pedagogy. According to the authors, “MALL will definitely play an important role in the Malaysian foreign language educational system”, so it should in other educational contexts.

Undeniably, mobile language learning is a momentous step forward toward offering second and foreign language learning that prepares global learners of the 21st century for the world characterized by interdependence, diversity, and rapid change. As John Traxler, a world-renowned m-learning expert, so aptly put in the foreword to this volume, mobile learning research is now more mature and it “operates within a well-defined paradigm”. At the same time, mobile technologies are increasingly powerful, affordable, user-friendly, personal, and familiar, thereby offering a solid technological base for the development of innovative approaches to language learning and teaching. The time is now to revise our perceptions and methods of language learning. We hope that this handbook, which shares a message of critical importance to the theory and practice of MALL, will assist its readers in implementing mobile language learning in their practice.
References


*Agnieszka Pałalas, Ed. D.*
Foreword

John Traxler

University of Wolverhampton, UK

I am not a linguist; I am no longer really a technologist, and I am only occasionally a teacher. I am however endlessly fascinated by language and increasingly conscious of the profound relationships between language, pedagogy and (digital) technology, and conscious of how rapidly these are changing. I am also conscious that underneath them and underpinning them, the epistemologies of our world: the processes and concepts that express how we know, how we come to know, how we change, store, share and pass on what we know, are also changing, subtly but certainly.

Digital technologies are now the technologies to learn language. They are however not the dumb and inert repositories and carriers of language or the dumb and inert repositories and carriers of learning, nor of the social practices in which languages are embedded. They transform languages, they transform learning and they transform social practices.

Digital technologies are implicated in the creation of new words and the auto-correction of old ones. They are also implicated in the creation of new genres, such as the blog, the obsolescence of old ones, such as the pen-pal letter, and the transformation of many others, including the diary.

Digital technologies upset the balance between mainstream languages and marginal languages, between recognised languages, informal languages and subversive languages. Digital technologies, especially mobile digital technologies, mean that digital conversation now intrudes into physical conversation, and cyberspace and phonespace now intrude into physical space, forcing new social practices and transformed etiquettes into our lives as we all attempt to manage our changed
communities and the conversations within them.

Digital technologies begin to problematize language learning as they offer more and more powerful linguistic performance support, translating the spoken or written word from one language to another in real-time and apparently eliminating the need to learn another language. Perhaps digital technologies mean we need only the linguistic ability to comprehend US English, the language of the digital knowledge economy. There is clearly a complex dynamic between languages, the learning of languages and the digital technologies that transform both.

These rather sweeping statements show just how timely and necessary the current book is, in order to bring a more critical, nuanced and comprehensive account of mobile language learning to the wider community of researchers, practitioners, professionals and policy-makers. The scope of the book includes diverse languages, cultures and sectors, and includes the spectrum of language learning activities, approaches and skills. This is an important snapshot of a body of work taking shape and addressing challenges in a constantly changing environment. In a world where mobiles are now easy and obvious, the place of theoretical and conceptual thinking and the need for rigour and analysis must constantly be restated, and the book does exactly that. When managers and policy-makers tell us that the only theory is, “content is king”, we need books like this to tell them, it is not simple, it is not that easy.

The mobile learning research community is now mature and coherent, and mobile learning research operates within a well-defined paradigm, but the context is changing and the current book appears at a cusp, as mobile technologies become increasingly powerful, robust, easy, cheap, personal and familiar. The book draws together a range of expertise and experience at a very important juncture and deserves to be widely and critically read. These accounts are important because they challenges us to explore two narratives, the historical narrative of the mobile learning research community and the emerging narrative of universal connection and mobility, and to revise our conceptions of language and learning.
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PART I:
Theoretical Foundations of MALL
Chapter 1: The Reality of MALL: Still on the Fringes

Jack Burston

University of Cyprus, Cyprus

Abstract

Mobile-assisted language learning (MALL) has existed now for nearly two decades with its application to foreign language instruction chronicled in over 345 implementation studies. For several years already, proponents have claimed that MALL is becoming commonplace in foreign language instruction. In reality, with few exceptions, published studies of MALL implementations have not progressed much beyond pilot testing, i.e., design proposals, proof of concepts, limited experiments, class trials. Above all, what is most striking about published MALL implementation studies is the virtual absence of follow-up reports of curricular integration.

In order to put MALL applications into perspective, this paper is organized into three sections. The first gives an overview of published MALL implementation studies, the second provides a comparative analysis of MALL applications, and the last addresses the issue of MALL curricular integration. On the basis of this review, the paper concludes that MALL remains marginal in terms of the number of students and courses involved, the duration of implementations, the language skills targeted, the kinds of learning activities undertaken and the methodological approach used.

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Nonetheless, it also maintains that the necessary technological base and pedagogical expertise are in place to bring MALL in from the fringes to the core of foreign language teaching.

**Keywords:** MALL, mobile-assisted language learning, mobile devices, ubiquitous technology, curricular integration

**Introduction**

Since the advent of computer-based hand-held mobile devices, “anywhere, anytime” learning has been promoted as the pedagogical wave of the future. Within the specific context of mobile-assisted language learning (MALL), the earliest attempts to realize the potential of mobile learning date from 1994. In the intervening years, there have been over 345 studies describing MALL implementations based on a range of mobile devices that includes e-dictionaries, MP3 players, Personal Digital Assistants (PDA), tablet PCs, and most especially mobile phones. Notwithstanding the attention it has received, MALL remains on the fringes of foreign language pedagogy. Even after nearly two decades, those who have undertaken MALL studies are mostly restricted to what Rogers (1962) termed “early adopters”, experimenters who have yet to influence the core of the language teaching profession. With few exceptions, published studies of MALL implementations have not progressed beyond pilot testing, i.e., design proposals, proof of concepts, limited experiments, class trials. To the extent that any large-scale implementations have been attempted, these have remained marginal to the curriculum, restricted to the use of voluntary complementary materials, most notably vocabulary review. Above all, what is most striking about published MALL implementation studies is the virtual
absence of follow-up reports of curricular integration.

This paper is organized into three sections. The first gives an overview of published MALL implementation studies, the second provides a comparative analysis of MALL applications, and the last addresses the issue of MALL curricular integration.

Overview of MALL Implementation Studies 1994-2012

Sources of Published Studies

According to the references cited in published MALL studies, some 570 works have appeared over the past 20 years. The topics covered are varied and include considerations of technical specifications, mobile device ownership, pedagogical design, learning theory, user attitudes, motivational effects, institutional infrastructure, and teacher training, among others. By far, the most frequently occurring type of MALL publications are project implementation descriptions, that is to say studies which involve some degree of actual trialing with students. In all, MALL application studies account for over 345 of the total, some 60%. Overall, MALL implementation studies are marked by two salient characteristics: the unevenness of the articles and the great diversity of their sources. While many of these papers conform to the expectations of applied linguistics publications, a great number omit essential information such as the duration of the project, number of participants, language level of learners, language skills targeted, etc. In large part, such omissions stem from the disparate publication sources of these studies, few of which have language acquisition as their primary focus. The extent of this diversity may be judged by the Reference section of this paper, which includes over 30 different journals.
As indicated in Figure 1.1, only about 10% of MALL application studies have appeared in CALL journals. By far, the single greatest source of MALL implementation publications is to be found in conference proceedings, which represent over 45% of all papers. Here again, these are mostly in areas outside of CALL, such as distance learning, mobile learning, educational technology, multimedia, and lexicography. The journals in which MALL implementation studies appear are similarly diverse, ranging from publications devoted to specific languages to those targeting educational technology, computer-assisted learning, and mobile learning. Other publication sources include project reports as well as a few masters and doctoral dissertations. The great dispersion of reference bibliography makes the consulting of these resources a major challenge in itself. Space does not permit dealing with all these MALL publications here, but readers interested in obtaining a more comprehensive account of this bibliography may consult Burston (2013) which includes annotations and web links to nearly all of these publications.
MALL Platform Exploitation

Target Language

The earliest attempts to exploit hand-held mobile technology for language learning involved first language (L1) word processing on PDAs. The very first published MALL studies reported on the use of PDA-based word processing programs to improve the L1 English writing skills of Canadian secondary school students (Callan, 1994) and Australian primary school pupils (Schibeci & Kissane, 1995). A number of government funded PDA-based L1 English literacy programs were also undertaken in UK primary and secondary schools shortly afterward (Fung, Hennessy, & O’Shea, 1998; Lewin, Scrimshaw, Mercer, & Wegerif, 2000; McTaggart, 1997; Moseley et al., 1999; Pyke, 1997). Though very much the exception, and only rather recently, mobile devices have also been used to support the reading and writing of L1 Chinese (Chen, Chang, Lin, & Yu, 2009; Wong, Chin, Tan, & Liu, 2010; Wong, Song, Chai, & Ying Zhan, 2011) in China’s Taiwan and Singapore.

The application of MALL to second and foreign languages (L2) began only slightly later than with L1 studies, prompted by the great popularity of pocket bilingual dictionaries among students in Japan, where researchers investigated their use as an English learning tool (Sharpe, 1995; Weschler & Pitts, 1999, 2000; Yonally & Gilbert, 1995). Interest in the use of e-dictionaries likewise spread to mainland China (Deng, 2006; Wang, 2003; Zhang, 2004) and Taiwan province (Liang, Liu, Wang, & Chan, 2005). Without exception, all these studies focused on L2 English and were primarily concerned with word look-up behavior compared to the use of printed dictionaries. As with portable e-dictionaries, the high rate of mobile phone ownership among students in Japan sparked an early interest in the
use of text messaging for the out-of-class acquisition of L2 English vocabulary (Houser, Thornton, Yokoi, & Yasuda, 2001; Thornton & Houser, 2001a, 2001b, 2002).

**Environment of Usage**

The “anywhere, anytime” appeal of mobile device usage has been so dominant that over 90% of all MALL implementations have been designed for out-of-class applications. Only about 20 MALL implementations have focused on the in-class usage of mobile devices. The earliest of these involved the use of a mobile phone-based audience response system in Japan to confirm the comprehension of L2 English language lectures (Thornton & Houser, 2003). Over the years, most of the rest have explored the in-class use of mobile devices as inexpensive alternatives to a computer lab installation for vocabulary and grammar learning (Begum, 2011; Gilgen, 2005; Kiernan & Aizawa, 2004; Liang et al., 2005; Lin, Kajita, & Mase, 2008; Ruan & Wang, 2008; Samuels, 2003), discussion activities (Bollen, Eimler, & Hoppe, 2004a, 2004b; Brown, Castellano, Hughes, & Worth, 2012; Lan, Sung, & Chang, 2007), reading (Chang & Hsu, 2011), listening practice (Oberg & Daniels, 2012) and video production (Brown, 2012). The ubiquitous availability of voice recording on recent mobile phones and MP3 players has also prompted their experimental use for pronunciation monitoring and note taking in L2 English classrooms for later consultation at home (Baleghizadeh & Oladrostam, 2010; Ghorbanddorinejad, Aghasafi, Farjadnasab, & Hardani, 2010).

**Mobile Phone-based Applications**

Despite the technological constraints of early mobile phones, the lure of their out-of-class exploitation fostered attempts to extend their limits via wireless application protocol (WAP) links to web-based resources. The earliest, and most ambitious, of these experiments was undertaken in the
US (Brown, 2001), where an L2 Spanish program was developed for university students that used e-mail, voice, and voice-recognition to provide vocabulary practice, quizzes, word and phrase translations as well as access to live talking tutors. American L2 English university students also trialed a web-based system that exploited the picture taking ability of early mobile phones to produce online multiple-choice quizzes of image-word pairs (Joseph, Binsted, & Suthers, 2005). Researchers in the UK experimented with the use of the text messaging capability of mobile phones to support L2 English listening comprehension via a wireless application protocol (WAP) link to an interactive TV system that allowed learners to access real-time program summaries, vocabulary and annotations (Fallahkhair, Pemberton, & Griffiths, 2005, 2007; Fallahkhair, Pemberton, & Masthoff, 2004). The first audio application, designed to practice the /l/ vs /r/ phonemic distinction with Japanese learners of L2 English, was also tested on mobile phones in the UK (Uther, Zipithia, Uther, & Singh, 2005).

**PDA-based Applications**

Early cutting edge mobile phone experiments notwithstanding, until the advent of more sophisticated phones, MALL applications that involved more than just text messaging were really only implementable using PDAs (and similar hand-held computers). Since ownership of PDAs outside of the business and scientific communities was virtually non-existent, as with WAP-enabled mobile phones, without exception these had to be loaned to learners for experimental trailing. Taiwanese primary school children were the first to test a PDA-based system linked to a multimedia resource database that allowed them to download L2 English learning materials, browse the web, take notes and do tutorial exercises (Tan & Liu, 2004). Taiwanese primary school children were likewise the first to trial a PDA-based speech recognition program designed to provide L2 English oral
practice in a game-based environment (Yang, Lai, & Chu, 2005). Taiwanese researchers also exploited the programming capability of PDAs to create a scrabble game to support the L2 English vocabulary acquisition of high school students (Lin, Liu, & Niramibianon, 2008).

With the addition of a camera and wireless phone connectivity, PDAs were used in the UK to allow L2 English college students to send location-related text and images via short message service (SMS) and multimedia message service (MMS) to a web-based multimedia message board (City College Southampton, 2005). PDAs offered not only access to multimedia resources, but also to radio frequency identification device (RFID) tag readers capable of identifying objects in the environment to support the in-context learning of vocabulary. Numerous studies were undertaken in Japan to exploit this affordance in the teaching of L2 Japanese mimetic words and onomatopoeic expressions (Hou, Ogata, Miyata, Li, & Liu, 2010; Hou, Ogata, Miyata, & Yano, 2009; Miyata, Ogata, Kondo, & Yano, 2008a, 2008b; Ogata, Kondo, Yin, Liu, & Yano, 2007; Ogata, Miyata, Hou, & Yano, 2007; Ogata, Yin & Yano, 2006). In Taiwan, PDAs were similarly linked to bar code readers to create game-based listening and speaking activities for L2 English (Liu, 2009; Liu & Chu, 2010; Liu, Tan, & Chu, 2007, 2010).

Above all, PDAs gave access to wireless server-based systems capable of storing and distributing context-sensitive information. In Taiwan, this capability was used to link PDAs to an online dictionary that allowed L2 English learners to create glosses to facilitate reading and translation activities (Chang & Hsu, 2011; Hsu, Ogata, Miyata, Li, & Liu, 2009). Server-based systems were likewise used to store learner profiles and location details that could be exploited to create user-adaptable language learning applications. Researchers in Japan led the way by combining global
positioning systems (GPS) and RFID with PDAs and server databases to develop location-aware MALL applications for L2 English and L2 Japanese vocabulary learning (Ogata & Yano, 2003, 2004a, 2004b; Ogata, Yin, El-Bishonty, & Yano, 2004; Yin, Ogata, Yano, & Oishi, 2004). Japanese researchers likewise pioneered the use of GPA-equipped PDAs to provide text and voice communication between instructors and L2 Japanese students to support collaborative task-based learning through the collection and sharing of multimedia data in real life situations (Ogata, Hui, et al. 2008; Ogata, Yin, et al., 2006; Paredes et al., 2005). While some interest in PDA-based location-aware MALL applications was shown in Norway (Markiewicz, 2006; Petersen & Markiewicz, 2008, 2009), by far the greatest work in the area outside of Japan has been undertaken in Taiwan for L1 Chinese (Chen, Chang, Lin, & Yu, 2009) and L2 Chinese (Anderson, Hwang, & Hsieh, 2008; Chen & Chou, 2007) as well as L2 English (Chen & Li, 2010; Chen, Li, & Chen, 2007; Chen & Tsai, 2010; Cheng, Hwang, Wu, Shadiev, & Xie, 2010; Hsieh, Chen, & Hong, 2007; Liu, 2009; Liu et al. 2007, 2010).

**Media Player Applications**

While PDAs were used in a few audio-based programs for L2 English pronunciation (Yang et al., 2005) and the learning of L2 Japanese kanji (Lin, Kajita, & Mase, 2007, 2008; Lin & Mase, 2006), the large scale exploitation of mobile devices to provide audio support for L2 learning stems from the introduction of the iPod into academia. The give-away of iPods to undergraduate students in Japan at Osaka Jogakuin College in 2004 and in the US at Duke University in 2005 sparked a general interest in podcasting (i.e., the online distribution of MP3 audio files) as a language learning tool, especially for listening comprehension activities. Aside from providing much simpler access to audio materials than what was possible using audio
cassette or CD-ROM technology, the iPod (and similar MP3 devices it spawned) also supported voice recording, first used in the US for native-speaker interviews in L2 German and audio diaries in L2 Spanish (Belanger, 2005). MP3 player-based voice recording was also used in the UK for note taking as well as for native-speaker interviews in L2 Serbian/Croatian (Ros i Solé, Calic, & Niejmann, 2010). iPods have similarly been used in the US for the creation of personalized L2 English audio dictionaries (Palalas, 2011; Palalas & Olenewa, 2012) and as an alternative to computer lab facilities for the recording of L2 English audio journals (Kessler, 2010).

The addition of video capabilities to the iPod led naturally to vodcasting, which was first exploited in Japan for the distribution of videobased L2 English vocabulary flashcards (Amemiya, Hasegawa, Kaneko, Miyakoda, & Tsukahara, 2007; Hasegawa et al., 2007; Hasegawa, Amemiya, Kaneko, Miyakoda, & Tsukahara, 2007; Ishikawa et al., 2007). In the US, video was also combined with podcasts to provide L2 English listening comprehension practice (O’Bryan & Hegelheimer, 2007). The latter is typical of the many published podcasting and vodcasting studies which followed in that the distributed materials could be downloaded to any computer and not just to mobile devices. Likewise, as with the O’Bryan & Hegelheimer study, subsequent podcasting/vodcasting implementation publications rarely specifically track mobile usage and, tellingly, the few that do so report an overwhelming preference for computer access (Abdous, Camarena, & Facer, 2009; Allan, 2007; Ducate & Lomicka, 2009; Hegelheimer & O’Bryan, 2008).

**Web-based Applications**

Even before the appearance of the iPhone, the increasing in-built ability of basic mobile phones to access the Internet prompted the
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development of a number of web-based MALL applications. Most web applications accessible by mobile phone were tutorial in nature, targeting vocabulary and grammar (Stockwell, 2007; Tschirhart, O’Reilly, & Bradley, 2008), listening comprehension (Nah, 2011; Nah, White, & Sussex, 2008), pronunciation (Saran et al., 2009), and reading (Huang & Lin, 2011). Inspired by collaborative constructivist methodologies, a few applications have experimented with the use of mobile phones to maintain web-based text blogs. One was used to support the L2 English cultural and linguistic integration of Chinese university students in the UK (Shao, 2011; Shao, Crook, & Koleva, 2007) and another to allow L2 Spanish university study-abroad participants in Spain to share their experiences with stay-at-home students in the UK (Comas-Quinn, Mardomingo, & Valentine, 2009).

In the US, mobile phones were used with L2 English university students to produce web-based audiblogs for the submission of oral assignments and provision of instructor feedback (Hsu, Wang, & Comac, 2008).

**Smartphone Applications**

The increasing multimedia capabilities of mobile phones led to their use as resource generators in MALL applications involving picture taking and voice recording (Gjedde & BoKristensen, 2012; Ishikawa, Kaneko, Haruko, & Norihide, 2009; Liu & Chen, 2012; Miyakoda, Kaneko, & Ishikawa, 2011; Palfreyman, 2012; Wang, Chen, & Fang, 2011). So, too, the improved programing ability of mobile phone operating systems fostered the development of a number of stand-alone MALL applications. In particular, the use of Flash and Java permitted the creation of vocabulary games (Amer, 2010; Fotouhi-Ghazvini, Earnshaw, & Hazi-Esmaili, 2009; Fotouhi-Ghazvini, Earnshaw, Robinson, & Excell, 2008; Yang & Chen, 2012) and multimedia tutorial programs (Burston, 2012; Salameh, 2011).

Advances in the technological sophistication of mobile phones
ultimately culminated in the iPhone, and smartphones generally. However, largely because of their expense and the mutual incompatibility of their operating systems, smartphones have yet had only minimal impact upon MALL implementations. Pedagogically, nothing new has been done with smartphones that has not already been done with earlier mobile devices. While commercial multimedia stand-alone iPhone and Android apps have been created for dozens of languages, of which over 100 are for L2 English alone, the activity behind them rarely extends beyond paired L1/L2 flashcards, multiple-choice, blank-fill and drag & drop vocabulary/grammar drills, vocabulary games, etc. Moreover, these applications are all intended for individual, extracurricular, usage. Only one MALL study (Kim & Kwon, 2012), which focused uniquely on L2 English, has systematically evaluated these applications. It found the pedagogy behind them to be mostly form-focused, audio-lingual and test-based in nature. Within academia, with one notable exception (see below Tai, 2012), smartphone-based MALL implementations to date have simply replicated what was done previously with PDAs, MP3 players and basic mobile phones. This includes location-aware vocabulary learning programs (de Jong, Specht, & Koper, 2010; Edge, Searle, Chiu, Zhao, & Landay, 2011; Sandberg, Maris, & de Geus, 2011; Wu, Sung, Huang, Yang, & Yang, 2011), class wikis (Wong, Chin, Tan, & Liu, 2010; Wong & Looi, 2010), vocabulary/grammar-based podcasts (Lin & Chen, 2012) and multimedia Flash-based tutorials (Anaraki, 2009).

**Phone-based Communication Applications**

Despite the ubiquity of mobile phone ownership, aside from the pioneering experimentation reported in Brown (2001), only a handful of published MALL studies involve the use of mobile phones for their intrinsic purpose as a communication device. Nearly all of these studies have been
based on the commercial Learnosity system, which allows learners using basic mobile phones to dial into an audio server and record their responses to oral prompts. Learnosity was trialed with high school students in Ireland for L2 Irish (Cooney & Keogh, 2007) and in Australia for L2 Indonesian (Robertson et al., 2009) and at university level in the UK for L2 French (Demouy, Eardley, Kukulska-Hulme, & Thorne, 2009; Demouy, Eardley, Shrestha, & Kukulska-Hulme, 2011; Demouy & Kukulska-Hulme, 2010). Independently, a similar system was developed in China for L2 English (Ruan & Wang, 2008). As part of an MA project in New Zealand (Li, 2009), students communicated via SMS with the researcher about unknown vocabulary. Only very recently has one study (Tai, 2012) systematically exploited the telephonic, Internet and multimedia capabilities of smartphones to allow L2 English learners to collect and share data and communicate with each other.

![Mobile Devices](image)

**Figure 1.2 Mobile Device Usage**

### Overall Mobile Device Usage

In sum, regardless of the type of mobile device used, over the past two decades MALL studies have focused almost exclusively on out-of-class applications. While the majority of early MALL studies were undertaken
with PDAs, overall their use accounts for less than 20\% of all mobile applications (Table 2).

Usage of PDAs has decreased in inverse proportion to the increase in the technological sophistication of mobile phones, with smartphones having now replaced PDAs completely in MALL studies. Though the exploitation of smartphones remains limited, overall the ubiquity of mobile phones of all types has made them the platform of choice, accounting for 53\% of all MALL applications. In comparison, MP3 devices represent about 12\% and e-dictionaries 8\% with the remainder of platforms either being other types of early hand-held devices or unspecified in MALL studies. CALL listserves are beginning to raise interest in the iPad and similar tablet computers, but to date only a handful of MALL implementations have experimented with them (Brown, 2012; Brown et al., 2012; Munteanu, Lumsden, et al., 2010; Munteanu, Molyneaux, et al., 2011; Yildz, 2012).

**Comparative Analysis of MALL Applications**

**Project Parameters**

As mentioned previously, there is considerable unevenness in the details reported in MALL application studies. For example, of the more than 345 published studies, only 335 identify the language area targeted, 329 the language involved, 289 the educational environment, 288 the mobile device used, etc. For no parameter does the number of MALL articles in which it is specified match the total number of published works. As a consequence, any comparative statistical analysis relating to these details can only be stated in relative percentages based on the number of studies in which they are specified, which varies from parameter to parameter. Besides the patchiness in the reporting of project details, the
statistical analysis of these parameters also has to cope with the fact that two
dozen of the works repeat study details published elsewhere (e.g., in other
conference proceedings, in articles that summarize multiple studies, etc.).
So as not to skew comparisons, only one instance of any study detail is
included in the following analysis.

While L1 applications were the first to appear, they in fact account for
less than 10% of all published MALL implementation studies. From the
very beginning, attention in MALL has been focused almost exclusively on
L2 applications.

Likewise, although MALL studies encompass some two dozen
languages, English is the target language in over 60% of these, nearly all of
which being L2 English (Figure 1.3). This focus on L2 English correlates
closely with the fact that about three quarters of all MALL implementations
have originated outside of English-speaking countries and regions (Figure
1.4). Japan and China’s Taiwan together account for 37% of all MALL
studies.

![Language Taught](image)

*Figure 1.3 Language Taught*
Figure 1.4 Countries/Regions in Which MALL Studies Have Been Undertaken

In terms of educational level (Figure 1.5), three quarters of MALL application studies have involved adults, the great majority of which were university students. Primary school and secondary pupils together account for less than a quarter of targeted language learners, with the remainder being unspecified in MALL studies.

Figure 1.5 Educational Level of MALL Learners

With regard to the content areas targeted by MALL applications
(Figure 1.6), the use of mobile devices to teach vocabulary has been the mainstay, accounting for nearly 45% of all implementations. In comparison, listening comprehension represents about 14%, reading and speaking each about half of that, i.e., 28% for the three in total. Grammar, pronunciation, writing, community building and culture make up the rest of the applications, with each representing only a small percentage.

![Figure 1.6 Targeted Language Area of MALL Implementations](image)

In line with the emphasis on vocabulary and listening comprehension, 75% of all MALL applications involve individual as opposed to collaborative learning. Likewise, some 85% of all MALL implementations have been teacher-centered and based on various kinds of content delivery in the form of SMS, MMS, podcasts, vodcasts, tutorials, quizzes, flashcards, text readings, games, etc. Learner-centered activities such as discussion forums, blogs, wikis, chats, journal writing and data collection (photos, audio, texts, etc.) account for only about 15% of all MALL applications.

**Project Orientation**

Lastly, with regard to the context of MALL implementations, it is
important to note their overwhelming short-term research orientation. Only about a third of MALL applications have actually formed part of a course curriculum, and nearly all of these as a voluntary complement. The remainder consists of pure research, limited class trialing, design descriptions, prototype testing, lab experiments and field testing (Figure 1.7).

![Figure 1.7 MALL Project Types](image)

Likewise, only about a quarter of all MALL implementations have taken place over an entire academic quarter or more (Figure 1.8). About 30% were trialed for only a week or less, with more than three quarters of these lasting less than three hours and some no more than five to ten minutes. So, too, the number of learners involved in MALL implementations has been limited (Figure 1.9). Only 8% of the cohorts consisted of more than 100 participants. Over half involved no more than 25, with well over a third of these groups consisting of no more than ten learners and some as few as four.
Learning Outcomes

Despite the large number of MALL application studies, statistically reliable measures of learning outcomes are few and far between. In large part this is due to the limited amount of curriculum implementation
undertaken, the short duration of projects and small numbers of students involved. Which is not to say that there is any shortage of claims of learning success in MALL implementation studies. However, claimed improvements in learning outcomes are beset with critical research design flaws. Over 100 studies, for example, fail to specify the duration of the experimental treatment and/or the sample size. So, too, claims of learning gains are frequently based on the subjective impressions of instructors or the self-reports of students. Rare indeed is the acknowledgement of MALL failing to deliver positive results (Brown et al., 2012; Chiang, 2012; Osman & Chung, 2011).

Analysis Summary

To summarize, MALL applications over the past two decades have been characterized by their L2 focus, most particularly on English, and directed towards adults. Pedagogically, the approach taken has been overwhelmingly teacher-centered and directed to learners working individually on targeted content areas, most especially vocabulary acquisition. The great majority of MALL implementations have been oriented towards short-term experiments involving only limited numbers of participants. As a consequence, despite near universal claims of success, statistically reliable measures of positive learning outcomes are quite limited.

Integration of MALL into the Foreign Language Curriculum

As with mobile-assisted learning in general, proponents of MALL have been heralding for many years the educational revolution that the use of mobile devices would bring. Already at the beginning of the present century it was claimed in the US that “ubiquitous computing will be a widespread force in schools by the end of the decade or sooner” (Bull, Bull, Garofalo,
For some, the coming MALL revolution had already come to fruition well before the end of that decade:

The potential value of learning via mobile devices or m-learning has been widely realized (Sharples 2000; Attewell 2002; Leung & Chan 2003). Mobile devices enhance learning experiences by enabling communications, learning on-the-move and use on an “anytime and anywhere” basis (Hardless et al. 2001; Roschelle 2003). For language learning in particular this realization also holds true. (Fallahkhair et al., 2007, p. 313)

There is an increase use of wireless technologies in education all over the world. In fact, wireless technologies such as laptop computers, palmtop computers, and mobile phones are revolutionizing education and transforming the traditional classroom based learning and teaching into anytime and anywhere education. (Cavus & Ibrahim, 2008, p. 38)

Integrating Mobile Assisted Language Learning (MALL) technology (personal multimedia players, cell phones, and handheld devices) into the foreign language curriculum is becoming commonplace in many secondary and higher education institutions. (Abdous et al., 2009, p. 76)

Such claims, needless to say, are at variance with the foregoing analysis of published MALL application studies. While it is certainly true that between 1994-2012 over 345 experimental MALL implementations were undertaken, few of these have actually been integrated into the curriculum in any substantial way and even fewer have been pedagogically innovative, let alone revolutionary.

Most notable of published MALL implementation studies is not accounts of the integration of MALL into the curriculum but rather the lack of follow-up. With regard to the published research, only the work of a dozen
authoring teams appears more than twice; almost everything else is a one-off account. Among the authors who appear more frequently, this is most often due to the same or similar papers being published in the proceedings of different conferences or subsequently appearing as a reworked journal article. Reports of short-term experimental projects have rarely been followed by evaluations of larger scale implementations. Likewise, with a few recent exceptions (Abdous, Facer, & Yen, 2012; Palalas & Olenewa, 2012), MALL implementations involving large numbers of learners over a semester or more have failed to give rise to any published sequels.

Judging by the MALL application studies published to date and especially the paucity of published follow-up implementation reports, the available evidence very much indicates that MALL remains on the fringes of foreign language instruction worldwide. A number of factors have contributed to this situation. Historically, the lack of integration of MALL into the curriculum can be attributed to technological limitations and cost factors; however, that is much less so now than ever before. Technologically, the performance of smartphones and tablets currently rivals that of full-fledged computers with regard to programmability, multimedia capabilities and network connectivity. Moreover, smartphones have already become the standard and tablet device ownership is increasingly commonplace, especially among the secondary and tertiary student population. Notwithstanding, the ubiquitous presence of mobile devices masks a critical continuing obstacle to the curricular integration of MALL: operating system incompatibility. Beyond the simplest SMS mobile phone applications, almost without exception, MALL implementation studies have been tied to specific mobile devices, which have had to be provided to students. However successful and promising, once experimental MALL projects have been completed, rare indeed is the institution with the funding

...
to purchase the required equipment for general distribution to students.

Pedagogically, it must also be said that the integration of MALL into the foreign language curriculum has been limited by a methodological approach at variance with the constructivist, learner-centered methodologies which have dominated foreign language teaching for the past 20 years. Despite the ever-improving technology, the majority of even the most recent MALL applications has remained restricted to structuralist vocabulary and grammar tutorial drill activities. As Goodwin-Jones (2011), echoing Kukulska-Hulme and Shield (2008), has observed with regard to MALL pedagogy over the years:

... for the most part uses of mobile devices were pedestrian, uncreative, and repetitive and did not take advantage of the mobility, peer connectivity, or advanced communication features of mobile devices. Most activities were teacher-led and scheduled, not leveraging the anytime, anyplace mobile environment. Oral interactions and learner collaboration were infrequently used. The problem is less one of hardware/software shortcomings and more in developers’ conceptualization of how language learning could be enhanced in new, innovative ways with the assistance of mobile devices. (p. 7)

In large part, this failure to pedagogically exploit the intrinsic communicative affordances of mobile technology stems from the excessive attention that has been paid to the use of mobile devices as a replacement for computers rather than a complement to them as a learning platform. Not surprisingly, MALL applications that use mobile devices as mini-computers, with small screens and even smaller keyboards, have mostly restricted themselves to simple drill activities, thereby limiting their integration into communicatively-based foreign language curricula.
In summary, prophetic visions notwithstanding, the widespread integration of MALL into the mainstream of foreign language instruction has yet to be realized. Technological limitations and costs have been greatly reduced, but large scale MALL implementation remains hampered by operating system incompatibility. Above all, curricular integration has been restricted by a pervasive structuralist tutorial approach which has been very much out of step with dominant learner-centered, communicative methodologies.

Conclusion

MALL has been and remains on the fringes of foreign language instruction. Its exploitation has been marginal in terms of the number of students and courses involved, the duration of implementations, the language skills targeted, the kinds of learning activities undertaken and the methodological approach used. However, as more recent and innovative implementations attest, substantial curricular integration of MALL is in fact possible when mobile devices are exploited as part of a learner-centered, constructivist, approach that provides ubiquitous access to learning resources. The extent to which MALL, in future, enters the mainstream of foreign language instruction will very much depend upon the degree to which its application conforms to best pedagogical practice and its ability to make resources available that actively foster language learning, wherever and whenever students need them. For this to happen, the hitherto narrow focus upon stand-alone MALL needs to give way to a seamless approach in which mobile devices and computers are used together to do what each does best in the fulfillment of task-based activities.

Fortunately, the necessary technology and pedagogy are already in place to bring MALL in from the fringes to the core of foreign language
teaching. As Tai (2012) has demonstrated, mobile devices can be used to integrate problem-solving tasks into the curriculum. Learners can use their mobiles as part of a classroom activity to prepare for an out-of-class task in which they use their GPS-enabled devices to collect and share Internet-based data and communicate in the L2 with each other and their teacher to obtain information and guidance. This can be done using a range of generic devices (phones, media players, tablets, etc.) independently of operating system. On their return to class, learners can review and compare the resources they have collected and discuss their solutions, thus generating authentic interaction and negotiation of meaning among language learners. Taking Tai’s initiative one step further, web-based programs, accessible via mobile, portable or desktop devices, can be used to collect, manage and further exploit resources through online databases, and communication affordances like blogs, wikis, and social networking sites. The creation of such a ubiquitous technology-enhanced learning environment is possible now. What is needed to bring about this transformation is a synthesis of available technology and innovative pedagogy into a coherent program of instruction.

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Chapter 2: Emerging Pedagogies for MALL

Agnieszka Palalas

Athabasca University, Canada

Debra Hoven

Athabasca University, Canada

Abstract

Mobile-assisted language learning (MALL), alternatively viewed as mobile language learning (MLL), reflects the redefined relationship between language learning, technology, and pedagogy. Mobile digital technologies have transformed how we use and learn language. MALL, which both differs from and builds upon CALL, brings about distinctive affordances and challenges which necessitate a shift in language pedagogy. Consequently, the roles of the language learner and teacher transform to include innovative strategies, tools, and contexts. New pedagogies of MALL are bound to emerge and provide a foundation for successful language learning. This chapter discusses the key pedagogical shifts brought about by mobile language learning and how they affect foreign and second language teaching. The key shifts that influence the process of m-learning and learning-teaching relationships encompass aspects of location, context, time, tools, learning/teaching approaches and modes, social interaction, personalization, and gamification, among many others. All of them are addressed in this chapter.

Keywords: Mobile-assisted language learning (MALL), mobile language learning (MLL), computer-assisted language learning (CALL), pedagogical shifts, pedagogy of MALL, 21st century learner, innovation
Introduction

Mobile-assisted language learning (MALL) is still a new field. While the number of MALL practitioners and researchers has been increasing, most language teachers do not have a very clear understanding of what it can offer or what pedagogical approaches are possible in the new mobile language context. As mentioned in the introduction to this volume, MALL can engage 21st century learners who display changing needs, habits, and preferences, in previously unexperienced language-rich contexts. MALL, or mobile language learning (MLL), reflects the redefined relationship between language learning, technology, and pedagogy. Mobile digital technologies have transformed how we use and learn language. New pedagogies of MALL are bound to emerge and provide a foundation for successful language learning.

MALL learns from CALL but cannot be considered as merely a subset of CALL. The distinctive affordances and challenges of MALL necessitate a shift in language pedagogy that consequently transforms the role of the language learner and teacher who now require innovative strategies and tools. This chapter discusses the key pedagogical shifts brought about by mobile language learning and how they affect foreign language (FL) and second language (SL) teaching. As language teachers strive to offer their foreign language learners (FLL) more authentic content, including natural speech and context-embedded language, mobile devices are coming into more common use. At the same time, teachers can provide their second language learners (SLL) with more accessible and meaningful language learning and practice opportunities. Technology, particularly in the form of audio and video, has played an increasingly important role in these endeavours, while also providing opportunities for individual practice and
informal learning.

Before moving on to a more detailed overview of the ways in which MALL is changing LL pedagogy and how this both differs from and builds upon CALL, it is important to explore some of the CALL derivations of MALL and the emergence of mobile language learning and teaching as a new field.

From CALL through M-Learning to MALL

Since the early 1980s, digital technology, characterized by the advent of personal computers, has increasingly been a key component of foreign and second language teaching and learning. With computers evolving in their capabilities, size and form, language learners can now choose from a variety of handheld, portable and even wearable devices to support their language acquisition. The arrival of mobile devices and cloud computing has brought about powerful networked “pocket computers” with capabilities that dwarf the computing power of 1969 that was used by Apollo 11 to land the first humans on the Moon. Mobile learners have now replaced their desktop computers and laptops with mobile devices that better match their “roaming” life styles and ICT preferences. They have advanced from CALL to MALL, or simply mobile language learning (as proposed by Palalas in the Introduction to this volume, Palalas and Hoven in Chapter 2, Kukulska-Hulme in Chapter 5), which represents a shift that is much more than merely applying a wider range of more advanced digital tools to assist them in their learning.

Admittedly, the toolbox of language learners and teachers has expanded

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considerably over the last three decades, potentially enabling new and improved teaching-learning strategies. However, it is important to remember that technology of and by itself does not produce enhanced educational results. A computer cannot make a teacher or learner better without some form of human intervention; nor can technology by itself improve learning. The role of human factors, including the selection and application of technologies, content and learning activities that would support and mediate learning, cannot be discounted. This was aptly observed by Jonassen (1992) over two decades ago:

Technologies do not directly mediate learning. That is, people do not learn from computers, books, videos, or the other devices that were developed to transmit information. Rather, learning is mediated by thinking (mental processes). Thinking is activated by learning activities, and learning activities are mediated by instructional interventions, including technologies. Learning requires thinking by the learner. (p. 2)

In other words, the learner frequently requires the teacher to intervene and promote thinking. Even the most innovative tools will not replace the expert pedagogy and orchestration of learning that is brought to the process by a good, tech-savvy teacher. Regardless of the technology under discussion, digital media and technology do not directly affect learning, but rather provide ways of accomplishing tasks (Clark, 1983, 1994), particularly new tasks in new environments. However, innovative technologies can often provide users with opportunities to complete tasks in new, more efficient ways, which in turn might result in improvements to learning (Simonson, Smaldino, & Zvacek, 2015). While technologies can enhance access to resources, connections to others, and aid in forming
communities leading to co-creation of knowledge, the pedagogical issues deserve attention before educational technologies are considered.

In the words of Thomas, Reinders, and Warschauer (2013), CALL serves as a vantage point “from which to explore more established educational practices in language learning” (p. 4). In their discussion of contemporary CALL, the authors assert that CALL offers evidence-and research-based best practices in terms of pedagogy, design, development and practice of second language acquisition and language learning. They then further elaborate that CALL technologies advanced to include mobile tools, allowing for more interactive and collaborative environments, and consequently a purposeful departure from the behaviourist principles, which characterized the first one of the three phases of CALL (Chaka, 2009; Warschauer, 1996; Warschauer & Healey, 1998), namely behaviourist CALL. In this first behavioural phase, the computer served as tutor, with the focus on drill-and-practice activities.

This was followed by the communicative phase, which offered a higher degree of student control and interaction and relied mainly on cognitivist/constructivist theories. Subsequently, the third phase, integrative CALL embraced the capabilities of networked computers along with multimedia and the Internet; a greater socio-cognitive perspective was offered, encouraging the integration of the four language skills with the use of technology in real-world social contexts.

Consequently, CALL reinforced the communicative approach to language teaching, emphasizing the usage of language for communication and negotiation of meaning rather than merely teaching vocabulary and grammar, and providing instruction about language. It also supported the transition from teacher to more learner-centered pedagogy as well as distributed language practice whereby learners are able to interact with web-
based learning resources, even when not under direct face-to-face guidance of their teachers. As observed by many authors (e.g., Hoven, 2006, Thomas et al. 2013), contemporary CALL aims at interactive technologies, multimedia, game-like quests, problem-based learning, intelligent and adaptive applications for feedback and assessment, web-based synchronous and asynchronous communication, more learner-centric approaches resulting in heightened engagement and motivation, and decentralized democratic attitudes that promote collaboration, sharing and self-directed participation. CALL now takes a more holistic pedagogical stance, encouraging learners to develop all four language skills along with socio-cultural competencies and 21st century skills. In addition, it promotes learner-centered pedagogies that facilitate the development of higher-order critical thinking skills in the context of authentic open-ended problem-based tasks that often necessitate both communicative competencies and creativity. Furthermore, CALL researches and applies principles of gamification, edugames, virtual worlds, learner analytics and other innovative educational practices in ways that respect the needs and preferences of the 21st century learner.

To better serve these new, highly digital citizens, language education should focus on preparing learners for the connected world and communication spanning contexts and modalities. Contemporary language learning environments can thus benefit from the implementation of constructivist collaborative learning supported by mobile technologies and the social web, which is increasingly accessed through portable devices.

These technologies enable a more participatory approach with learners as

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According to the statistics of We Are Social from January 2015, the share of global web traffic represented by mobile device usage had increased by 39% over the same time in 2014, with one-third of all web pages now served through mobile phones. The mobile share of the web also varies considerably around the world; mobile phones account for 72% of all web pages accessed in India and 89% in Papua New Guinea. SOURCE: We Are Social's new Digital, Social and Mobile in 2015-http://wearesocial.net/blog/2015/01/digital-social-mobile-worldwide-2015/.
“active agents and users of the target language” (Thomas et al. 2013, p. 7), while being engaged in truly communicative practice (Palalas, 2012). Furthermore, in his discussion of the role of mobile technologies in language learning, Stockwell (2012) posits that with the advent of truly mobile devices, distance language learning and CALL have taken one step further into a new phase of CALL.

We propose, however, that MALL, or more accurately, mobile language learning, provides a unique framework. The interplay of pedagogical and technological innovations embodied in MALL has engendered a variety of conceptual ideals and innovative strategies that are unique to MALL and thus not applicable to non-mobile uses of digital technologies. Accordingly, MALL should be viewed not as a subset but rather an extension of CALL that comes with its own characteristics, affordances, opportunities and limitations, just like an offspring that inherits many yet not all features of the parents and evolves into a distinctive organism. While MALL, as a successor of CALL, should learn from CALL and its latest directions, mobile learning needs to leverage its own affordances and contexts; it needs to advance and develop by means of research and experimentation to offer language learning for mobile teachers and learners.

MALL offers its own character and framework as it addresses distinctive behaviours, attitudes, habits, and actions displayed by mobile learners while using digital technology to access resources, interact with content, connect, communicate, and collaborate. The mobile learner is the pivotal element of the m-learning ecosystem. Mobile learning is not synonymous to learning with mobile devices. Mobile technologies are necessary but not sufficient for successful mobile learning to occur. M-learning is about the experience and outcome that is enabled by any technology or interplay of
technologies that afford mobile learners with the construction of knowledge or acquisition of skills across various contexts. It is enriched by social interaction as noted by Crompton (2014) in her definition of m-learning as “learning across multiple contexts, through social and content interactions, using personal electronic devices” (p. 8).

M-learning thus draws on the attributes of enhanced mobility and flexibility that are enabled by portable devices and cloud-based networks. The notion of mobility across time and space (location) is central to mobile learning (Pachler, Bachmair, & Cook, 2010; Palalas, 2013; Woodill & Udell, 2015). As a result of more than a decade of m-learning research and discourse, the definition of mobility has evolved to embrace mobility in (1) physical space, (2) technology, (3) conceptual space, (4) social space, and (5) learning dispersed over time, with context being the “overarching term to cover interrelated aspects of mobility” (Kukulska-Hulme et al. 2011, p. 159). Mobile learners can navigate through physical space and alternate between location-bound or location-flexible learning. They can engage in place-independent activities, such as listening to podcasts or in context-sensitive (context-dependent) and location-aware options where knowledge is built using information embedded in the particular setting (such as the case of museum tours or wildlife observation tasks). Alternatively, they can blend various learning strategies, activities and episodes across the temporal, physical, pedagogical, transactional, and technological spaces (Palalas, 2013). To broaden the definition, m-learning and its advantages can be also viewed as bridging the following: creation with sharing of content; learning for work with learning at work; individual and social learning; informal and formal learning (and their contexts); and finally, bridging a variety of learning theories and strategies with each other (Pimmer & Pachler, 2014).
These characteristics of m-learning thus lead to a unique approach to FL and SL learning and teaching. Mobile-assisted language learning or mobile language learning is characterized by a number of distinctive shifts, which are addressed in the subsequent section.

**Shifts in MALL Pedagogy**

MALL has expanded the contextual and interactional dimensions of language practice and use. The distinctive characteristics and nuances of MALL bring about specific affordances, benefits and challenges that are quite different from those of CALL and from more traditional approaches to language teaching and learning. The key shifts that impact the process of mobile learning (not only mobile language learning) and learning-teaching relationships encompass aspects of location, context, time, tools, learning/teaching approaches and modes, social interaction, personalization, and gamification, among many others. These are discussed in more detail below.

**Location of Learners and Teachers**

Both of these groups are mobile and can therefore enter into their roles and tasks at various times and places; teachers and students can collaborate and communicate both face-to-face and virtually, thus expanding the time and place boundaries of their interaction. They can also incorporate teaching and learning into their lives in a more fluid and dynamic manner, which would allow for self-selection of best learnable moments and improvement of total time-on-task. This potential flexibility can result in optimized scaffolding and access to language resources, practice, and supports, especially authentic language practice and feedback. It can afford on-demand and just-in-time expert intervention and feedback. In addition,
learners can access more experts and receive support from more than one
teacher. This novel mobile learning relationship may require strong self-
directed learning and metacognitive skills as well as time management
skills. It may also result in unrealistic learners’ expectations, as in seeking
24/7 teacher support.

Location of Learning

Directly related to the mobility of the learner and teacher is the change
in the place of learning. Mobile learning expands learning outside the
classroom, encompassing new environments and places. Instead of bringing
simulated real-life language practice into the classroom in the form of role-
plays, recordings, movies, computer-based activities or simulations, mobile
language learners (both SL and FL) can now shift their language activities
into the real world that speaks the target language. Learners and teachers
can use their mobile devices to mediate that process by accessing resources
and supports necessary to engage in authentic communicative situations. In
their communicative activities, learners can leverage information offered by
the location and other speakers of the language who are part of the language
situation, whether face-to-face or mediated through their devices. They can
thus engage in location-dependent and location-aware tasks (for instance,
using GPS, QR codes, online information in various formats, or
conversation with a passer-by). Location-independent learning activities,
on the other hand, provide the flexibility of learning anytime, anywhere. It
is important to bear in mind that not all activities are appropriate for any
time or any place and hence there are some limitations to the ubiquitous
nature of m-learning (Palalas, 2015). Privacy issues come into play in
some contexts, such as on public transport or at bus or train stations. Many
learners (and teachers!) may feel embarrassed at the possibility of making
mistakes in the target language, or discussing personal information in locations where they could be overheard. In such cases, personal safety could also be compromised. Hence, for instance, as Demouy and Kukulska-Hulme (2010) observed, interactive speaking activities were unnatural and not necessarily successful in public places when surrounded by people or when learners were simultaneously involved in other activities-students would rather look for quiet spots. Overall, MALL offers flexible-place language learning that opens a range of possibilities, while also requiring purposeful design of language activities and selection of appropriate location in order to optimize the learning process and outcome. Location of learning should be concurrently considered with other dimensions of the learning context, including time and circumstances, to offer optimal learning experiences (Palalas, 2013).

**Context of Learning**

The shift in the learning context draws on both the mobile location and time afforded by innovative technologies. Following the discussion by Hoven and Palalas (2015) of ecological constructivism offered in this volume, context is viewed as a multi-directional interplay of elements of physical location and time, combined with the interaction of the actors of the learning transaction, as well as other enabling and limiting circumstances. The contextual affordances resulting from the interplay of these situational factors can provide unique linguistic and socio-cultural information that enables individual and collaborative learning. In keeping with Jonassen’s (1992) observation that constructivist learning environments “should support multiple perspectives or interpretations of reality, knowledge construction, context-rich, experience-based activities” (p. 137), mobile learning contexts offer an unprecedented variety of information-rich learning scenarios.
to choose from. Mobile learning also allows for drawing from resources from different locations and combining contexts according to the needs and preferences of learners.

Situated practice as described by Lave and Wenger (1991), is one of the key benefits of near-ubiquitous, pervasive m-learning across real-life contexts. Contextualized m-learning is enriched by the authenticity of the communication challenge, real-life feedback, and the information available in-situ. With the help of mobile technologies, mobile language practice can now support real-world language events with virtual resources and scaffolds, thereby leading to fulfillment of the plea of CALL “to produce more effective spaces for our learners” (Thomas et al., 2013, p. 9). Embedding learning in information-rich contexts and augmenting language resources on-demand (using location-aware information via mobile devices) expands learning spaces to offer unparalleled language input followed by more engaging negotiation of meaning, comprehension efforts, and eventually-output. Reducing the separation between learners and learning events leads to a lessening of both the psychological (Stockwell, 2012) and the physical (transactional) distance between the two (Fuegen, 2012). Real-life feedback and reflection in close spatial and temporal proximity to the learning event can help learners interpret the context and language exchange in which they are participating. Moreover, this proximity affords authentic tasks in real-world environments that learners can relate to (Thomas et al., 2013). At the same time, such real-life challenges may bring about unexpected fear, anxiety, and other strong emotions, which also should be factored in, when designing mobile language learning. Informed decisions have to be made by SLL and FLL experts (teachers) to blend virtual worlds with real-world contexts in a way that promotes meaningful language learning.
Time of Learning

As mobile time of learning is an integral component of the larger context of learning, many characteristics of this have already been highlighted above, in relation to the shift of location and context of m-learning. In addition, the mobility of time further expands the learning process, blending formal with informal learning, scheduled and impromptu learning, and “interstitial learnable moments, time-bound events, as well as extended periods of learning” (Palalas, 2013, p. 92). Both time-flexible and time-bound activities can occur as “brief event[s], a series of learning episodes, a lengthier activity, or a combination of the three types (Palalas, 2013, p. 91). Hence, a learning activity can extend across time and be paused whenever necessary and then restarted at another learnable moment-learners can choose these moments or be guided to them through directions or instructions conveyed via their mobile devices. They can “negotiate time confinements and continue certain learning activities seamlessly throughout the day” and consequently better use “their interstitial time and space to learn” (p. 92). Having said that, separating private and study time is yet another issue that calls for guidance from an expert.

Tools Used for Learning

The capabilities of ever-advancing mobile technologies are the foundation of learning across contexts and boundaries. These enabling technologies include portable and wearable mobile devices; their builtin functionalities and tools in combination with their ever-growing computational power; mobile/cellular and wireless connectivity and access to the Internet and the cloud; social networks; other mobile software
capabilities, including a variety of mobile apps; as well as the supporting infrastructure. The level of flexibility of m-learning is directly dependent on the available tools-their combination and specifications (e.g., memory capacity, speed, and bandwidth of connection). Certain m-learning possibilities available to learners in the urban areas of developed countries are out of reach for learners in less well-served socio-economic contexts. For instance, learners using feature or basic phones might have to rely solely on the SMS functionality of their devices compared to learners with fully loaded smartphones who can instantly create and share multimedia files or contact their teachers through the Internet. For such instant connection to occur, users need appropriate data plans, which for some creates a major cost barrier (one of many barriers that stem from limited access to mobile tools and infrastructure).

Where the necessary connectivity is available, the arsenal of MALL tools is much richer than when relying solely on the offline mobile phone or tablet capabilities. Generally, some of the most innovative and popular m-learning applications for smartphones include built-in multimedia tools (such as camera, audio and video player/recorder, text-to-speech), apps (including chat, dictionaries, flashcards, vocabulary games, audiobooks, podcasts, e-portfolio, story creation, social media, note taking, mind maps), location-aware solutions such as Augmented Reality (AR), GPS, QR codes, beacons\(^\text{\textregistered}\) (iBeacons\(^\text{\textregistered}\)) and many other applications that support the capturing of multimedia content, the creation, communication, rehearsal, communication, and exchange of resources, as well as content delivery.

\(^{\text{\textregistered}}\) Beacon – a Bluetooth Low Energy (BLE) devices that broadcasts its identifier to nearby mobile devices allowing them to listen for signals from beacons in the physical world and perform actions when in close proximity to a beacon. For more information go to http://www.ibeacon.com/what-is-ibeacon-a-guide-to-beacons/.
While mobile technologies are the *sine-qua-non* of m-learning, an increasing number of m-learning tasks are designed to be cross-platform and can be completed using a blend of mobile and non-mobile devices. Alternating computer and mobile software to develop, publish, and share artifacts is but one example. Once again, the decisions about what tools to use and how, should be made by expert m-learning teachers, as the success of the learning process heavily depends on the right blend. Teachers have to ensure that proper technologies are used in a purposeful way with a thoroughly considered strategy in mind. In their m-learning curriculum, teachers must also consider the caveats of mobile technology use discussed in more detail in the introduction to this volume. The key factors to be cautious of include designing for a fragmented learning process, unequal access to mobile tools, the need to monitor learning across various platforms and devices, prejudices against using technologies, and inadequate knowledge of mobile learning tools and methods amongst both learners and teachers.

**Approach and Strategies of Teaching and Learning**

As learning contexts are being increasingly enriched by information and the tools available to manipulate that information, the repertoire of teaching and learning strategies has significantly expanded. A variety of learning theories and teaching approaches have been discussed in mobile language learning literature (Burston, 2014; Kukulska-Hulme & Shield, 2008; Pegrum, 2014) with more active, learner-centered methods and constructivist paradigms entering the language classroom. A shift toward an eclectic approach to pedagogy allows for the selection of the right approach for the right outcome and context, for learners and learning, often resulting in a “mash-up” of pedagogical approaches.
As learners are exposed to a wider range of resources, learning spaces and tools, if not appropriately scaffolded and supported, they are often overwhelmed by the amount of information and ever-changing digital literacy requirements. When offered more learning opportunities and shared control over the learning content and process, learners are faced with greater responsibility to manage their learning effectively. Consequently, mobile learners may have to exhibit higher levels of self-regulation, which does offer learners’ choices and, at the same time, may involve goal setting, self-monitoring, self-assessment, and coordination of mental functions, self-efficacy, and help seeking (Schunk, 2012). In this era of more learner-centered and participatory approaches to pedagogy, learners still need the guidance of subject matter experts and teachers who can direct them to valid content and the optimal learning strategies for their particular needs. The teaching-learning relationship has been shifting toward “a greater equality of control over the design of learning” (Beetham & Sharpe, 2013, p. XVIII) and the individual learning path. Even though the locus of control might be gradually shifting, this does not mean the elimination of experts (teachers) who are qualified to optimize learning, but rather, a shift in roles and responsibilities. Despite the fact that “mobile devices can support self-directed learning and language learner autonomy, the role of teachers [remains] important” (Kukulska-Hulme, Norris, & Donohue, 2015, p. 3). The shift in teaching and learning approaches is discussed in more depth in the Pedagogy of MALL section below.

New Perspectives on Participatory and Collaborative Learning

New forms of collaboration, involvement, and sharing are being made possible to the connected learner. The Internet coupled with social media tools and practices are as much part of the educational ecosystem as they are
part of daily personal and professional activities. These practices include a mix of synchronous or delayed interaction and exchange of feedback; impromptu sharing and negotiation of meaning and experiences; co-creation and distributing of information, ideas, and artifacts; connecting at a distance through micro-communicating and micro-blogging; and more frequent and dynamic communication. In addition, the exchange and mediation of learning is made possible in continuous and rapid cycles, such as a conversation using Snapchat\(^1\). As a result, the reduced transactional distance (Moore, 1993) and decreased isolation both for learners and teachers, coupled with the feeling of belonging to a networked community and the repetitive character of the language activity, can generate a less threatening environment. Such an environment can encourage communication and active participation in conversation or co-creation of language artifacts. The participatory culture of this mobile-enhanced era, exemplified by social networked or crowdsourcing activity, is reflected in the way people communicate and use language. This new form of culture and activities together seem to be bringing about shifts in language usage, both in terms of the language that is used and how and where it is used.

Overall, mobile tools encourage higher levels of participation leading to more frequent, although often fragmented, communication and exchange of opinions and resources, including learner-created artifacts. They also enable communities to stay in touch across disjunctions of time and location, allowing for both synchronous and asynchronous communication and mediation of learning, including more frequent and relevant opportunities for knowledge co-creation. Communication via social network platforms tends to be unstructured, more fluid, sometimes even chaotic and unpredictable.

\(^{1}\) Mobile app supporting dynamic conversation through photos, videos, and captions; https://www.snapchat.com/.
However, if used properly with guidance from a facilitator, the social networks and mobile tools through which users connect can enrich both learning at a distance and in the classroom.

**Mobile Social Interaction**

This is an aspect of participatory m-learning that deserves separate discussion. Social interaction by means of mobile devices is a pervasive practice that stems from the customary use of mobile devices as the gateway to social networks; a practice that shapes the pedagogy of m-learning. New social behaviour patterns have emerged with the growth of social networks to the extent that now they are affecting the way people communicate, socialize, and learn. According to Dron and Anderson (2014), social software helps build communities; assists in creating knowledge; engages, motivates, and is enjoyable; encourages debate, cognitive conflict, and discussion; encourages active learning; supports creativity; addresses both individual and social needs; builds identity, expertise, and social capital; advances current models of ownership and identity; and is also easy to use, amongst many other benefits (pp. 15-24). Social media interaction influences the way people mediate symbols and express their thoughts. Text is more often augmented by multimedia artifacts, with images and video gaining in popularity as modes of expression. This consequently has had an effect on the language that is taught and how it is taught. Keeping in mind that the broad adoption of social media tools might have both positive and negative effects on human interaction, social network systems undeniably provide a powerful forum for participatory and collaborative learning.

**Personalization of Learning and Learning Environments**

M-learning allows for learning designed around learners’ charac-
teristics, needs, and habits. In the PALLAS system (Petersen & Markiewicz, 2009), for example, content delivery was adjusted based on the learner’s age, proficiency level (dynamically), interests, native language, and courses taken. It was also dynamically adapted to the context of learning, including location, time, device, and even weather. Apart from the personalization of the time and place of learning, learners can use their mobile devices “to do personal publishing and sharing from anywhere, anytime” and to construct their own “educational activity through the use of web-based applications and social media to create personal and authentic communities of learning” (Brown & Mbati, 2015, p. 122). They can also select the content and resources that are relevant to them at a particular learnable moment—a selection derived from a learner’s dissonance gap or need to know or understand at that particular time. The interplay of learner-centeredness and personalization aspects of MALL further enhance the authenticity of the learning experience, as noted by Alm (2015) in her discussion of technology-mediated task-based listening. Alm observed that new language education requirements necessitate authentic input, authentic listening, and authentic response, in which “authenticity relates to the material itself and further to the meaning it holds for the learner” (p. 40). She continued that as listening is a subjective experience, authenticity can be achieved by means of personalized material choices combined with individual listening strategies and reflective responses to podcasts.

Furthermore, learners’ personal mobile devices adapt to the users, their preferences and habits, thus providing a highly customized interface, content and even some aspects of functionality. Mobile users consider their devices highly personal and private—a point well demonstrated by their reluctance to share their phones, compared to a much higher degree of willingness to share laptops or desktops. Learners therefore rely on their
mobiles and trust them as a *personal* technology. Although, there has been some hesitancy among students to use mobile devices for educational purposes, this forms less of a barrier today as mobiles have been entering progressively more educational settings. Learners perceive the mobile channel as an acceptable way to receive reminders, notifications, and personal messages, which may enhance one-to-one and one-to-group communication. Moreover, the personalization of the mobile tool results in a decrease in the gap between technology and the learner who now relies on the familiar and uncomplicated, function-oriented device for facilitating interaction (Fuegen, 2012). Finally, this may also lead to higher levels of ownership of the learning content and process. Overall, personalization of learning might result in increased learner motivation, engagement, and self-direction. These possibilities should thus be reflected in the design of mobile language learning.

**New Perspectives on Games and Gamification**

The positive effect of incorporating game elements in language learning has been observed in face-to-face, online, and now also mobile learning settings. Games can be designed and delivered digitally using multimedia graphics, interactive characters and automated score keeping, or they can be conducted in a classroom with simple interactions and engagement (Kapp & Coné, 2012). Digital or traditional, games can promote learning if they are designed as a purposeful element of pedagogy, incorporated into a meaningful instructional design aimed at specific learning outcomes, such that the games “are not a break from learning – they are learning” (Kapp & Coné, 2012, p. 3). Digital games so designed are based on the premise that players need to learn, memorize, collaborate, explore, or obtain additional information in order to progress further in the game (Felicia,
Game-based learning promotes intrinsic motivation, learning through enjoyment and fun, authenticity, self-reliance and autonomy, as well as experiential learning (Perrotta, Featherstone, Aston, & Houghton, 2013). Likewise, gamification uses “game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems” (Kapp & Coné, 2012, p. 2). Mobile language games, such as vocabulary games (see Chapter 13 in this volume) or AR place-based games (Perry, 2015), are often designed to provide personalized on-demand experience, contextualized language examples, faster and more dynamic interaction, and opportunities to apply creativity, while generating or capturing language artifacts. Mobile language games and gamified tasks (such as a scavenger hunt) may blend virtual world contexts with the real-world, thereby augmenting or even replacing virtual world, simulated language practice with experiential and discovery learning in real-world communicative situations. Context-independent mobile-based language games and simulations are still an important part of the equation, with their role being preparatory, for revision, or focused on a particular objective or competence as opposed to being an integral communicative experience. The gamification of mobile language learning is a student-centered approach that takes advantage of the experience, habits, and preferences of 21st century learners, and suits the way they communicate, collaborate, and learn. It is essential for mobile language teachers or designers, therefore, to be cognizant of gamification elements and effective design guidelines, so that they can create an immersive, meaningful learning experience that engages and facilitates learning.

Other Pedagogical Shifts

Other shifts engendered by the interplay of the mobility of the context,
learner, teacher, and the mobile technology include the following:

- **Mobile learning experiences**: the learning process tends to be more dynamic yet fragmented. Bite-size pieces of content and the episodic character of the learning activity enable on-the-go learning. However, at the same time, it is essential that they be woven seamlessly into meaningful practice. This requires not only new learning and metacognitive strategies that should be brought to students’ awareness, but also integration at a curricular level. This, in turn, necessitates a shift in pedagogical approach to accommodate such learning and integrate it into the system of learning opportunities made available to learners.

- **Increased responsiveness, time-sensitivity, and immediacy**: a key element of the changing learning experience, the speed of access to resources and experts has undeniably increased. This has enabled just-in-time information and feedback, leading to more relevant learning and instantaneous feedback, when needed. However, the downside of this increase and the potential for immediacy is that it may also lead to rising expectations on the part of learners for nearly synchronous response or feedback, without respect for the circumstances and preferences of others. Therefore, while it is indeed essential to design m-learning in a way that leverages the potential of swift and timely response, clear time limits and guidelines should be part of any MALL solution.

- **New roles and identities**: students are not only expected to be
more active and productive in the teaching-learning transaction, but they are also given more control over their learning path, the design of their learning materials (often created by students under the expert watch of the teacher), and their learning environments (e.g., mixing virtual and real-life activities). As noted by Alm (2015), “putting learners in charge can create natural listening and speaking situations and lead to natural language use” (p. 43). Most importantly, it can lead to increased engagement and motivation. While varying patterns of participation have been observed amongst mobile language learners, latest MALL research reports higher levels of learner engagement. In fact, the locus of control has been shifting toward higher degrees of learner input as noted by Cochrane et al. (2015) in the discussion of how mobile social media enables creative pedagogies that progress on the “Pedagogy-Andragogy-Heutagogy continuum” (p. 3). New roles and technology-enabled contexts may engender new identities, both online and offline. This might have a positive impact on learner agency but also requires both learners and teachers to be prepared (through formal and informal efforts) for their new roles.

- The amount and location of information and resources: the wealth of materials accessible on-demand adds a new dimension to the learning experience; yet it also necessitates scrupulous selection and validation of the materials, and criteria on which to evaluate the fit, effectiveness, and usefulness of such materials.
• Reaching the hard-to-reach and the disenfranchised: with mobile devices being accessible to individuals and groups who, in the past, were disconnected and isolated, m-learning can empower them with literacy and other essential skills. For instance, the BBC Janala\(^1\) project, serving over 26 million Bangladeshi, provides English language lessons through mobile phones and a combination of other media to increase learners’ chances of a better future (Palalas, in press). Similarly, the MASELTOV project (MASELTOV, 2015) targets marginalized migrant populations with low literacy and uses an app-style program based on busuu.com to assist them with informal language learning. Mobile technologies can reach populations that could not be reached by any other technology and serve the underserved.

Overall, new mobile hardware and software has expanded learning beyond spatial, physical, and conceptual barriers of CALL, thus allowing earlier pedagogical goals to be reached and new ones to be generated. Computer power grows exponentially, doubling approximately every 12-18 months (Moore’s Law). Does the way we use computers for educational purposes double up in power every year? Before we discuss the role of the teacher in MALL, it is important to take a closer look at the pedagogy of MALL.

**Pedagogy of MALL**

Researchers agree that m-learning has a potential to become a catalyst

\(^1\) http://www.bbcjanala.com/.
for new pedagogies which are needed to respond to the needs of the 21st century learner (Cochrane, et al., 2015; Herrington et al., 2009). Although a behaviourist, teacher-centered, transmission model of instruction might still prevail in some areas of MALL (Burston, 2014; Kukulskas-Hulme & Shield, 2008), mobile language learning is “equally capable of supporting more innovative constructivist, collaborative, learner-centered instruction” (Burston, 2014, p. 344), and even to go beyond the existing pedagogical approaches. This requires an ontological shift and reconceptualization of the role of the teacher, the learner, and the tools that would result in changing “entrenched pedagogical cultures rather than focus upon developing mobile accessible content that does not necessarily result in pedagogical change” (Cochrane, et al., 2015, p. 3), or even worse, creating mobile apps because we can or because it might be easy to do, with little or no thought for the pedagogical implications for the learner or the field.

Pedagogy is fundamental to successful learning and it should be underpinned by carefully selected learning theories and thorough understanding of the needs of the target learner. New scientific discoveries combined with changing learner needs, opportunities, contexts and tools require reconsideration of the pedagogical practices that underpin language education. What do pedagogical practices stand for and how do they relate to learning? Drawing on Beetham and Sharpe’s (2013) discussion of the meaning of the term “pedagogy” in the 21st century, pedagogy is viewed herein “in the original sense of guidance-to-learn; learning in the context of teaching, and teaching that has learning as its goal” (p. 2). Pedagogy, hence, refers to teaching practices, tasks and responsibilities, including selected methods, strategies, values, and beliefs. It also encompasses scholarly discourse amongst educational practitioners as well as the design
and orchestration of learning. Altogether then, a learning environment comprises the essentially intangible conflux of teachers, learners, physical resources, “soft” technologies and the networked interplay among all these in which learning takes place. To elaborate on these terms as used here, teachers’ pedagogies, beliefs, values, and roles interact with learners’ needs-driven goals, or informal and non-formal interests, and their competencies, learning styles and strategies. This interplay also takes place with and within an environment comprised of technologies (of which mobile and wearable devices are but one aspect) and libraries, as well as virtual or “soft” technologies represented by software, mobile apps, internet facilities, as well as crowd and cloud-based resources.

The field of language pedagogy is multifaceted; it has “developed as a disorganized, multipronged and often contradictory collection of notions and practices” (Davies, Otto, & Rüschhoff, 2013, p. 19) that now give emphasis to the social dimensions of language learning. The shift towards more social presence in the often digitally connected community of learning frequently empowers and motivates learners. However, at the same time, it can be overwhelming and lead to somewhat diluted learning experiences that require better-defined learning goals and paths than are often available to learners. Guidance, support, and feedback from pedagogy experts are as essential in MALL as they have ever been in any learning ecosystem. The paradigm shift engendered by MALL is characterized mainly by a change in the proportional involvement of teachers and learners—and even incidental L1 speakers as resource persons – in learning events. The time-place-channel of learning support and mediation is also shifting more to peers and other teachers/experts located “elsewhere”, whereas increasingly the role of teachers includes the management or co-management of the dynamic “distributed” learning of individuals and groups. Teachers now have new
responsibilities but also multiple new opportunities to leverage innovative technologies in novel learning environments and thereby better meet ever-changing learner needs.

As noted by Hoven (2006) almost a decade ago, the newer technologies of CALL allowed for innovative pedagogical approaches that could be employed to achieve new goals, which consequently entailed a shift “in the very exciting direction of intentional, flexible, active, experiential, learner-shaped pedagogy” (p. 236). MALL has taken this shift to a new level offering previously unexperienced learning contexts and architectures as well as pushing forward with a facelift for learning methodology frameworks.

According to Wheeler, (2015) “[p]edagogy in the digital age is profoundly social, involving the negotiation of meaning and the co-construction of knowledge. It is about learning together” (p. 28). While traditional models of language teaching were anchored in the transmission-oriented paradigm, newer models are being shaped by constructivist theories of learning and more participatory student-centered approaches to teaching-and even to instructional design. For instance, the socio-cultural approach has sought, for some time, to integrate language learning and technology with collaborative discourse, learner-centered, task-based, and authentic-content strategies (Felix, 2003; Kern, Ware & Warschauer, 2004; Palalas, 2012).

As presented in the section on pedagogical shifts, learning with mobile devices adds a richer repertoire of tools, contexts, and resources, as well as changing roles of people and technologies. It redefines some of the existing pedagogical methods. For example, situated learning (a concept that originated in the 1980s), places the mobile learner in real-world communicative events, facilitating authentic practice and discovery/inquiry-oriented language exploration. Both foreign language and second language
learners can employ mobile functions and apps (e.g., AR apps such as ARIS) to practice location-enabled language tasks that enhance their comprehension and communication skills, and eventually can replace more traditional role-playing techniques. The device serves as a tool for producing learner-generated dialogues, as the interlocutor, and as a communicative event support. Tethered computer simulations and desktop games of the CALL era, which hindered continuous practice and limited the user’s experience due their less interactive design, are now replaced with cross-device multimedia games and challenges that are portable and customizable. Well-designed language apps and games also afford a shared experience and integration with the learner’s social network activity. Mobile learning pedagogy can thus “harness students’ motivation to socialize and connect with peers by guiding, not limiting, communication, and collaboration” (McQuiggan, McQuiggan, Sabourin, & Kosturko, 2015, p. 104).

Pair and group activities can now be supplemented by interactive pair and group work that extends across former barriers of time and place. These collaborative activities benefit from a combination of mobile multimedia tools that support synchronous and asynchronous communication, as well as easier language artifact co-creation and exchange. MALL pedagogy, indeed, advocates collaborative knowledge construction and the creation of learner-generated language artifacts through individual or project work, encompassing meaningful process and relevant outputs that can be rehearsed, refined based on feedback and published as evidence of learning, for instance, student-created podcasts, co-creating and publishing an e-book/digital story.

M-learning relies on technologies of unprecedented capabilities that synthesize the functionalities and scaffolds available both on the web and locally on the device. Not only do they afford flexible access to the target
language resources through text, images, and video but also exemplifications of the socio-cultural context of the language studied. This allows for more integrated language practice as well as direct contact with target language speakers via the Internet gateway, even if they are geographically out of reach. Consequently, MALL pedagogical approaches encourage interaction, communication, and exchange of feedback with L1 speakers and culture (such as with LiveMocha, Duolingo, etc.), preferably as part of a purposeful learning effort and under expert guidance and facilitation of a formal or informal teacher (or reliable teaching presence). Individual episodes of learning can become the responsibility and choice of a learner. However, a complete learning path leading to a desired language proficiency level still benefit from expert planning, resources, assessment, support and encouragement that match the overarching learning goals. Mobile language learning cannot do without an expert comprehensive bird’s-eye-view perspective and “synchronization” of all the components of the SLL or FLL practice to fit the broader goals and needs of the 21st century learner, while providing cognitive and psychological benefits that persist throughout the process.

This more holistic approach to teaching, coupled with 21st century learner expectations creates an appropriate environment for incorporating critical thinking and problem-solving activities in mobile language teaching. In fact, González-Lloret and Ortega (2013) mentioned holism as one of the essential characteristics of a technology-assisted language-learning task. They identified “five key definitional features of a task in the context of technology-and-task integration” (p. 5), namely: (1) primary focus on meaning; (2) goal orientation (some communicative purpose and communicative and/or non-communicative outcome); (3) learner-centeredness; (4) holism (real-world language use that integrates form-
function-meaning); and (5) reflective learning (direct experiences involving reflective higher-order learning and self-reflection). Other proponents of task-based language learning have also recognized the potential of enhancing SLL and FLL curricula with technology-assisted tasks (González-Lloret & Ortega, 2013; Long & Doughty, 2011; Skehan, 2003; Van den Branden, 2010), particularly experiential language tasks taking place in authentic contexts (Ellis, 2003; Felix, 2002; González-Lloret & Ortega, 2013). The notion of holism is thus taking on a completely new meaning in MALL.

This holistic approach was exemplified by the MELLES system (Palalas, 2012) which was based on eight MALL tasks designed to “stimulate the process of co-learning through both collaborative and individual (cognitively focused) activities while creating an evolving ESP resource” (Hoven & Palalas, 2013, p. 152). These mobile learning tasks were interrelated and required learners to enter and actively participate in the MELLES network of peers, experts, and authentic language speakers who co-directed their learning experience. Each personalized learning path incorporated individual and group activities, both online and offline, in-class and out-of-class. The resulting active TBL, communicative practice, embedded in a real-life context, was facilitated by way of authentic discourse, expert and peer feedback exchange, resource sharing and social media support. In this holistic MALL experience, “both transitory communication experiences (such as a one-time encounter with a passerby) and longer lasting connections with sustained continuity between the actors (such as exchange of emails for four weeks) contribute[d] to learning episodes which mediate[d] individual learning processes” (Palalas, 2012, pp. 311-312). The integrational character of the MALL solution promoted a whole language experience that encouraged the practice of all four language
skills in dynamic interaction with peers and with the target-language-speaking environment and its socio-cultural features. The relevant real-world communication tasks offered a degree of content choice as well as time and place flexibility, to allow for seamless integration of tasks into the busy lives of the learners. A balanced blend of individual and group tasks coupled with on-demand support and communication via social networks can further facilitate continuity of practice and the feeling of belonging to a learning community (both f2f and online).

Overall, MALL tasks can satisfy the above-mentioned five criteria proposed by González-Lloret and Ortega (2013) and offer: (1) even higher levels of authenticity and mobile-scaffolded real-life negotiation of meaning; (2) increased relevance of learning goals that can span individual and group interests and skills; (3) learner-centeredness that includes greater flexibility, choice, and learner agency; (4) a holistic experience that combines form-function-meaning with a dynamic real-communication context and the learning network; and (5) reflective language practice enhanced by language-action-language events and mobile-mediated feedback in authentic communicative situations. As mentioned above, new needs and habits of the learner coupled with the affordances of mobile technologies and the prevalence of social networks, foster learning through intervallic (episodic, on-off) exploration, communication and collaboration. Consequently, mobile language learning tasks reflect these trends by integrating all language skills through a hybrid mix of structured and unstructured tasks, that include a combination of behaviourist, spaced repetition or even “drill-and-practice” exercises, and open-ended constructivist in-situ challenges.

Once again, the role of a teacher/teaching presence in the mobile task context is that of cohesion for all the elements and as a manager who oversees and coordinates the interplay of the system as an interdependent
whole. Combined with social and emotional presence, teaching presence motivates individuals and groups by reinforcing connections between learners and experts, which “engenders integrative thinking usually associated with the values of cooperation, partnership, quality and conservation (Capra, 1996)” (Palalas, 2012, p. 312). Moreover, MALL teachers need to work towards the optimum design of all integral learning activities and how they interrelate, be it by means of direct validation and creation of materials followed by directing learners in the process of resource selection, or by supporting the creation of student-generated artifacts. Finally, it is vital that teachers promote the development of appropriate learning strategies and metacognitive skills, such that learners can gradually become more independent.

Technology continues to develop, change, and expand in modes and means of use at an unpredictably fast rate. While it is no longer possible for teachers at any level to “keep up with” these changes, it is both feasible and, in fact, imperative that they look to developing and implementing flexible and adaptive pedagogies that suit their personal teaching philosophies at the same time as fitting with the technology-infused teaching and learning environments in which they work. The shifting roles of teachers that are emerging because of these shifts in pedagogy now include more learning-support, and resource compilation, curation and manipulation, as well as modelling and coaching in strategies to foster learning in new ways, places, and configurations with peers and other teachers, mentors, and experts.

The Pedagogical and Support Role of the Teacher

As teachers work towards developing the necessary flexibility and adaptability inherent in these new pedagogical stances, some reflection is necessary on the nature and purpose of these new personal and learning
strategies that will need to become part of the repertoire of both learners and teachers themselves, and especially from an intercultural perspective. Overall, it is up to teachers to identify and advocate for the positive pedagogical shifts of mobile language learning. It is up to them to ensure readiness of learners and other teachers and to adapt the teacher-learner relationship based on experiments and active dialogue. Teacher expertise in the subject matter and in learning theories is the foundation of successful learning experiences; however, this expertise does not have to be conveyed through direct instruction. In these still-early stages of MALL, teachers are faced with the need to gradually share their ever-growing responsibilities and, in the process, to transition toward team-based pedagogical solutions-managed by teachers yet executed by a team of learners, peers, instructional designers, technology experts... and incidental target language speakers.

For the time being, MALL teachers are still responsible for creating networked learning environments and directing learners to a place and space where they can effectively learn for themselves, before they rejoin the “connected space”. Mobile teachers are tasked with designing a mix of online and offline activities that blend seamlessly to facilitate the process of interpretation, negotiation, and meaning making. They should aim to incorporate individual and collaborative activities that enhance interaction and communication while providing sufficient space for intrapersonal cognitive processes and enough flexibility in terms of time and place of learning. Mobile language learning also calls for flexibility and adaptability in the selection of materials and learning tasks as well as tools that are used to complete those tasks, which adds another requirement for teachers to become educational technology experts.

Moreover, with the promise of personalized learning comes the corollary: that of choice. While innovative adaptive content and
technologies are available, for the time being, they still require the support of the teacher who can mediate, validate, and curate the selection of resources and learning strategies that correspond with the language proficiency and abilities of the student. Similarly, learner analytics and progress monitoring tools, although very promising as feedback mechanisms, for the most part, currently still necessitate the expert interpretation and manual integration of the results into the learning plan of the individual learner.

The design and development of MALL materials imply additional expertise on the part of teachers. Not only do they have to be familiar with a wide range of mobile technologies, but also of mobile learning design principles. Many of the MALL projects have enlisted the help of IT experts and instructional designers, but many more never took off because of the lack of such expertise. As noted by Davies et al. (2013), “[e]ach major advance in computing technology has triggered a temporary step backwards in the production and delivery of CALL materials. What had arduously been developed for one dominant technology had to be rethought and reprogrammed for the promising new technology” (p. 24). Likewise, MALL materials are unique and require unique expertise from their creators.

As a facilitator and administrator/manager of mobile learning, the MALL teacher has to promote and model a pedagogical rationale that appreciates how people learn differently, how they can benefit from innovative technologies, how they can leverage new learning spaces and new digital connections, and what new skills their require. This calls for changes in pedagogical approaches and in attitudes: personal, societal, cultural, and intercultural. These changes require open minds, creativity, and understanding combined with PD initiatives and culturally sensitive mobile learning community support. Innovative pedagogical practices can be
attained if the following elements are present and contributed by educators: some self-sacrifice, visionary leadership, risk taking, and disruption (Wheeler, 2015). MALL teachers can embrace the evolution of learning by connecting to learners via innovative mobile technologies. Connected learners necessitate support from connected teachers.

Conclusion

As we step out into the world of great social and cultural change and technological innovation, it is important to ground ourselves in and continue to research that knowledge and those understandings that have hitherto underpinned sound pedagogical practice. Many experiences and lessons learned from CALL iterations and manifestations can apply to mobile language learning. However, the unique features of mobility of devices and learner-teacher participants must be layered upon these lessons and understandings. In this chapter, we have presented an overview of the similarities between CALL and MALL, and then detailed the features of mobile language learning that distinguish it from other and earlier uses of technology to assist or enhance language learning. Chief among these distinguishing features are the essential mobility and distributed nature of learners, teachers and resources that afford learning; the concomitant shift in pedagogical paradigms; and the strategies of self-regulation or metacognition necessary for learners (and teachers) in these new environments.

In relation to mobility of teachers, learners and resources, these last may be in the form of L1 speakers in the SL environment or virtually in FL environments; while the teacher may be one assigned formally by an institution to a particular learner or group of learners, may be one suggested or recommended by this teacher, or may be selected formally, informally,
non-formally (or opportunistically) by learners themselves.

This range of elements of mobility then drives the shift in pedagogy, as discussed in detail in various sections throughout this chapter. The major shift is towards more holistic pedagogical theories and approaches, as manifest in Ecological Constructivism (or Construal, discussed in detail Chapter 4 in this volume) and the shift in locus of control and the onus for motivation towards more learner-initiated directions, exemplified in the discussion of gamification. Changing teacher and learner roles and strategy modelling and learning represent essential components of these shifts. In order for many learners to gain the skills necessary to make appropriate and informed choices and to take a stronger role in their learning environment, they first need to develop the socio-affective and metacognitive strategies of self-regulation (Schunk, 2012), thereby finding a balance among cognitive, teaching, social, and emotional presences.

Nevertheless, this chapter has been premised on the understanding that teachers and learners must inevitably find their “sweet spot”: that space within the temporal-spatial matrix where they feel the most effective learning occurs – or work towards identifying the elements of this space. At this point, an additional element of mobility is introduced: that of the transitions among varying degrees and combinations of technology-pedagogy instances and implementations as appropriate and timely for all participants.

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Chapter 3: Three Agendas for MALL

Mark Pegrum
The University of Western Australia, Australia

Abstract

There are many kinds of mobile-assisted language learning projects in the world today. The centrality of language and literacy in society and culture means that educational initiatives involving language and literacy can have an impact across many areas of life, locally and globally. By their nature, mobile devices open up the possibility of an especially broad impact across numerous areas. In short, MALL matters. However, depending on the agenda or agendas with which it is integrated, MALL matters in widely varying ways in diverse contexts. Following a discussion of mobility as a defining factor, this chapter will examine the significance of different levels of mobility in learning, from the least to the most sophisticated. It will be seen that mobility in learning can be constrained or enabled by the twin principles of affordability and affordances, and that it is intimately linked to the mobile learning (m-learning) agenda or agendas being implemented. At least three major agendas for promoting MALL can be identified: transforming teaching and learning; developing 21st century skills; and promoting social justice. These will be examined one by one, and illustrated with examples. As we will see, educators must consider a variety of factors-including levels of mobility, the tension between affordability and affordances, and above all the underlying agenda or agendas for m-learning-in order to design the optimal MALL experiences for their own students in
their own contexts.

**Keywords**: Mobile learning, m-learning, MALL, affordability, affordances, pedagogy, design, 21st century skills, social justice, ICT4D, M4D

**Introduction**

It has been estimated that by the end of 2014, nearly three billion people out of a global population of some 7.2 billion had access to the internet (Grossman, 2014; ITU, 2014). For a substantial and growing number of those with net access, this occurs primarily via mobile devices. At the end of 2014, mobile phone penetration stood at around 121% in developed countries and 90% in developing countries, giving a global penetration rate of 96%, though, as will be seen, mobile broadband penetration is rather lower (ITU, 2014). Still, in early 2015, the proportion of web traffic originating from mobile devices had already surpassed 33% worldwide (Kemp, 2015).

In view of the educational opportunities opened up by the internet, as well as data services like text messaging (or SMS, for Short Message Service), there is still untapped potential to advance educational agendas the world over through the use of mobile devices and mobile learning (m-learning). When it comes to fundamental language and literacy skills, there is considerable scope for transforming personal, social, working and civic lives, hence the importance of the field of mobile-assisted language learning within the wider field of m-learning. However, before considering the major educational agendas associated with the promotion of MALL, it is necessary to define mobile learning, and in particular to examine its parameters in terms of the underpinning concept of mobility.
Why Levels of Mobility Matter

The principle of mobility serves as a unifying focus in the field of m-learning, and likewise MALL, for three key reasons. First, it is the central principle that links together mobile devices, mobile learners (Pachler, Bachmair & Cook, 2010), and mobile learning experiences (Traxler, 2007). Yet, while mobility applies to all of these, our focus must be primarily on mobile digital devices (Pegrum, 2014). Otherwise, we would have to conclude that learning with a toy in a playground, or a book in a café, is an example of m-learning, which would broaden the concept too far and make it impossible to comment meaningfully on contemporary trends involving connected educational technologies. Thus, using Puente’s (2012) distinction that a portable device is typically used at Point A, closed down and transported, then opened up again at Point B, while a mobile device may be used at Point A, Point B and everywhere in between, we can say that m-learning is learning supported by mobile digital devices such as feature phones, smartphones and tablets. Following a period of experimentation in which governments, educational institutions and development projects supplied mobile devices to learners, there is now a worldwide shift towards Bring Your Own Device (BYOD) models (Pegrum, 2014; Vosloo, 2012), reducing costs for providers and, given the regularity with which many users upgrade their technology, amplifying the power of the available devices.

The second reason for focusing on mobility is that, while communication technologies will continue to develop and change for the near future, mobility is likely to remain core to their functionality. Already phones and tablets are being complemented by wearables like activity trackers (such as the Fitbit, Jawbone or Nike + FuelBand trackers) and
augmented reality (AR) glasses (like Google Glass, the first device of its kind to reach the market), with AR contact lenses (Carmigniani & Furht, 2011) and smart clothing (Johnson et al., 2013) not too far away. In time, these are likely to be joined by what we might call *embeddables* or *implantables*, which, “whether swallowed, attached to parts of the nervous system, sensed through brain waves, or placed on or under the skin, are all in the testing phase of development” (Woodill, 2015b, Kindle location 2255).

The third reason for focusing on mobility is that the degree of mobility associated with the devices, the learners, and their learning experiences has a major impact on how fully the affordances of mobile technologies for education are exploited, and how closely their use aligns with contemporary pedagogical approaches. In practice, of course, our mobile devices are integrated into a broader ecology of hardware, currently consisting of devices ranging from smart TVs through desktop computers to laptops, and in the future increasingly incorporating the sensors that make up the internet of things (Johnson et al., 2015), along with other independently mobile hardware extending from smart cars to robots that react and give feedback to humans (Isaías, 2014). But within this overall context, the level of mobility is crucial to the learning that occurs. There is no doubt that a conceptual shift is needed, by teachers, learners and the wider community, to see mobile devices not just as social tools but as educational tools (e.g., Gaved et al., 2014), and a further shift is needed to see how differently these tools can be exploited at varying levels of mobility. If the implementation of m-learning and MALL has to date been disappointing (Reinders & Pegrum, in press), it is in no small measure because the potential for greater mobility—not just of the devices, but of the learners, and of their learning experiences—has often been neglected in the design of
learning activities, programmes and environments.

At the first level of mobile learning, the *devices* are mobile (indeed, they are mobile by definition) but the *learners* and the *learning experience* are not (Pegrum, 2014). Learning at this level may involve students sitting at desks in a classroom using mobile devices to look up information or engage in drills, sometimes dressed up as simple games; or it may involve distance learners sitting at home using mobile devices to view PowerPoint presentations, read set texts, or answer comprehension questions. While the mobility of the devices is important-class sets of tablets can be moved easily from room to room by teachers, and a smartphone can be carried between home and the office by a distance learner—there is little here, in terms of the learning itself, that could not be accomplished on a desktop or laptop computer. One possible point of difference is the use of mobile apps which, if well designed, may offer a more integrated, multimedia-rich learning experience than parallel websites, when such websites are available. Yet it has been widely noted that the vast majority of m-learning apps are still predicated on information transmission or behaviourist approaches (Oakley et al., 2012; Searson, 2014), which is equally true of MALL apps (Beatty, 2013; Burston, 2014). While some newer apps layer social networking and social sharing functionality over an *information* transmission or behaviourist base (Reinders & Pegrum, in press), this is not yet the norm.

At the second level of mobile learning, both the *devices* and the *learners* are mobile, but the *learning experience* is not. Learning at this level may involve students carrying mobile devices around a classroom to share what they have learned with peers, or to co-operatively engage with apps. It may involve students working collaboratively on personal devices as they circulate in new learning spaces, or “third spaces” like cafés or libraries (Woodill,
2015a), which, in fact, frequently provide the model for new learning spaces in educational institutions. It may involve distance learners filling their spaces of downtime in everyday life with study, for example, as they are sitting on the bus or train home from work; or it may involve employees engaging in a course of study in whichever workspaces they happen to find themselves during spare moments. In the first case, while students’ movements may be minimal, they facilitate the addition of an element of active, collaborative, constructivist learning to what might otherwise be stationary, individualised work; in the second, third and fourth cases, it is the flexibility and personalisation of learning—the famed “anywhere, anytime” of m-learning—that comes to the fore, potentially with some scope for collaboration and networking. In none of these cases, however, is the learning experience mobile, inasmuch as it remains unaffected and unaltered by the changing spaces and environments through which learners are moving.

At the third level of mobile learning, the devices, the learners and the learning experience are all mobile. Learning at this level may involve students exploring the world around them, for example making multimedia recordings by photographing signs or audio-recording examples of spoken language-in-use, with mobile devices thus supporting inquiry-based pedagogical approaches (Sharples & Anastopoulou, 2012; Woodill & Udell, 2015) in which everyday environments can become “user-generated contexts” for learning (Cook, 2010). It may involve employees scanning quick response (QR) or other codes to review instructions for operating machinery, or seeking mentoring for problems they are confronted with (Ally et al., 2014), as they engage in just-in-time on-the-job learning or performance support (Quinn, 2013; Woodill & Udell, 2015). It may involve participants taking up roles in carefully structured AR games
(Dunleavy, 2014), where they respond to learning prompts in everyday settings. As we move into an era of big data (Feinleib, 2013; Mayer-Schönberger & Cukier, 2013), it may even involve learners engaging in large-scale, real-world guided data collection projects which, with input from sufficient contributors, permit tracking of the spread of anything from vocabulary to diseases; this is one example of how mobile devices may lend themselves to participatory pedagogical approaches (Vartiainen, 2014) which can lead not just to individual learning but systemic learning. Such systemic learning is an increasingly important subset of the third level of m-learning: “Collaborative mapping is, in the world of civics, a new literacy” (Thompson, 2013, Kindle location 3941). In all these cases, the learning context becomes part of, and feeds into, the learning experience, thus fostering situated, embodied learning, and minimising transfer distance, that is, the gap between formal, abstract learning and the informal, real world contexts in which it is to be applied. There is, moreover, the possibility of assessing learners immediately—and formatively or summatively—on their performance in real-world settings (Feser, 2015).

At this third level, the limitations of the first two levels of m-learning become evident: the first level essentially consists of e-learning on smaller screens, while the second involves physical movement but ignores the contexts through which learners are moving. Although all levels of m-learning have their place for different purposes at different times, the traditional overemphasis on “the anytime anyplace vision of m-learning” may have been an unfortunate distraction from the capability of smart devices, especially, to facilitate contextualised learning (Petit & Lacerda Santos, 2014, p. 2). It is thus time to reconceptualise the relationship of technology and learning: “It is not a question of the integration of technology in the learning process anymore; it is about integrating [the] learning process in
the daily use of technology” (Petit & Lacerda Santos, 2014, p. 12).

In recent years, there has been a growing emphasis on the centrality of teachers as designers of students’ digitally enhanced learning (Garcia, 2014; Laurillard, 2012). Nowhere is this more evident than when it comes to m-learning (Milrad et al., 2013) and MALL (Hockly, 2013; Reinders & Pegrum, in press). It has been suggested that the three levels of m-learning outlined above represent “a comfortable development cycle for teachers wishing to experiment with integrating mobile and hand-held learning into their current practice” (Hockly & Dudeney, 2014, p. 9). In other words, educators can work towards the third level of m-learning as they build their Technological, Pedagogical and Content Knowledge (TPACK, formerly TPCK; Mishra & Koehler, 2006) and grow their ability to design learning tasks at the more transformational levels of the Substitution-Augmentation-Modification-Redefinition (SAMR) model (Puantedura, 2011). Thanks to the expanding availability of user-friendly software for building apps and even creating AR learning trails, teachers can increasingly become pedagogical-technological designers of mobile and other learning experiences tailored to their students’ needs (Mwanza-Simwami et al., 2011; Pegrum, 2014). Yet this tailoring process necessarily involves taking into account the thorny issue of affordability and affordances.

**Why Affordability and Affordances Matter**

There is a fundamental tension in the field of m-learning, and by extension MALL, between affordability and affordances (Pegrum, 2014). Where fixed telecommunications infrastructure is limited, notably in the developing world, mobile devices and networks hold out the promise of internet access. However, it is clear from the work of the GSMA (e.g., GSMA Intelligence, 2014a) and UNESCO (e.g., Vosloo, 2012) that
access to mobile devices and connectivity is very differently distributed between regions and countries, in large part due to varying levels of affordability relative to average income. It is estimated, for example, that a typical European spends a little over 1% of his or her monthly income on mobile communication, by contrast with an average African who spends 17% (ibid.). In spite of such spending differences, an African is much more likely to have access only to a feature phone and 2G connectivity, while a European is more likely to have access to a smartphone and 3G or 4G connectivity.

As regards hardware and software, smartphones with their mobile operating systems and constellations of apps have begun to outsell feature phones globally (Danova, 2014), and the largest segment of the smartphone market is now the low-end segment (Ahonen, 2014). Yet it will be a long time before most people have access to a smart device; in 2014, the GSMA estimated it would take 3-4 years before smartphones reach parity with feature phones in terms of their unique subscriber base in developing markets (GSMA Intelligence, 2014b). By then, of course, new mobile tools will be on the market and are likely, again, to be largely out of reach for those in developing regions.

As regards connectivity, mobile broadband penetration was estimated to reach 32% globally at the end of 2014 – but 84% in developed countries as opposed to 21% in developing countries (ITU, 2014). While 3G and 4G networks are expanding globally, 2G networks will continue to dominate in many developing countries for some time (GSMA Intelligence, 2014a). Notwithstanding current initiatives by Facebook and Google to use drones or balloons circling the earth to blanket the planet with internet access (Grossman, 2014), it is likely that by the time 3G and 4G have rolled out to much of the developing world, the developed world will be heading
towards 5G (Eadicicco, 2014).

If we consider hardware, software and connectivity together, it is clear that, in comparison with a feature phone on a 2G network, a smartphone on a 4G network has a vastly higher level of *affordances* that can be exploited for educational purposes. The affordances of mobile devices are, after all, directly dependent on the sophistication of the hardware and software, and the size of the available bandwidth. Affordable devices, therefore, typically offer far fewer affordances for learning, and are most easily used at the first, most basic level of m-learning; while the third, most sophisticated level of m-learning generally relies on a greater range of affordances and thus necessitates less affordable hardware and software. In short, learning with a feature phone is not the same as learning with a smartphone since “[t]he affordances of the latter are much more numerous, and offer a greater diversity of actions and activities than the former” (Petit & Lacerda Santos, 2014, p. 1). Naturally, with an expanding continuum of low-end to high-end smartphones now available, it is important to remember that not all smartphones are equal. It is also important to remember that, as Mark Zuckerberg of Facebook points out, “low-end” phones and networks are actually “typical” phones and networks from a global perspective (cited in Grossman, 2014, p. 38). When designing learning tasks, especially where a BYOD approach is in place, educators must seek to exploit the affordances of the available mobile devices, and promote an appropriate level of mobility to achieve the maximum educational benefits while remaining within the bounds of affordability. This entails making design decisions that align with a relevant educational agenda, or agendas.

**Why Agendas Matter**

There are three major agendas for promoting mobile learning in
general, and MALL in particular, seen in the world today, namely *transforming teaching and learning; developing 21st century skills*; and *promoting social justice* (Pegrum, 2014; cf. Warschauer, 2011). While evidence is mounting that mobile devices can have an impact on language and literacy learning (Pegrum, 2014), our analysis of their effectiveness must always be context-specific. It will depend on the educational agenda, or agendas, being implemented, with these agendas in turn affecting and being affected by the trade-off between affordability and affordances, and the level or levels of mobility involved.

The first agenda involves *transforming teaching and learning*. This means aligning learning with the broad contemporary shift away from information transmission and behaviourist educational approaches and towards progressive pedagogical approaches (Reinders & Pegrum, in press) such as, notably, social constructivism (Vygotsky, 1978) and its multiple instantiations like inquiry-based learning, problem-based learning (or Apple’s version, challenge-based learning; Johnson et al., 2009), project-based learning and task-based learning; these may also incorporate elements of situated learning (Lave & Wenger, 1991) and embodied learning (Driver, 2012). Although many language teachers recognise that information transmission and behaviourism still have a role in their classrooms, especially when it comes to foundational grammar and vocabulary, most accept that in order to foster deeper learning and activate higher order thinking skills, it is important to have students engage, some of the time at least, in constructivist, collaborative and contextualised learning experiences. It is well established in MALL research that mobile devices have the potential to support a move in this direction (e.g., Burston, 2014; Comas-Quinn & Mardomingo, 2012; Tai, 2012). However, this potential is only likely to be fully realised if the whole range of *affordances* of the
devices is exploited (meaning that the devices are often relatively unaffordable) to support the third level of mobile learning, where the devices, the learners and the learning experience are all mobile, and where there can be a strong emphasis on learning in context. At the cutting edge of contemporary developments, we find AR projects, which superimpose digital information and communication channels on real-world settings, thus aiding students in turning them into learning contexts.

One example of this can be seen in the Singaporean Heritage Trails project (2008 onwards), created by LDR with the backing of the Ministry of Education, where school students can navigate 35 inquiry-based city learning trails (part of a collection of more than 100 trails) using Android or Apple devices provided by LDR or their schools. Through a combination of GPS (geofencing), Bluetooth and image recognition technology, the devices overlay information and tasks on the real-world setting. Students engage in active, constructivist, situated learning as they process contextually relevant multimedia information, investigate answers to multiple choice or open-ended questions by interacting with the people and objects around them, and collaboratively synthesise multimodal responses to more complex tasks. Currently available in English, Mandarin, Malay and Tamil, the trails often involve a code switching element as students draw on the linguistic expertise of their multilingual teams to communicate effectively in ethnic neighbourhoods (for more information, see: www. ldr. sg; Pegrum, 2014).

Meanwhile, the Trail Shuttle software developed by another Singaporean company, Rockmoon, allows teachers and students to design their own location-based m-learning activities in any form, such as inquiry-or problem-based games, set in authentic contexts to suit the students’ learning needs (for more information, see: www. rockmoon. sg).

A second example is found in the European MASELTOV project
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(2012-2015), funded by the European Commission, where the MApp dashboard app for Android devices integrates a number of mobile apps which can provide contextually relevant language learning resources. This allows the target audience of recent immigrants to Europe, whose limited educational backgrounds and other commitments may keep them away from formal classes, to use their own mobile devices to turn their lived environments into everyday situated learning contexts where they can acquire proficiency in the local language. Based on a combination of elements including location, activity, history and preferences, the recommender system might provide immediately relevant vocabulary on detecting that the user is visiting a particular site, or suggest learning resources on the basis of regular patterns of activity. Field tests of the prototype MApp took place in 2014 in London, Madrid and Vienna (for more information, see: www.maseltov.eu; Gaved et al., 2014; Pegrum, 2014).

Critical questions about the first agenda concern the assumptions sometimes made about the suitability of progressive pedagogical approaches for all content, levels and contexts, as well as the need to obtain further empirical evidence of improved learning outcomes. Contextually triggered learning raises pedagogical questions about how to combine episodic into extended learning and, in the case of AR trails in particular, ethical questions about surveillance and privacy (Gaved et al., 2014; Traxler, 2010). A critical mobile literacy skillset is necessary to address such pedagogical and ethical questions.

The second agenda involves developing 21st century skills, which are vital to working and civic life, not to mention personal and social life, in the contemporary era. Those generally considered to be most important include the interlinked trio of creativity, innovation and entrepreneurship (Barber, Donnelly & Rizvi, 2012; Robinson, 2011; Zhao, 2012), complemented
by skills and dispositions like critical thinking and problem solving, collaboration and teamwork, and autonomy and flexibility (Gee, 2013; Mishra & Kereluik, 2011; P21, n. d.), along with the digital literacies to support them (Dudeney, Hockly & Pegrum, 2013). There is potentially considerable overlap between promoting progressive pedagogical approaches (the first agenda) and fostering 21st century skills (the second agenda), which may be mutually reinforcing. As with the first agenda, the full development of the second agenda is best supported by mobile devices with a wide range of affordances used at the third level of m-learning, where the devices, the learners and the learning experience are mobile. This may involve AR: on the abovementioned Singaporean Heritage Trails, students practise collaborative problem-solving and creative composition of multimedia texts, honing their digital literacies as they do so; and using the MApp, MASELTMOV participants engage in autonomous, flexible learning, developing networks and intercultural literacies in the process. However, it is not only about AR.

For instance, in the One Laptop Per Child (OLPC) Australia project (2008 onwards), largely focused on rural or remote schools, many of which have a high proportion of Indigenous students, small XO laptops and hybrid laptop-tablet XO-duos have been used to support the teaching of language and literacy. With their generic, productive apps, XOs support networking and collaboration between teachers and students. Their multimedia capabilities allow the students to develop multimodal literacy through the creation of digital stories and e-books, as well as intercultural literacy as they code switch between Aboriginal languages and Standard Australian English in their digital presentations of their local cultures. In addition, those students who acquire the technological literacies to support their teachers and peers in maintaining and repairing the digital equipment are
rewarded with XO-Champion and XO-Mechanic certifications (for more information, see: www.one-education.org; Pegrum, 2014; Pegrum et al., 2013).

In another example, the iPads for Access project at Casa Thomas Jefferson (CTJ) in Brasília, Brazil (2012 onwards), initially funded by the US State Department, class sets of iPads were bought to support Access students from low socioeconomic backgrounds in acquiring digital literacies at the same time as acquiring English language proficiency. Further class sets have been purchased for use with regular students, bolstered by a rapidly expanding BYOD model for staff and students. As part of the shift towards more learner-centred pedagogies mediated by mobile technologies, students have gained greater freedom to move around and generate their own English-language digital posters, stories and other materials, which can later be reused and remixed by teachers and peers. The year 2015 will see the launch of CTJ’s first Makerspace, where students will have the opportunity to develop programming skills, or code literacy, alongside other digital literacies (for more information, see: thomasonline.org.br/mlearning; Hockly & Dudeney, 2014; Pegrum, 2014).

Critical questions about the second agenda concern the extent to which the promotion of 21st century skills via consumerist devices (Merchant, 2012; Traxler, 2010) may serve to endorse a neoliberal market economy supported by personal entrepreneurship and digital self-marketing (Marwick, 2013), to the detriment of broader identity development and global citizenship goals. A critical mobile literacy skillset, once again, is vital to keep such economic and sociopolitical questions to the fore.

The third agenda involves promoting social justice, which means extending the educational as well as social, economic and political benefits of new technologies to under-served populations. This includes populations
living in developed contexts, with mobile devices offering advantages for those who are geographically isolated, those who belong to indigenous communities (Wallace, 2013; Zelezny-Green, 2013), and those who have special needs or disabilities (Greenfield, 2014; Schmitz et al., 2014). However, this agenda is most commonly seen in Information and Communication(s) Technologies for Development (ICT4D) or Mobile(s) for Development (M4D) projects in developing contexts, often linked to the UNESCO Education for All Goals and the UN Millennium Development Goals (Pegrum, 2014). M-learning is viewed “as being able to extend access to, as well as improve quality of, education” (Langer, Winters, & Stewart, 2014, p. 157), in part by “helping to address the shortage of teachers evident in many developing world countries” (GSMA Intelligence, 2014a, p. 43). This frequently entails a focus on particularly disadvantaged populations within the developing world, such as women and girls (GSMA, 2010b; Zelezny-Green, 2014) and disabled users (GSMA, 2010a; UNESCO, 2013). The third agenda does not usually require the learners or the learning experience to be mobile, in large part because, at least in developing contexts, it foregrounds affordability rather than affordances; and the available devices and connectivity often only support the first level of m-learning.

In fact, the third agenda sometimes dovetails with the first or second agendas, especially in initiatives targeting disadvantaged learners within developed and/or affluent contexts; the Australian OLPC and Brazilian iPads for Access projects, discussed above, specifically focus on the digital literacies of students from Indigenous and low socioeconomic backgrounds, respectively, under the umbrella of progressive approaches to learning. In developing contexts, there are also a number of well-funded projects that provide teachers and learners with the requisite hardware and software and
which, although they may involve little mobility on the part of the students, open up some limited scope for the introduction of contemporary pedagogies and/or 21st century skills. For instance, in the English in Action (EIA) project in Bangladesh (2008-2017), funded by the UK government, English teachers are provided with lesson guidelines as well as listening and speaking materials to be played on supplied feature phones connected to portable speakers in the classroom, in order to facilitate a shift towards communicative pedagogy (for further information, see: www.eiabd.com; Pegrum, 2014; Walsh et al., 2012). Meanwhile, in the Smart4Kids Khmer App project in Cambodia (2013 onwards), an Android reading app, comprising amongst other things interactive games and multimodal short stories, may be used on supplied devices, allowing students to practise some basic multimodal and gaming literacy skills as they learn their own language (for further information, see: www.et4d.com/work/; Pegrum, 2014). Yet the Bangladeshi and Cambodian students participating in these initiatives are not engaged in the kinds of collaborative, constructivist learning or active 21st century skills acquisition which undergird the Singaporean, European, Australian or Brazilian initiatives outlined above.

When it comes to the growing numbers of BYOD, informal learning projects in the developing world, the low levels of affordances of the available devices (which may have little or no internet connectivity) and the limitations of the settings (which may lack adequate telecommunications infrastructure and even a reliable electricity supply) largely eliminate any common ground between the third agenda and the first and second agendas. For example, in the British Council/Nokia Life Learn English project in China (2010 onwards), subscribers receive a phrase of the day on their personal feature phones five days a week, followed by a quiz question on the sixth day and the answer on the seventh day. While this text-based service,
which involves richly formatted messages using SMS as the bearer, is predicated on information transmission and does little to support contemporary pedagogies or digital skills, it has opened up access to English learning for millions of users who previously had no such opportunity (for further information, see: Ballantyne & Tyers, 2012; Pegrum, 2014). Similarly, the British Council’s Learn English SMS projects in North Africa (2009 onwards in Sudan and 2013 onwards in Libya) have allowed users who live at a distance from capital cities, often in areas where it may be dangerous for foreigners to travel, to access regular vocabulary, grammar and study tip updates, accompanied by quiz questions available in pull mode in Sudan (though this is currently precluded by the telecommunications infrastructure in Libya) (for further information, see: Pegrum, 2014). In a sense, questions of pedagogy and 21st century skills arise only after educational access has been established; and third agenda projects are, primarily, about establishing this access.

Critical questions about the third agenda concern an overreliance on new technologies to solve social problems and a narrowly economic focus on development (Unwin, 2009), as well as the imposition of developed world technologies and pedagogies on developing world populations (Traxler, 2013), and the potential disenfranchisement of those populations. Again, a critical stance is necessary to keep these issues in focus.

**Conclusion**

Given varying levels of mobility based on different trade-offs between affordability and affordances, and given the diverse agendas into which MALL may be integrated, its benefits can only be assessed within specific contexts, and its success can only be judged relative to the agenda(s) which underpin it. There is considerable potential for MALL to transform
teaching and learning, develop 21st century skills, and promote social justice, with effects extending beyond education to social, economic and political areas. Yet MALL cannot necessarily fulfil all these agendas at the same time-and not in ways appropriate to every context. Nor should we expect it to do so. However, we should expect that educators, working in concert with educational leaders and project developers, would consider the levels of mobility, the balance between affordability and affordances, and above all the agenda or agendas most appropriate to their own contexts, with the aim of producing the most effective m-learning experiences for their learners.

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Chapter 4: Ecological Constructivism as a New Learning Theory for MALL: An Open System of Beliefs, Observations and Informed Explanations

Debra Hoven
Athabasca University, Canada

Agnieszka Palalas
Athabasca University, Canada

Abstract

With the emergence of mobile language learning over the past decade, it is becoming clear that the field requires a theory of learning that is more appropriate to the diverse spaces, contexts, situations, technologies, and systems, in and through which learners live and move, reflect, act and interact-and learn in the process. This chapter aims to begin to address this need by proposing and outlining a new theory of learning that derives from aspects of flexible, distributed and mobile learning approaches, as well as various other theories from fields as diverse as ecology, biology, geology, physics, architecture, mathematics, and linguistics. Termed Ecological Constructivism (EC), this theory has the capacity to describe, explain, and predict language learning facilitated through the use of mobile devices specifically, and learning more generally. Definitions, derivations, and explanations of the terms used will be discussed, as well as some practical examples of how the theory is realized in mobile enhanced or assisted language learning (MALL).
Keywords: ecological constructivism, EC, theory of learning, mobile language learning, MALL, MLL, learning theory, affordances

Introduction

Constructivism as a theory of learning encompasses a range of branches or sub-theories based primarily on the approach to learning or the pedagogical context of the proponents. These sub-theories include social constructivism (Davis & Sumara, 2002), pragmatic constructivism (Perkins, 1999), radical constructivism (von Glasersfeld, 1998; 2000), cognitive constructivism (Proulx, 2006; Davis & Sumara, 2003), and other related conceptualizations such as Sociocultural theory in the field of language learning, for example (van Lier, 2000; Lantolf & Thorne, 2006) and connectivism (Siemens, 2004; Downes, 2007) in the context of online learning in large or massive contexts as found in MOOCs. The differences among these various sub-theories and the epistemological derivations and pedagogical applications have been extensively discussed elsewhere (von Glasersfeld, 1998; 2000; Proulx, 2006; Davis & Sumara, 2002; 2003). However, with the advent of mobile learning within the past decade, and, more specifically, mobile-assisted language learning, it is becoming clear that the field requires a theory of learning that is more appropriate to the diverse spaces, contexts, situations, technologies and systems, in and through which learners live and move, reflect, act and interact-and learn in the process. Indeed, several authors in the field have claimed the need for “a theory of learning for a mobile society” (Sharples, Taylor and Vavoula, 2006, p. 222) and that m-learning is a new approach to learning that requires a new theory (Crompton, 2013). This chapter aims to address this need by further explicating a new theory of learning: Ecological Construc-
tivism (Hoven, 2008; Hoven & Palalas, 2011) that has the capacity to describe, explain, and predict learning facilitated through the use of mobile devices specifically, and learning more generally, as part of dynamic context-embedded activity. Definitions, derivations, and explanations of the terms used will be discussed, as well as some practical examples of how the theory is realized in mobile enhanced or assisted language learning.

Choice of the Term MALL

As discussed elsewhere in this volume (Chapter 2 by Palalas and Hoven), the term MALL developed out of the field of computer-assisted language learning, as a natural extension in the progressive evolution of computer-or technology-enabled or-enhanced language learning that can take place through the mediation of various forms of technological devices. In the field of CALL, however, with the on-going advancements in digital technologies, there has been much discussion of the role of technology and to what extent language pedagogy is influenced by, or influences, the applications of technological developments. This discussion has subsequently given rise to a series of alternative terms proposed for the process of learning that is facilitated by the technology, and consequently, the pedagogical approaches that have accompanied the emergence of new learning and teaching technologies.

In this chapter, the term MALL will be used to refer to language learning that is facilitated or mediated through, or enhanced by the use of mobile devices. Elsewhere the authors have indicated that their preferred term is Mobile-Enabled Language Learning (MELL—see also Chapter 2 by Palalas and Hoven and Chapter 12 by Petit, Lacerta Santos and Ferreira in this volume) to highlight the notion that mobile devices can not only assist or enable learning but can actually enhance the experience, by providing a
wider range of locations or contexts wherein learning can be experienced. In addition, these devices provide tools that promote higher levels of interaction and engagement with content, people, activity, and the setting in which this learning activity occurs. Another preferred term is simply MLL (mobile language learning—see Chapter 5 by Kukulska-Hulme and Chapter 2 by Palalas and Hoven, this volume) as this moves the focus to mobility of the learner as well as the learning. However, since MALL has become the term used most commonly in the literature, this term will be used throughout this chapter.

The Search for an Appropriate Theoretical Framework

With the new contexts and possibilities for learning enabled through the use of mobile devices, also comes the need for a theoretical framework or theory of learning that can describe, explain, and predict how such learning takes place. Mobile devices create possibilities for learning in diverse spaces, modes, contexts, and situations, through a range of technologies and systems. As exemplified by the increasing number of conferences and publications (Burston, 2014; Cochrane, 2013; Cochrane, Guinibert, Simeti, Brannigan & Kala, 2014; Pegrum, 2014) on the topic of mobile learning, and recent publications on mobile language learning (Kukulska-Hulme, Norris & Donohue, 2015), there is a recognition of the need for a new or expanded theory of learning that can encompass the spaces, modes, and places wherein mobile devices facilitate learning. In this chapter, the term theory is used following Cresswell (2003) as an “explanation for behavior/attitudes” or a “theoretical lens or perspective to guide researchers as to what’s important and who to look at … or possible causal relationships … [and] also indicate how the researcher positions him/
herself” (p. 131). The approach to a theory of learning discussed in this chapter aims to describe, explain, and predict the systems operating within (internal to) the learner, at the interface between the learner and the external world, as well as the systems, networks, or systems of networks of mutually inter-dependent relationships that are experienced by learners, learning collaboratively, and especially through the mediation of mobile devices.

Systems and processes internal to the learner include the learner’s sensory perceptions leading to noticing and becoming aware of opportunities in the environment around them that may facilitate or enable learning. These may also include responses and reactions based on a learner’s existing schemata, and the experiences, knowledge and connections among these that comprise a learner’s understanding of the language and the context in which it is used. Learning is seen, therefore, as partially comprised of processes internal to the learner, including private speech, rehearsal, and reflective space or reflexivity. Other processes leading towards learning that are internal to the learner include sensory perception, whether this be aural, visual, or through other senses, and learners’ responses to these, which encompass emotional, social, cognitive, sensory, and spiritual aspects. These responses, which will be discussed in more detail below, represent the interface between learning that is internal to the learner and the interpersonal or interactive components (as illustrated in Figure 4.1 below) which come into play when learners work collaboratively or cooperatively with others or with content and cues present in their environment, whether instructionally designed or not.
Figure 4.1  Relationship between Personal, Intrapersonal and Interpersonal Aspects of Learning (adapted from Palalas, 2013)

The extent to which learners learn within their internal and interface spaces may be related to their level of introversion or extroversion (Cain, 2012) – or also to the affordances which they perceive, notice, act upon, or react to in the environment or context in which they are moving. For extroverted learners who are more oriented towards communicating and interacting with others; in pairs or groups, either f2f or remotely via mobile devices—these contexts provide affordances which resonate with their predisposition towards learning from and together with others. In other words, their personal characteristics predispose them to perceive, notice and become aware of elements of the interactions from which they can learn—acting on the affordances they perceive and, in turn, also contributing affordances to the interactions that their interactors can learn from. In contrast, learners possessing more introverted characteristics tend to spend more time in their own sensory, emotional, cognitive, and spiritual reflexive spaces, and at the interface spaces between these and the external world of communication and interaction with others. As Cain puts it, “[i]ntroverts often work more slowly and deliberately. They like to focus on one task at a time and can have mighty powers of concentration … [and] listen more
than they talk, think before they speak, and often feel that they express themselves better in writing than in conversation” (Cain, 2012, p. 11). Learners with these personal characteristics dominant will be predisposed to perceiving, noticing, and acting more reflectively on elements of content, relationships, and the context from which they can learn. This is not to portray a bipolar dichotomy, but rather a continuum, to illustrate the personal characteristics of learners that may predispose them to perceiving different elements of the context and environment and thus to act (and learn) in different ways, whether formally, informally or in non-formal modes.

Although some people may not completely accept this continuum between introversion and extroversion, there is a case to be made for the probability that the push over the last several decades in the language field for increasingly more communicative tasks, has favoured those learners (and teachers) possessing more extroverted characteristics in their personalities. At the same time, these communicative tasks and the focus on group and collaborative work may have been mitigating against those learners whose personalities predispose them more towards reflexivity, or in other words, characteristics of introversion. This discussion bears further investigation in another venue. However, in recognition of this possibility, together with the increasing mobility of learners, content and learning context, it is time to reassess theories of learning in general, and of language learning in particular, with a view to formulating and articulating a theory that better accommodates the range of personal, social, cultural and intercultural variables found across learners. Ecological constructivism (derived from individual construal of affordances in the environment) is the theory of learning proposed here, as having the facility to describe and explain both the learning that is experienced while working alone and also while working
Definition of Terms

In order to adequately explain how EC describes learning, some terms need to be defined and the relationships among them elaborated. For EC, the terms *perception*, *noticing*, and *affordances* are critical to an understanding of the nature of learning conceptualized in the theory, as well the term *ecological* itself. How these terms are used in EC is discussed in detail in the following sections.

For some time now in the language field, the relationships among perception, noticing, and paying attention, have been recognized as playing an important role in second language acquisition (Ellis, 1992; Slimani, 1992; Schmidt, 1990; 1993; 2001; Hoven, 1997; 2008; and Ducate and Lomicka, this volume). These processes are also intrinsically intertwined with the concept of *affordances*. The concept of affordances was first introduced into social and cognitive psychology by Gibson as early as 1966 and 1971, though its wider influence dates from Gibson’s *The ecological approach to visual perception* (1979). Wells (2002) further refined the definition of affordances as “properties of the environment taken relative to an observer” (p. 140) – which leads to the question of what is meant by “relative to”. In exploring the ways in which properties of the environment, become relative to an observer, or, in the case of a theory of learning, relative to a learner, it is also necessary to examine what makes a learner become aware of an environmental property or element, including instructional content, and to what extent a learner is not merely an observer, but rather, an active, reciprocating participant. The issue of the relationship between a learner’s awareness and consequent action leading to learning then also comes into play. In the formulation of the theory explicated in this
chapter, with its focus on learning and pedagogy enabled by mobile devices, the working definitions for affordances as stated below, were initially considered.

**Affordances**

Initially, a definition of affordances was proposed as “potentials for learning relative to the technology, the context, and the individual learner and their intentions”, where potentials could include information/messages in the environment, context may include instructional content, while the technology may be either part of the affordance or may comprise those elements of the technology that mediate the affordance for the learner. An alternative definition was framed as “the potentials for learning made available or mediated for individual learners by or through the presence of context-embedded technology”.

In both of these working definitions, there are three nodes central to the definition and thus an understanding of the role of affordances in EC. These are: 1. technology (mobile devices), 2. context (where the learner is located temporally, spatially, cognitively, socially, emotionally and spiritually at the learning moment or period), and 3. the learner (embodied, among other features: experience, intentions, reflexivity, and receptivity). In addition, these working definitions highlight the principle that affordances are not absolutes, but rather, are relative to specific combinations of, and inter-dependencies among the three nodes. While in his earlier work on defining and discussing affordances, Norman (1988) included the need for an affordance to be a property of an object that “suggests” a certain action or use, he subsequently revised this to include the notion of relationships, following Gibson’s conception (Norman, 2004). Other researchers, in their definitions, have maintained that an affordance
exists or emerges only in relation to an agent’s perception or the context-embedded environment (see also Perry, 1999).

Bearing in mind the definition proposed by Wells above, the more colorful and ecology-focused metaphor that was put forward by van Lier (below), also bears consideration.

An affordance is a particular property of the environment that is relevant-for good or ill-to an active, perceiving organism in that environment. An affordance affords further action (but does not cause or trigger it) [emphasis added]. What becomes an affordance depends on what the organism does, what it wants, and what is useful for it. In the forest a leaf can offer very different affordances to different organisms. It can offer crawling on for a tree frog, cutting for an ant, food for a caterpillar, shade for a spider, medicine for a shaman, and so on. In all cases, the leaf is the same; its properties do not change; it is just that different properties are perceived and acted upon [emphasis added] by different organisms. Parallels to language can easily be drawn. If the language learner is active and engaged, she will perceive linguistic affordances and use them for linguistic action. (van Lier, 2000, p. 252)

This metaphoric definition from van Lier introduces another element critical to the conceptualization of affordances – that of perception, as italicized by the authors in the quotation above. Further elaboration of the process of perception in relation to affordances in learning is therefore required in order to shape EC more fully. How do individual learners perceive an affordance and what causes them to then act on it? In EC, perception is viewed as the first step for a learner in acting upon an affordance; the learner must perceive an element of the context or environment initially, then become aware of its presence-by responding
emotionally, socially, cognitively, sensorially, or spiritually to that presence. These responses represent the second step: noticing the element. When awareness emerges of some usefulness (step 3) of the element/affordance, the learner can then react to the affordance by taking action—step 4. Action in step 4 may include ignoring it, acting upon it either intentionally or incidentally, or integrating it into their schema of knowledge of the world, for immediate or perhaps some future action). An EFL/ESL learner hearing the phrase “Red sky in the morning is a sailor’s warning” for example, may notice that the sky is red at that point but not be able to further process or make meaning from the aphorism. However, when the weather takes a turn for the worse later in the day, these new circumstances can then be recalled, associated with the phrase heard and noticed earlier, and then integrated into that learner’s schema of meaning for that particular aphorism. These steps can be summarized as follows:

1. Perception

2. Noticing (response or reaction)

3. Awareness (of usefulness—when elements of the environment become affordances)

4. Action on affordance: avoid, ignore or uptake (which may also include storing for further reflection or postponing action for a later time)

Steps 3 and 4 are discussed in this volume by Ducate and Lomicka (Chapter 8) in their chapter on noticing and awareness playing a role in intercultural competence through MALL activities. In their study, it seemed that it was the activities themselves, “focusing students’ attention on noticing items in their surroundings and environment” that brought learners
to awareness of certain intercultural elements or perspectives. This noticing, leading to awareness, may have effects internal to individual learners, as well as at intrapersonal and inter-personal levels. Ducate and Lomicka also mention increased sensitivity as one aspect of intercultural competence, which is reflected in Step 2 above: responding emotionally, socially, cognitively, sensorially, or spiritually. “Spiritually” is used in this discussion to refer to human responses at a deep level, when elements of the environment resonate with a person’s beliefs, values or experience and their sense of being in the environment. This is not based on any religious worldview (though it may be), but rather on their perception of who they are and their capacities, capabilities, responsibilities and potential within the world around them, and in which they move, live and learn.

A re-formulated definition of affordances as used in the conceptualization of EC would therefore better be stated as follows:

[ Affordances are ] potentials for learning and experience which are present and available in the environment for perception by learners, leading to action and learning, and which are relative to individual learners and their intentions, to the context, and to the context-embedded technology. This definition of affordances then encompasses both the affordances inherent to a mobile device (the features) and the affordances beyond these that individual learners perceive and notice.

Evolution of EC as a Theory of Learning

The coalescence of elements and relationships conceptualized as Ecological Constructivism as a theory of learning, are drawn from various theoretical frameworks, including Pattern Theory (Neuman, 1991), Dynamical systems theory, Fractal Geometry, and Chaos Theory (Capra, 1996), General System theory (Bertalanffy, 1968), Autopoiesis
(Maturana & Varela, 1980), Gaia theory (Lovelock, 1991; Margulis, 1995), the Systems View of Life (Capra, 1996; Capra & Luisi, 2014),
and in language learning: Sociocultural theory (Hoven 1997; van Lier, 2004; Lantolf, 2004; Lantolf & Thorne, 2006; Lafford, 2009). As discussed elsewhere (Hoven, 2008; Palalas & Hoven, 2013), an ecological view of learning, based on learners construing or interpreting what they perceive of as important in the environment, is preferred over a more architectural or construction metaphor as conveyed by the term “constructivism” (Proulx, 2006; Davis & Sumara, 2002, 2003). This distinction is elaborated below.

Constructivism versus Construal

As Proulx (2006) delineates, constructivism originated in the writings of Piaget, dating back to his doctoral thesis in the 1920s in biology, the focus of which was the ways in which molluscs “were adapted and modified themselves to new habitats-and, reciprocally, how they were also simultaneously modifying and adapting their new habitats”. Piaget subsequently saw similarities between the adaptive processes of molluscs and the processes whereby human learners experience adaptation to new knowledge and modify it to their own “ever-evolving structure of thinking” (Proulx, 2006, p. 66).

As Proulx (2006) continues, when Piaget used terms such as “‘construct’, ‘structure’ and ‘construction’ in his writing, his intended meanings were related to a biologically based definition” (p. 66).

Within constructivism, which is concerned with the individual’s construal of a world, it is asserted that all knowledge is personally construed by the learner on the basis of his or her own lived experiences. In other
words, the meanings construed by individuals are subjective knowledge in
the sense that it is through their own interpretations of their experiences that
they came to know. Knowledge is affected by the learner’s own subjective
vision of things. The experiences of the learner act as a filter through which
all future experiences will be interpreted and understood. (Proulx, 2006,
p. 70)

Furthermore, as Davis and Sumara (2002) point out, in translation
from Piaget’s French, the verb construire came into English as “construct”,
which has subsequently been interpreted in English into metaphors relating
to architecture rather than Piaget’s original intent, which was biological.
Contemporary uses of the term constructivism thus tend towards metaphors
involving building, scaffolding, and the concomitant constraints of
structure, whereas a biological interpretation allows for much more fluid,
dynamically reformulated, inter-dependent conceptualizations of learning
and the learner’s role, with permeable membranes or interfaces between
learners and their environment.

As Davis and Sumara also argue (2002, p. 411), the socially
constructed versions of constructivism, which they term “constructionisms”,
and which are “subject-centred” interpretations, have their derivation in
Vygotskyan traditions in which knowledge is seen as being socially
constructed. This is in contrast to a Piagetian approach wherein individuals
construct their own understandings. In proposing Ecological Constructivism
as a theory of learning here, the intent is that the “constructivism” part of
the term be interpreted as “construal” on the part of learners, ala Piaget,
rather than employing a construction metaphor. Furthermore, in EC, the
role of both Piagetian and Vygotskian traditions are acknowledged, as the
contention here is that humans learn from both perceiving, interpreting,
reacting to and acting upon affordances in the environment, as well as using these same processes in learning from and through interactions with others, in mutually inter-dependent and co-creative ways. That is to say, just as individuals learn from perceiving and acting upon affordances in the environment, they also utilize similar processes of perception, response, and action in learning cooperatively and collaboratively with others. In both modes of learning, individuals dynamically both affect and are influenced by emerging affordances in the context or environment. In EC therefore, as with Piaget’s molluscs and later his learners, individuals perceive and construe or interpret elements (affordances) of their ecosystems in terms of their sense of who they are, their needs and motivations, and their unique experiences. These individual interpretations are then reflexively re-interpreted or-construed in keeping with an individual’s dynamic thought processes, to be progressively integrated into that individual’s learning. At the same time, when people are acting cooperatively or collaboratively, each individual’s personal construal processes and products are being perceived and responded to by others in the group, in a fluid, multi-directional manner, thereby co-creating new meaning for themselves and other group members. This phenomenon may be likened to the water in waves coming together on a shallow shore with an uneven bed. Some of the water of each wave co-mingles with that of the previous one, some of the volume recedes, while some volume moves on, adding to the wave before it, to increase in both strength and volume. Therefore, the process continues and is echoed in many other systems within the environment or ecosystem in which we live and learn.

**Exploring the Term Ecological**

*Ecological* is a term much used in different fields, with differing
intentions and meanings, including sometimes being used synonymously with the term holistic. In his discussion of an ecological view of “the web of life”, Capra (1996) uses the comparison of a holistic vs ecological view of a bicycle to illustrate how he sees the difference and why he feels ecological is the more appropriate term. According to Capra, a bicycle (for example) is seen from a holistic viewpoint, “as a functional whole … [together with an understanding of] the interdependence of its parts” (p. 6). Meanwhile, an “ecological view of the bicycle includes [the holistic view], … but adds to it the perception of how the bicycle is embedded in its natural environment—where the raw materials that went into making it came from, how it was manufactured, how its use affects the natural environment and the community by which it is used, and so on” (1996, pp. 6-7). Just as the difference between holistic and ecological is delineated by Capra in his development of a universal theory of life, so too does this discrimination follow through to EC. Ecological Constructivism also represents more than a holistic view of learning, by encompassing the whole context of the learner and their learning. This includes affordances in the context in which the learner is situated or moving that may not otherwise be conceived of as affordances for learning, if that learner does not perceive them as such. In other words, “ecological” in EC refers to the parts, the sum of the parts, and the interdependencies among the parts. In EC, this includes elements in the environment, affordances the learner perceives and becomes aware of, their interactions or collaborations with others and their sensory, cognitive, emotional, social and spiritual responses to all of these, both learner-internal and at the interpersonal interfaces.

For language learners using mobile devices, learning in an ecological constructivist model then acquires a broader interpretation than merely the accessing of content or creation and posting of content. The learners (and
teachers) are seen as mutually inter-dependent mobile agents immersed within a system (or ecology), which offers for their perception various linguistic and cultural affordances inherent in networks of language situations, populated by individual language users (SL, FL or TL), and groups, communities and networks of these, as well as other physical and technology-mediated resources (see also Pegrum’s 3 levels of “mobile” in Chapter 3, this volume; Petit & Lacerda Santos, 2014, pp. 2 & 12).

In an ESL MALL context, for example, learners might go out of the classroom with their mobile devices to explore certain elements of their environment relevant to their learning. Similarly, EFL learners could work individually with content on the web, either processing this for particular tasks, or creating content themselves; or they could meet in pairs or groups by means of their devices and/or through various learning management systems or social media tools, with other EFL learners or background speakers of their target language. A task could be designed, for example, in which: learners meet together f2f with an instructor and classmates, all with mobile devices, to discuss and record how they could solve a specific problem; where to find the necessary information; what range of information resources (human and digital) could be accessed, how, and where; how and by whom the information could be compiled, curated and communicated; and what form the final outcome or product might take.

Such tasks can incorporate combinations (blending) of in-class f2f activities (planning, organizing, pre-teaching, distribution of taskload, debriefing), mobile-mediated access to content (web searches or task explanations, discussions and links) and creation of content (personal or group podcasts, videos, vocabulary lists with definitions), and individual or small group planning, study or de-briefing activities, which may take place fully online, mediated by devices or f2f, whether in or out of a classroom.
context. Using a task-based approach in which learners have some investigation to do on their own, some searching and/or interaction with web-based content, some pair or group work, and some interaction with passers-by or targeted resource people, the task could incorporate practice in all four major language skills to expand the language repertoire of learners in natural, authentic environments (Palalas, 2012).

**Distinguishing Features of Ecological Constructivism**

As mentioned earlier, one of the antecedents in language learning theory from which EC is drawn is sociocultural theory (SCT). As Lantolf comments, however, “despite the label ‘sociocultural’ the theory is not a theory of the social or of the cultural aspects of human existence. ... its, rather, ... a theory of mind ... that recognizes the central role that social relationships and culturally constructed artifacts play in organizing uniquely human forms of thinking”. (Lantolf, 2004, pp. 30-31) In EC, such culturally constructed artifacts are seen as being constructed or construed within the mind of the learner/human (intrapersonal), as well as within and by various communities, collaborations and institutions (interpersonal and beyond). Culturally constructed artifacts can thus include artifacts of the natural and culturally constructed environment, as well as culturally constructed and environmentally mediated human apperceptions and interactions. This conception stands in contrast to the contention of Wertsch as cited in Lantolf and Thorne that “the goal of [SCT research] is to understand the relationship between human mental functioning, on the one hand, and cultural, historical, and institutional setting, on the other” (Wertsch, 1995, p. 56, as cited in Lantolf & Thorne, 2006, p. 3). EC steps back from this dichotomous perspective and views human mental functioning as encompassing senses, emotions, society and spirit, as well as
cognition, embedded in the ecology of systems of community, culture, history and other aspects of context. EC thus expands sociocultural perspectives on how learning occurs, to incorporate individual human mental functioning in relation to and within the natural environment, including incidental apperception leading to learning, and emotional, cognitive, sensory, and spiritual responses, as well as cultural, historical, and institutional settings. This elaboration on SCT, which is characteristic of EC, therefore recognizes the mutually inter-relatedness of these constructs-that the internal reflexivity and private or inner speech of learners (Lantolf, 1994; Lantolf & Appel, 1994) also affect the cultural and social meanings inherent in the environment. In this way, the EC interpretation of learning resonates with theories of autopoiesis (Maturana & Varela, 1980), in which structure, patterns and organization are fluid and constantly self-recreating and restructuring, by means of multi-way flow, with progressive refinements and adjustments happening through iterations, which are often not consciously recognized in human minds.

Turning to the perspective of how learning occurs within EC, the four major principles of SCT (Hoven, 1997), namely: (1) mediation, (2) goal-oriented or situated learning, (3) the Zone of Proximal Development (ZPD), and (4) and the “community of practice” proposed by Donato and McCormick (1994) are melded with the concept of schema as proposed by Piaget (2001). In this melding, perception and noticing in context-embedded situated environments become learning, as the awareness and response of Steps 3 and 4 mentioned earlier, are fitted into existing schemata and some of the dissonance or uncertainties in the learner’s mind are resolved. This resolution may be temporary or fluid; to be either further refined or revised later, or incorporated into the learner’s understanding of the particular incident, or to become their apperception of how the world
works in that instance. When viewed through Steps 1-4 of EC perception to action as explained earlier, some insights emerge as to how progressive stages of the ZPD may be triggered: both through perception of and acting upon (or avoiding) affordances in the environment. However, in EC, the boundaries between different zones in the ZPD construct are better seen as amorphous, porous and irregular transitions or demarcations as found in cell membranes, rather than the circular solid lines as commonly depicted. In MLL or MALL contexts, the mobile devices and the language involved in their use mediate the learning by introducing new affordances into the learning environment.

Concluding Remarks

As discussed in this chapter and in Chapter 2 by Palalas and Hoven (this volume), Ecological Constructivism is emerging as a general theory of learning and more specifically, as a theory that is appropriate to describe, explain and predict how language learning develops through the use of mobile devices. By using tasks that draw learners’ attention to certain features, they can move from perception to noticing, to response and reflection, leading to learning, as Ducate and Lomicka (Chapter 8, this volume) have also shown. The job for mobile teachers using mobile devices with mobile learners therefore, is to design tasks that lead learners to notice the features that are within their ZPD or capacity to learn. In other words, mobile teachers need to mediate the space between tasks and learners, to lead and support learners to perceive and act on more useful affordances in their learning ecosystems. This seems to be the missing factor in earlier language learning theories-how to bring learners from where they are to their next step in learning. The concept of affordances, in the context of EC and mediated by means of mobile devices may be exactly what is now needed in
order to further the field.

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Chapter 5: Mobile Assistance in Language Learning: A Critical Appraisal

Agnes Kukulska-Hulme

The Open University, UK

Abstract

MALL literature tends to focus on formal learning contexts, but in so doing, the research may overlook some of the rich variety of mobile language learning and rehearsal taking place in informal settings. Informal uses of personal technologies call for a deeper examination of the notion of assistance, which may be built into mobile systems, environments and application designs and also provided by many different people. The chapter reviews relevant literature relating to mobile assistance with special consideration of individual learner requirements and the important challenge of supporting informal learning among migrants. The author considers how the notion of assistance may be extended so that learners not only benefit from assistance but they are also empowered to help themselves and others.

A classification of assistance for mobile language learning and communication support is proposed. The idea that a handheld device can offer “personal assistance” to its user has been around a long time, but technology advancements and more mobile lives introduce new perspectives. Mobile learning researchers, designers, practitioners and others must consider not only mobility of technology but also many other mobilities which include the dynamic nature of human communication and language development. As advanced societies appear to be on the cusp of a new era
of “intelligent assistants” and “social robots”, the pressing need to revisit the notion of assistance and explore its multifaceted nature in informal and out-of-class language learning is very apparent.

**Keywords:** Informal learning; out-of-class learning; types of assistance; assistive technology; learner agency; mobile pedagogy; well-being support; sustained help; personal development; enrichment

**Introduction**

When learning another language, an ideal scenario could be to have constant and immediate access to one or more people who are always willing to assist the learner in the process of learning, practising and communicating, and who are capable of doing so. Only the most privileged learners can realise such a dream, if the assistance is to be provided by qualified and tireless human beings who perhaps also expect high levels of remuneration. Private tutors and interpreters have traditionally played such roles. Some learners have the dedicated support and guidance of close friends or family members, like the very involved Chinese parents and elders described by Xuesong (2006) who help and motivate their children in learning English. However, those are exceptions when considering the totality of deliberate foreign and second language learning across the globe.

The majority of language learners must rely on other ways to access target language assistance or support. This may include using technologically mediated solutions, which can bring their own challenges. Selwyn (2010) has argued that “thousands of hours and millions of dollars are directed towards the optimistic exploration of how technology is capable of supporting, assisting and even enhancing the act of learning…” yet the day-to-day realities of contemporary education undermine this optimism in
practice (p. 66). In the application of technology in language learning, there is abiding caution around evidence of its value. Zhao’s (2003) meta-analysis highlighted many limitations in published studies on the effectiveness of technology uses in language education, including inadequate research designs, short duration of studies, and limited scope in terms of target learners, languages, and aspects of language learning that had been investigated. A systematic review of computer-assisted language learning in English as a second language (ESL) in schools found only slight or tentative evidence of effectiveness (Macaro, Handley, & Walter, 2012). The review included some studies where mobile devices had been used, although that was not the main focus. As mobile-assisted language learning has become more widely adopted, it has provided many new ideas for how technologies might improve the experience of language learning, however capturing expected or actual learning gains has proved more problematic. In his critical analysis of the last twenty years of MALL implementation, Burston (2015) bemoans the lack of well-designed research studies, although he notes that of the few reliable ones, most report unequivocal positive results.

MALL literature tends to focus on formal learning contexts and seeks improvements in language skills and competences such as vocabulary acquisition, reading, writing, speaking, and listening. In so doing, the research may overlook some of the rich variety of mobile language learning and rehearsal taking place in informal settings, and activities that may connect formal and informal contexts of learning. MALL now potentially encompasses engagement with mobile-enabled courses, programmes and MOOCs; interaction and collaboration in classroom learning; educational trip activities; support for study abroad; mobile games, simulations and treasure hunts; and ad hoc or informal assistance in diverse social situations or for individual requirements.
In this chapter, we will concentrate on informal uses of personal technologies, with special examination of the notion of assistance. “Assistance” is a generic term that can include direct help, collaboration on a task, supportive words and actions, and provision of helpful scaffolds or resources. Informal language learning may progress more smoothly if various types of assistance are called upon according to emerging learner needs; the learning may be initiated and directed by learners themselves, but assistance in various forms (including encouragement and inspiration) may come from teachers and other people, from materials, tools and technologies and from the physical environments in which learning takes place. This is less-explored territory to date in the field of MALL, and there is limited research evidence or documented practice around informal mobile language learning, although efforts are being made to report and comprehend such practices (Chen, 2013; Comas-Quinn, Mardomingo, & Valentine, 2009; Kukulska-Hulme, 2015; Kukulska-Hulme & de los Arcos, 2011; Petersen, Procter-Legg, & Cacchione, 2014; Velghe & Blommaert, 2014).

Informal language learning invites the possibility that what is sought and achieved may not always coincide with formalised language learning objectives and outcomes. Could Perez Cavana and Edwards’s (2014) proposed Language Learner Support Dimensions (LLSDs) provide useful measures of learning gains from informal language learning? They are framed in a learner-centered pedagogy aiming to enable individuals to reflect on their progress and development, and to take control of their learning process; the proposed dimensions include creativity and willingness to communicate, amongst others. The powerful combination of informal and mobile learning gives added scope for re-thinking possible objectives and outcomes. Can mobile devices come to the rescue of learners who are
struggling with a particular communication issue, or support those who want to move ahead faster with aspects of their language practice and acquisition? Is it possible that newer, ingenious uses of personal mobile devices used across different settings may be bringing us closer to the ideal of devoted and effective personal assistance? Alternatively, might this be the wrong ideal in the first place? Gradual removal of scaffolding, or “fading” of assistance, may be a better goal in an educational context, perhaps depending on the tasks to be performed (e.g. Tullis, Goldstone, & Hanson, 2015). It may be too early to provide definitive answers to such questions, but a review of relevant concepts and developments will highlight important considerations.

The Notion of Assistance and Technology-Assisted Learning

Any learner might require some form of help or assistance to get over a hurdle, to enable them to move forward in their learning, to reflect on progress, or in a more general sense to reach their potential. The idea of inclusive education is pertinent here as it involves focusing on the individual needs of learners, “helping them to overcome any barriers that may prevent them from reaching their potential” (Walker, 2009, p. 4). Assistance may be given to learners by many different people, including teachers, coaches, mentors, experts, parents, more able peers (Vygotsky, 1978; Luckin et al., 2005), or simply other learners (e.g. self-help groups and revision partners), as well as by adjusting the learning environment or through various uses of technologies. It may be offered without prior request, or sought out actively by learners through “help-seeking” (Nelson-Le Gall, 1981; Aleven et al., 2003; Mäkitalo-Siegl & Fischer, 2011). The cognitive, metacognitive and social processes of learning may be articulated and reflected upon, as in the process of cognitive apprenticeship (Collins, Brown, & Newman, 1987) and in situated cognition (Brown, Collins, &
Duguid, 1989).

The notion that a handheld device can offer “personal assistance” to its user has been around a long time. This idea had an early incarnation in the Personal Digital Assistants, which rose to popularity in the 1990s, and has evolved to include more humanoid services such as Siri, Speaktoit Assistant, Cortana and JIBO. User interfaces that use touch, gesture and gaze reinforce the intimate, affective relationship with a device that is carried or worn on the body (Vincent, 2006). Digital tools for lifelogging (Sellen & Whittaker, 2010), Google Glass, wearable fitness trackers, and companion robots (Schroeter et al., 2013) all provide more intimate assistance whilst also amplifying and creating many social and ethical challenges.

In the field of disability support, assistive technology is commonly defined as including products, equipment or technologies that are designed or adapted with a view to improve the functioning of a disabled person, and there are many developments in this field. Pollak’s (2009) work on neurodiversity, or specific learning differences, includes descriptions of a number of mobile software tools and device features such as voice recognition, screen reading, voice recording, digital pens for electronic note-taking, and optical character recognition to read aloud any text that has been photographed. It has been argued that environmental aspects and processes enabling access and use of assistive products or technologies should be included in the definition (Cook & Polgar, 2015). Cook and Hussey’s (1995) Human Activity Assistive Technology model emphasizes that assistive technology is used by humans, in context, to perform some activity, thus de-emphasizing the role of the technology itself. Devices that promote communication, support cognitive activities, and augment hearing and vision enable participation in educational activities, although they may not directly contribute to achieving specific educational goals (Cook &
Polgar, 2015). One example is Hwang and colleagues’ (2014) research on mobile technology support for parents to help their young children with first language development delay by raising awareness of patterns of interaction at home. A different example is the beacon technology installed to assist visually impaired Londoners to navigate the tube (subway) so that they can reach more destinations in the city (TFL, 2015). Another is BlueAssist, a simple card system designed to help anyone who has difficulty communicating (for example due to anxiety, memory problems or hearing impairment) to find a way of asking for help, or making a request when out and about (BlueAssist, 2015).

Selwyn (2015) points out that as the language of educational technology has shifted from computer-based instruction and computer-assisted learning to “technology-enhanced learning”, there is an underlying assumption that a positive enhancement is somehow inevitable, and by the same token, “…the possibility of technology not leading to learning and/or other educational gains is rarely a matter for consideration” (p. 3). The notion of computer-assisted learning (rather than enhanced) does not bear the same criticism, although historically it has associations with a dehumanised process whereby computers sideline the role of the teacher. Palalas (2012) has proposed the term mobile-enabled language learning to emphasize the role of mobile technology as an enabler of the learning process. Technology can undoubtedly play a role in enhancing, assisting or enabling language learning but how this is best realised is still a matter for debate. As contemporary researchers investigate and analyse the human dimension of “social robots” (Vincent, Taipale, Sapio, Lugano, & Fortunati, 2015), the need to revisit the notion of assistance and explore its multifaceted nature is very apparent.

In fact, a fresh look at the notion of assistance reveals some positive
and some negative connotations. Too much assistance may disempower learners whereas too little may leave them stranded. Assistance can be construed as a neutral term that will take on specific meanings depending on who is using it and why. In reality, many common words like assistance are pre-loaded with (local, professional or personal) shades of meaning and this will affect how such words are understood across contexts of use. Mobile language learning is preferable to mobile-assisted language learning, in that it subtly but importantly shifts the focus to mobility: connoting not just mobility of technology, but also other mobilities pertaining to time, space, activity, and the dynamic nature of human communication and language development. However, learners’ abiding need for some form of assistance has to continue being examined.

Mobile and Animate Assistance

Working on the concept of mobile assistance, researchers Sumi and colleagues (1998) declared their long-term goal to be the enhancement of communications and information sharing between people and “knowledgable machines.” They built a prototype assistant with a life-like animated character on a mobile computer to provide visitors to open house exhibitions with personalized information based on their locations and interests (Sumi et al., 1998). Another early example of a mobile assistant was the animate mentor that could act both as a learning guide and a means of interaction in the HandLeR device for young learners (Sharples, Corlett, & Westmancott, 2002; Kukulska-Hulme, Sharples, Milrad, Arnedillo-Sánchez, & Vavoula, 2011). This is an active field of research, and published studies are producing an initial glimpse into the potential of animate mentor support for learners. In an ESL context, a study comparing an animated pedagogical agent with an “arrow and voice narration” feature (directing attention and
voicing key concepts) concluded that only learners with the lowest levels of prior knowledge benefitted from the animated agent (Choi & Clark, 2006). Wik and Hjalmarsson (2009) describe two systems using embodied conversational agents for language learning: a virtual language teacher for vocabulary and pronunciation training (an agent acts as a guide that also gives encouragement and feedback) and a role-playing game for practising conversational skills (an agent acts as a conversational partner). Macedonia, Groher, and Roithmayr (2014) introduce a new generation of “language trainers”: intelligent virtual agents (IVAs) with human appearance and the capability to teach foreign language vocabulary. They report results from studies that they have conducted with Billie, an IVA employed as a vocabulary trainer, showing that Billie can train humans as well as a human teacher can, and that both adults and children accept the IVA as a trainer (Macedonia et al., 2014).

This research may raise concerns about agents that could replace human tutors and teachers in certain respects, but it can also prompt reflection on how such agents should be designed to complement human assistance and to support learners’ personal development. In the next section, we consider how the notion of assistance may be extended so that learners not only benefit from assistance but they are also empowered to help themselves and others.

Learners Helping Themselves and Others

The early m-learning research and development project (Attewell, 2004; Stead, 2003) helped learners identify areas where they needed support and enabled tutors and learners to become aware of existing abilities in the learners that had not been previously recognized. Alongside intended learning outcomes, such as skills acquisition that could lead to improved
confidence and the chance to progress to higher levels of education, mobile learning contributed to planning longer-term development and highlighted that some learner abilities may be revealed and acknowledged through the use of new educational media that are part of learners’ everyday lives. Mobile technologies have also been used to help reflect on psychological states and readiness for learning; for example, the “Mobile Mood Diary” project (Matthews, Doherty, Sharry & Fitzpatrick, 2008; Arrigo et al., 2010) developed support for young people aged 9-18 with mental health issues, specifically enabling self-monitoring of a young person’s mood as part of their cognitive behavioural therapy. The emerging “quantified self” paradigm (Swan, 2012; Whitson, 2013; Wolf, 2010) highlights the capacity of individuals to become engaged in gathering and interpreting data that illuminate their everyday behaviours and experience as well as contributing directly to bodies of knowledge in several domains including medicine, biology and sports science. However, there is also scope for applications in language learning. What if a mobile device supported the function of recognizing or logging when learners used their target language to help others?

Using mobile devices can promote learner agency and it has been shown to support learner autonomy in language learning (Díaz-Vera, 2012). Godwin-Jones (2011, p. 8) suggests that language educators should encourage use of smartphones and apps to enable learner autonomy and as a means to combine formal and informal learning. Activities such as noticing and recording how language is used in various settings can help both the learner and others (Kukulska-Hulme & Bull, 2009). It may be argued that one vital function of an assistant is to educate language learners in how they may help themselves, so that over time they become more autonomous and rely less on the assistant, although it is not always in the (human)
assistant’s best interest to do so. Xuesong’s (2006) research with Chinese parents mentioned earlier showed that some had been directly training their children to be “good language learners” by fostering certain behaviours and beliefs (p. 289). This could lead to greater self-motivation and self-direction in the longer term, which are aims that many parents would support.

**Teachers Needing Assistance**

When it comes to helping others become “good mobile language learners”, it may be the teachers who first need assistance. In the English in Action programme initiated by the Government of Bangladesh and funded by UKAid, The Open University has enabled tens of thousands of teachers to access teaching materials and techniques via “the trainer in the pocket”—a low-cost mobile phone-to help them improve their own knowledge of English and also to assist them in delivering lessons (Walsh & Shaheen, 2013; Walsh et al., 2013). The teachers are therefore supported in developing their language skills as well as their teaching methods. A study by Park and Slater (2014) has revealed contrasts between ESL students, “who generally felt comfortable and enthusiastic about MALL and used it outside the classroom,” and ESL teachers, “who were enthusiastic about MALL’s potential in the classroom but much more unfamiliar with the technology” (p. 112). Recognising that this problem goes far beyond familiarity with technology, Kukulska-Hulme, Norris and Donohue (2015) have produced a guide for teachers that proposes engagement with the concept of “mobile pedagogy” for English language teaching in the classroom and beyond the classroom, emphasizing that learners can take more responsibility for their own learning and that teachers play their part in enabling this. This guide
for teachers stresses that teaching practice involves consideration of learning outcomes that can be predicted and other outcomes that may arise as a by-product of participating in a language learning activity. Teacher wisdom and experience informs intended outcomes while remaining open to other possibilities that will likely arise from the dynamic nature of language in use and communication via multiple channels and media. Mobile learning outcomes may include some of the following (Kukulska-Hulme, Norris, & Donohue, 2015):

- identifying gaps in knowledge
- developing a habit of reflection on language learned
- learning to notice (how language is used, how I use the language)
- connecting language users (more expert and less expert)
- using language for real purposes in real world contexts
- developing ability to respond to a context
- rehearsing, experimenting
- developing multiple perspectives
- learning to learn, developing autonomy
- developing digital (mobile) literacies (p. 9)

Recent research by Wong, Chai, Aw and King (in press) on seamless mobile learning connecting school and out-of-school environments aims to foster “a greater degree of self-directedness and social/participatory learning in the target learners” (p. 3). Wong and colleagues have reflected on how the student participants typically lacked the ability to deploy their thinking skills and imagination “for making deeper meaning on their daily
encounters, and in making connections between their learned linguistic knowledge and their personal lives” (pp. 19-20), which can be achieved through enculturation and scaffolding activities to assist students in establishing these connections.

Mobile Assistance for Migrant Populations

Informal and out-of-class language learning can take place among all kinds of people but one large (and growing) group across the world are migrants and migrant workers. The MASELTOV project (www.maseltov.eu, 2012-15) had these populations in mind when it developed a mobile assistant in the form of a prototype suite of integrated smartphone services and tools aimed specifically at recent immigrants to Europe. Accessed through a single app (the MApp), the services and tools were devised with a view to foster social inclusion, and they provide support for gaining specific information (e.g., for health emergencies), help with navigation, language learning lessons, translation, playful cultural learning, recommendations, and social interaction. The Open University (UK), a partner in this project, led the work package on persuasive learning services, which aimed to encourage target users to engage with the provided tools, and services in ways that would give them a sense of achievement and progress. The research has touched on the issue of how new configurations of human mobile assistance-teachers, friends, volunteers, mentors, an online community-in tandem with the MApp provided on the smartphone, can support learners who may be enrolled in some formal language classes but who urgently need daily practice, assistance and support. The development of such innovative services benefits our broader understanding of what it means to learn in informal environments (while travelling,
walking about, visiting a health centre, and so on) and how this may be supported through semi-structured activities, context-specific recommendations, assistance for both planned tasks and unanticipated events, and a range of progress indicators, feedback and rewards (Gaved et al., 2013; Kukulka-Hulme et al., 2012; Kukulka-Hulme et al., 2015; Scanlon et al., 2014). A spin-off project, SALSA (Sensors and Apps for Languages in Smart Areas, 2014-15), is testing how mobile phones can be combined with “smart technology”-Bluetooth beacons built into the environment that trigger context-specific language learning experiences on the user’s phone. At a bus stop, for example, mobile users could be prompted to try a language lesson related to travelling (SALSA, 2015).

Types of Mobile Assistance

Table 5. 1 attempts to capture the rich variety of possibilities for mobile assistance for language learning and communication support. It is based on the literature review in this chapter and was expanded to inspire discussion among mobile learning researchers, developers, designers and all those involved in providing or receiving mobile assistance. As with any such categorisation, there is some degree of overlap or fuzzy boundaries between the categories. In some instances, the technology might connect people to facilitate assistance, while in others the assistance may be built into the design of the materials, applications, tools, or avatars. The need for various types of assistance, and combinations of assistance, will vary between contexts in which mobile learning is taking place, and some will be more relevant for informal learning than others but this cannot always be determined in advance.
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<th>Table 5.1 Types of Assistance for Mobile Language Learning</th>
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<td>Motivational support</td>
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<td>Rewards for achievement or trying</td>
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<td>Confidence coach</td>
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<td><strong>Progress monitoring</strong></td>
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<td>Feedback on performance</td>
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<td>Rectification of mistakes</td>
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<td>Reflection tool</td>
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<td><strong>Direct help</strong></td>
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<td>Emergency help</td>
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<td><strong>Sustained help</strong></td>
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<td>Directing attention</td>
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<td>Scaffolding and fading</td>
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<td>Memorisation aid</td>
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<td><strong>Organisation</strong></td>
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<td><strong>Social support</strong></td>
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**Conclusion**

Mobile language learning calls for human and technological forms of assistance and highlights the need to re-examine this notion as new possibilities emerge. The last few years have seen an explosion of online environments and mobile apps for foreign and second language learning that are open to all-or at least to anyone who has access to a personal computer, smartphone or tablet. Some of these are for individual study, but increasingly they have a social component, with reciprocal language teaching, mutual encouragement, and elements of play and competition becoming popular. This generation of learning technologies offers alternative
pathways for learning and practice, in virtual and physical settings that are different from most conventional language classrooms. Mobile language learning is still in its early stages of development, yet we already see the emergence of a new generation of wearable and context-aware technologies that will add new flavours and nuances to the learning experience. Mobility, in conjunction with the use of social networks and portable devices, can create entirely new possibilities for language learning. Many learners will become more able to take advantage of these options, but they will still need help.

The notion of assistance is foregrounded in the context of informal learning settings, where teachers may be hard to access or when additional practice is needed. In the field of language learning, the availability of a personal device to support everyday communication and learning is certainly valuable yet still in many ways contentious. Mobile learning is taking on new qualities and characteristics as devices become ever more integrated with everyday life, and wearables intensify the increasingly close relationship between people and technology. Technology advancements suggest a future where devices will become integrated with daily activities and will come to understand human intentions: “We... conceive the notion of a ‘codriver’: an artificial agent that is able both to drive similar to a human and to infer human intentions, interacting accordingly, including rectifying mistakenly executed actions by the human driver.” (Da Lio et al., 2015). These developments will surely permeate learning environments as well.

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papers/mobile-pedagogy-english-language-teaching-guide-teachers


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Chapter 6: Selecting and Evaluating Mobile Apps for Language Learning

Jeong-Bae Son

University of Southern Queensland, Australia

Abstract

Mobile-assisted language learning is one of the most important recent developments in the field of computer-assisted language learning. MALL is growing, with an increasing number of studies that examine various mobile devices in formal and informal learning environments. Along with the advancement of mobile devices such as smartphones and tablets, a large number of educational apps have been developed and are widely available in the App Store (iOS), Play Store (Android) and other repositories. The number of language learning apps is also rapidly growing and the increasing accessibility of the apps is generating the need for the appropriate selection of the apps. This chapter explores mobile apps for language learning and looks at the evaluation of language learning apps. It introduces a language learning app review form, which guides language teachers to critically evaluate pedagogical and technical aspects of language learning apps. The review form contains 15 evaluation criteria: purpose, accuracy, usefulness, flexibility, authenticity, engagement, feedback, integration, support, price, reliability, presentation, organization, navigation and multimedia. The chapter also presents a list of example apps selected for reading, writing, listening, speaking, vocabulary, grammar, pronunciation and
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culture learning activities with a particular focus on learning English as a second/foreign language (ESL/EFL).

**Keywords:** Mobile-assisted language learning, mobile apps, language learning apps, app evaluation, English language learning

**Introduction**

Mobile learning using mobile devices (e.g., MP3 players, personal digital assistants (PDAs), electronic dictionaries, mobile phones, and tablet computers) is considered as anytime and anywhere learning (Burston, 2014a; Kukulska-Hulme & Shield, 2008; Stockwell & Hubbard, 2013). Mobile learning on smartphones and tablets, in particular, normally involves mobile apps, which are rapidly on the rise (Godwin-Jones, 2011). Mobile apps are available in the App Store (iOS), Play Store (Android) and other repositories. The number of apps is continuously increasing. According to Pocketgamer.biz, the total number of active apps in the App Store (available for download) on 15 February 2015 was 1,515,650 and, on average, 720 new apps were submitted to the App Store every day (App Store Metrics, 2015). In terms of downloads, Statista.com reported that 85 billion apps had been downloaded from the App Store from July 2008 to October 2014 (Apple App Store: Number of downloads 2015, 2015). Categories of mobile apps include games, education, business, lifestyle, entertainment, utilities, travel, books, music, productivity, health and fitness, sports, reference, photo and video, news, finance, food and drink, medical, social networking, navigation and weather. At the time of investigating the total number of active apps reported on Pocketgamer.biz, the most popular category of apps was games (21%), followed by education (10%), business (10%), lifestyle (8%) and entertainment
(7%). The increasing accessibility of apps, particularly educational apps, is generating the need for the appropriate selection and use of apps for educational purposes.

In the field of computer-assisted language learning, the rapid development of mobile technologies has brought up a new trend called mobile-assisted language learning. Mobile devices are widely available for language learners and teachers and a number of studies on the use of mobile devices for language learning and teaching have been reported in CALL publications (e.g., Burston, 2013, 2014a, 2014b, 2015; Kukulska-Hulme & Shield, 2008; Stockwell, 2012). As the body of literature on MALL is growing, it is likely to see more studies attempting to use mobile apps on smartphones and tablets in user-friendly learning and teaching environments. This chapter explores mobile apps for language learning and looks at the evaluation of language learning apps. It introduces a language learning app review form, which guides language teachers to critically evaluate pedagogical and technical aspects of language learning apps so that they can make informed decisions in their search for good mobile apps. It also presents a list of example apps selected for reading, writing, listening, speaking, vocabulary, grammar, pronunciation and culture learning activities with a particular focus on learning English as a second/foreign language (ESL/EFL).

**Mobile Apps and Language Learning**

With the enhancement of hardware and software in recent years, smartphones and tablets have become powerful multi-functional devices featuring touch screen interfaces, voice recognition, motion sensors, high-resolution image and video capture, fast Internet connectivity, Bluetooth and/or Global Positioning System (GPS) technologies. As a result, MP3
players and PDAs have been replaced by smartphones and tablets and MALL is now essentially associated with mobile apps (Burston, 2014a) for smartphones and tablets. Mobile apps are software programs designed to run on mobile platforms such as Android (Google) and iOS (Apple). Some apps come pre-installed while users can download other apps onto mobile devices.

It is known that there are largely three types of apps: native apps, web apps and hybrid apps. Native apps are developed specifically for their targeted platforms and can make use of all device features. Web apps are cross-platform websites that provide users with similar looks and feelings to native apps but run on mobile browsers, and hybrid apps are a mix of native apps and web apps—they can use many device features like native apps while relying on Hyper Text Markup Language (HTML) rendered in browsers like web apps. Each type of these apps has strengths and weaknesses in terms of device features, offline functioning, discoverability, speed, installation, maintenance, platform independence, content restrictions, approval process, fees, development costs, and user interface (Budiu, 2013). Developers create apps using specific programming languages and tools in their own programming environments (e.g., Objective-C and XCode for iOS apps; Java and Android Studio for Android apps; C# and Visual Studio for Windows apps; HTML, JavaScript and Cascading Style Sheets (CSS) for web apps and hybrid apps). The question of which type of apps should be developed and used can be answered based on users’ needs, preferences, expectations and styles of work.

A wide range of apps are available and can be used for language learning and teaching. Bradin Siskin (2009) proposed four types of apps for language learning: (1) built-in apps such as email, voice recorders and video recorders; (2) instructional apps such as AccelaStudy

Along with MALL studies looking at specific functions of mobile devices, including short message services (SMSs) (e.g., Kennedy & Levy, 2008), podcasting (e.g., Ducate & Lomicka, 2009) and GPSs (e.g., Sandberg, Maris, & de Geus, 2011), it is likely to see more app-based studies attempting to examine apps in language learning and teaching environments. In Amer's (2014) study, for example, a language-learning app called Idiomobile, containing a game, a quiz and a flashcard, was used for learning English idioms and collocations with four groups of learners for a period of one week. The findings of the small-scale study show the usefulness of the app and the learners’ positive attitudes toward the use of mobile technology in language learning.
In this chapter, language-learning apps are defined as apps dedicated to the learning of languages. They can be developed as the aforementioned native apps, web apps or hybrid apps and used in and out of the language classroom. They are instructional apps, which are explicitly designed with language learning in mind. Therefore, they are different from other general-purpose apps (e.g., email apps, messaging apps, photo apps, audio apps, video apps) that could be used in language learning but are not originally developed for that purpose. In other words, apps can be categorised into two types: apps dedicated to language learning (ADLL) and apps adaptable to language learning (AALL). The focus of this chapter is given to ADLL.

Mobile App Evaluation Criteria

The explosion of the number of mobile apps has led to the need for the effective selection of apps and the provision of a variety of review sources. Several practitioners and researchers have responded to the need by suggesting useful criteria for evaluating mobile apps. Walker (2010, as cited in Walker, 2011), for example, presented an evaluation rubric for mobile apps comprising six domains: curriculum connection; authenticity; feedback; differentiation; user friendliness; and student motivation. Schrock (2011) expanded Walker’s criteria and provided critical evaluation survey forms for content-based apps and creation-based apps. Her criteria for evaluating content-based apps include: curriculum connection; authenticity; feedback; differentiation; user friendliness; student motivation; reporting; sound; instructions; support page; navigation; and modalities. Referring to Walker’s rubric and Schrock’s form, Vincent (2012) proposed a rubric emphasising the purpose of using apps. His rubric has the following seven criteria: relevance; customization; feedback; thinking skills; usability; engagement; and sharing. Bell (2014) adapted these resources
and posted another list of app selection criteria covering curriculum support, relevance, usability, engagement, accuracy, quality and costs. For the evaluation of science education apps, on the other hand, Green, Hechter, Tysinger and Chassereau (2014) presented a Mobile App Selection for Science (MASS) rubric, consisting of six items (i.e., accuracy; relevance of content; sharing findings; feedback; scientific inquiry and practices; and navigation) on a four-point response scale. They reported that the rubric was developed based on the analysis of quantitative data and qualitative data collected through four design cycles with the importance of context-specific approaches to technology integration. Their study provides a good example of critical evaluation of mobile apps not only for science education but also for other fields such as language education.

Based on a critical analysis of these suggested criteria, educational benefits of apps and the nature of MALL, a list of mobile app evaluation criteria has been generated and incorporated into a Language Learning App Review Form (see Appendix A). The basic structure of the review form was adapted from Son’s (2005) Language Learning Website Review Form and an initial version of the review form was presented at a CALL conference (Son, 2014). The first section of the form asks for general information on the target app such as its title, place to download, price, last updated date, version, size, publisher/developer, target audience and target language activities/skills. The second section of the form has a space for the description of the app. The third section of the form is given for the evaluation of the app and provides 15 criteria that reviewers can use in assessing the app on a five-level scale: “Very Unsatisfactory”, “Unsatisfactory”, “Neutral/Uncertain”, “Satisfactory”, or “Very Satisfactory”. The criteria include:

1. Purpose: Is the purpose of the app clear? Is the content of the app in
line with its purpose? Is the app appropriate for its target learner?

2. **Accuracy**: Is the content of the app accurate? Are spelling and grammar accurate? Are the learning materials of the app culturally accurate?

3. **Usefulness**: Is the app useful for learning the target language? Does the app provide useful information? Are the activities or tasks of the app practical?

4. **Flexibility**: Does the app allow the user to adjust settings to meet his/her needs? Does the app offer various modes of learning activities? Does the app provide opportunities to collaborate with others?

5. **Authenticity**: Does the app provide authentic learning experiences? Are the learning materials of the app authentic? Are authentic materials provided in appropriate contexts?

6. **Engagement**: Is the user motivated to use the app? Does the app provide reinforcement to hold the interest of the user? Does the app offer a meaningful and interactive learning environment?

7. **Feedback**: Does the app provide specific feedback? Is feedback on learner responses constructive and timely? Is error handling meaningful and helpful? Does the app allow the user to monitor his/her progress? Does the app provide a summary of learner performance?

8. **Integration**: Can the learning materials of the app be integrated into a curriculum? Does the content of the app fit with curricular goals? Is the content of the app relevant to the course of study undertaken by the user?

9. **Support**: Is user assistance available? Is online help adequate? Does the app provide necessary updates?
10. Price: Is the app free? Is the app paid? Is the price of the app appropriate and reasonable? Is the app a value for money and time?

11. Reliability: Is the app free of bugs and breaks? Is the app stable without crashes? Does the app load quickly?

12. Presentation: Is the content of the app presented clearly and logically? Is the user interface of the app attractive and friendly? Are screen displays effective and efficient?

13. Organization: Is the app well organised? Is the content of the app well structured? Is the app interesting to look around?

14. Navigation: Is the app easy to navigate? Are the on-screen instructions of the app easy to follow? Is it easy to retrieve information? Does the app use the touch screen effectively to explore?

15. Multimedia: Does the app make effective use of graphics, sound and colour? Is the level of audio quality, the scale of graphics or video display appropriate for language learning?

At the end of the evaluation section of the review form, reviewers are invited to give an overall rating: Very Poor (Not recommended at all), Poor (Not appropriate), Adequate (Acceptable with reservation), Good (Appropriate for use) or Excellent (Highly recommended). Finally, there is a space for reviewers to make additional comments and then sign and date the form. The form guides users to have a quick summary of app evaluation and helps them make a judgement about the quality of the target app and its potential applicability. In practice, empirical validation is needed for the further development of the form in various language learning environments.
Mobile Apps for Learning English

There are a number of practitioners and researchers who have presented interesting lists of apps for learning ESL/EFL. Pesce (2014), for example, pointed out the convenience, efficiency and learner engagement aspects of apps and recommended nine ESL apps on a busyteacher.org page (http://busyteacher.org/12155-9-best-mobile-apps-for-esl-students.html). The Educational Technology and Mobile Learning (2014) website also offered a list of ten iPad apps for learning English (http://www.educatorstechnology.com/2014/03/10-great-ipad-apps-for-learning-english.html). In addition, MasterinESL.com (2014) provided a guide to 101 ESL learning apps in four categories: ESL study aids; dictionaries and vocabulary tools; translation and pronunciation; and general language learning apps (http://mastersinesl.com/essential-esl-app-guide/).

More example apps for learning English are shown in Table 6.1. These applications are divided into the aforementioned two types of apps (i.e., ADLL and AALL) and are listed together with target learning activities (i.e., reading, writing, listening, speaking, vocabulary, grammar, pronunciation and culture) that the apps can be used for. In the category of ADLL, specifically, Learn English Grammar (British Council) helps users improve their grammar skills with practice questions at the elementary, intermediate and advanced levels. LearnEnglish Podcasts (British Council) presents three series of English learning podcasts to download and listen to together with audio scripts. Learn English, Speak English (SpeakingPal Ltd.) offers videos for beginner, intermediate and advanced level learners and allows users to speak with a video character and get feedback on their speech; Learn Languages with busuu (Busuu Limited) is an app that helps users learn selected words and phrases, practice what they have learned.
with native speakers of English and test their knowledge with quizzes. *Practice English Grammar* (Cleverlize) helps users improve their knowledge of English grammar with grammar exercises such as practice questions and tests; *Sounds: The Pronunciation App Free* (Macmillan Publishers Ltd.) contains a phonemic chart with sounds in British English and American English and samples of practice and quiz modes; and *Real Deal English* (OpenLanguage Inc.) provides users with free podcasts about a range of topics related to American culture.

**Table 6.1 Mobile Apps for Learning English**

<table>
<thead>
<tr>
<th>Apps Dedicated to Language Learning (ADLL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td><strong>Learn</strong></td>
</tr>
<tr>
<td><strong>English Grammar</strong></td>
</tr>
<tr>
<td><strong>Learn</strong></td>
</tr>
<tr>
<td><strong>English Podcasts</strong></td>
</tr>
<tr>
<td><strong>Learn English, Speak</strong></td>
</tr>
<tr>
<td><strong>English by SpeakingPal</strong></td>
</tr>
<tr>
<td><strong>Learn Languages with busuu</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Practice English Grammar</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Sounds: The Pronunciation App Free</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Real Deal English</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Apps Adaptable to Language Learning (AALL)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Category</th>
<th>Activity</th>
<th>Price</th>
<th>Download</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Idioms Illustrated</td>
<td>Education</td>
<td>Vocabulary, reading</td>
<td>Free / paid</td>
<td>App Store</td>
<td>Meanings behind idioms</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------</td>
<td>---------------------</td>
<td>------------</td>
<td>-----------</td>
<td>----------------------</td>
</tr>
<tr>
<td><strong>iTunes U</strong></td>
<td>Education</td>
<td>Listening, reading, writing, speaking, etc.</td>
<td>Free</td>
<td>App Store</td>
<td>Free courses</td>
</tr>
<tr>
<td><strong>Pirate treasure hunt: Eight challenges</strong></td>
<td>Education</td>
<td>Listening, reading</td>
<td>Free</td>
<td>App Store</td>
<td>Problem solving</td>
</tr>
<tr>
<td><strong>TED</strong></td>
<td>Education</td>
<td>Listening</td>
<td>Free</td>
<td>App Store; Play Store</td>
<td>Videos and audios</td>
</tr>
<tr>
<td><strong>Advanced English Dictionary &amp; Thesaurus</strong></td>
<td>Reference</td>
<td>Vocabulary</td>
<td>Free / paid</td>
<td>App Store; Play Store</td>
<td>Lexical database</td>
</tr>
<tr>
<td><strong>Dictionary.com</strong></td>
<td>Reference</td>
<td>Vocabulary, pronunciation</td>
<td>Free / paid</td>
<td>App Store; Play Store</td>
<td>Offline access</td>
</tr>
<tr>
<td><strong>Toy Story Read-Along</strong></td>
<td>Book</td>
<td>Reading, listening</td>
<td>Free</td>
<td>App Store</td>
<td>Interactive reading</td>
</tr>
<tr>
<td><strong>Dilbert Mobile</strong></td>
<td>Entertainment</td>
<td>Reading, culture</td>
<td>Free</td>
<td>App Store; Play Store</td>
<td>Comics</td>
</tr>
<tr>
<td><strong>Podcasts</strong></td>
<td>Entertainment</td>
<td>Listening, culture</td>
<td>Free</td>
<td>App Store</td>
<td>Podcasts</td>
</tr>
</tbody>
</table>

Source: http://www.apacall.org/member/sonjib/projects/apps/ (This site has direct links to each app in the App Store and Play Store.)

**Conclusion**

MALL still has many challenges (Burston, 2014a). One of the challenges is the development, evaluation and selection of apps that maximise language learning and provides both an improved learning process and outcome. In evaluating language-learning apps, the language learning app review form presented in this chapter can be adopted or adapted to examine pedagogical and technical aspects of the apps critically and effectively. Through the suggested 15 criteria, the review form addresses
important issues such as curriculum integration, learner engagement, collaboration, learner monitoring, interactivity, response feedback and personalised learning. Language teachers are invited to use the review form when they need to evaluate and choose certain language learning apps in their specific learning situations and contexts.

The popularity of apps on smartphones and tablets and the number of language learning apps are likely to increase further. In MALL, learners are encouraged to combine formal and informal learning, learning within the classroom and outside the class. Apps provide learners with a great way to achieve the goal of connecting learning with real life experiences. It is recommended that more app-based research should be conducted to explore different aspects of apps from diverse perspectives in a variety of contexts. It is also recommended that more MALL training opportunities be offered to teachers so the evaluation of context-specific apps can be done by teachers well versed in mobile pedagogies and technologies.

References


smartphones/


Burston, J. (2015). Twenty years of MALL project implementation; A meta-analysis of learning outcomes. ReCALL, 27(1), 4-20.


Kukulska-Hulme, A., & Shield, L. (2008). An overview of mobile assisted language learning: From content delivery to supported collaboration and interaction.
ReCALL, 20(3), 271-289.


## Appendix A

### Language Learning App Review Form

<table>
<thead>
<tr>
<th>App Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong></td>
</tr>
<tr>
<td><strong>Place to Download</strong></td>
</tr>
<tr>
<td><strong>Price</strong></td>
</tr>
<tr>
<td><strong>Last updated date</strong></td>
</tr>
<tr>
<td><strong>Version</strong></td>
</tr>
<tr>
<td><strong>Size</strong></td>
</tr>
<tr>
<td><strong>Publisher/Developer</strong></td>
</tr>
</tbody>
</table>

### Target Audience

<table>
<thead>
<tr>
<th>Language</th>
<th>Reading</th>
<th>Writing</th>
<th>Listening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activities/Skills</td>
<td>Speaking</td>
<td>Vocabulary</td>
<td>Grammar</td>
</tr>
<tr>
<td></td>
<td>Pronunciation</td>
<td>Culture</td>
<td></td>
</tr>
</tbody>
</table>

| Other-Please specify: |

### App Description

### App Evaluation

1. **Purpose:** Is the purpose of the app clear? Is the content of the app in line with its purpose? Is the app appropriate for its target learner?

<table>
<thead>
<tr>
<th>Very Unsatisfactory</th>
<th>Unsatisfactory</th>
<th>Neutral/Uncertain</th>
<th>Satisfactory</th>
<th>Very Satisfactory</th>
</tr>
</thead>
</table>

2. **Accuracy:** Is the content of the app accurate? Are spelling and grammar accurate? Are the learning materials of the app culturally accurate?

<table>
<thead>
<tr>
<th>Very Unsatisfactory</th>
<th>Unsatisfactory</th>
<th>Neutral/Uncertain</th>
<th>Satisfactory</th>
<th>Very Satisfactory</th>
</tr>
</thead>
</table>
3. Usefulness: Is the app useful for learning the target language? Does the app provide useful information? Are the activities or tasks of the app practical?

<table>
<thead>
<tr>
<th>Very Unsatisfactory</th>
<th>Unsatisfactory</th>
<th>Neutral/Uncertain</th>
<th>Satisfactory</th>
<th>Very Satisfactory</th>
</tr>
</thead>
</table>

4. Flexibility: Does the app allow the user to adjust settings to meet his/her needs? Does the app offer various modes of learning activities? Does the app provide opportunities to collaborate with others?

<table>
<thead>
<tr>
<th>Very Unsatisfactory</th>
<th>Unsatisfactory</th>
<th>Neutral/Uncertain</th>
<th>Satisfactory</th>
<th>Very Satisfactory</th>
</tr>
</thead>
</table>

5. Authenticity: Does the app provide authentic learning experiences? Are the learning materials of the app authentic? Are authentic materials provided in appropriate contexts?

<table>
<thead>
<tr>
<th>Very Unsatisfactory</th>
<th>Unsatisfactory</th>
<th>Neutral/Uncertain</th>
<th>Satisfactory</th>
<th>Very Satisfactory</th>
</tr>
</thead>
</table>

6. Engagement: Is the user motivated to use the app? Does the app provide reinforcement to hold the interest of the user? Does the app offer a meaningful and interactive learning environment?

<table>
<thead>
<tr>
<th>Very Unsatisfactory</th>
<th>Unsatisfactory</th>
<th>Neutral/Uncertain</th>
<th>Satisfactory</th>
<th>Very Satisfactory</th>
</tr>
</thead>
</table>

7. Feedback: Does the app provide specific feedback? Is feedback on learner responses constructive and timely? Is error handling meaningful and helpful? Does the app allow the user to monitor his/her progress? Does the app provide a summary of learner performance?

<table>
<thead>
<tr>
<th>Very Unsatisfactory</th>
<th>Unsatisfactory</th>
<th>Neutral/Uncertain</th>
<th>Satisfactory</th>
<th>Very Satisfactory</th>
</tr>
</thead>
</table>

8. Integration: Can the learning materials of the app be integrated into a curriculum? Does the content of the app fit with curricular goals? Is the content of the app relevant to the course of study undertaken by the user?

<table>
<thead>
<tr>
<th>Very Unsatisfactory</th>
<th>Unsatisfactory</th>
<th>Neutral/Uncertain</th>
<th>Satisfactory</th>
<th>Very Satisfactory</th>
</tr>
</thead>
</table>

9. Support: Is user assistance available? Is online help adequate? Does the app provide necessary updates?
PART 1: Theoretical Foundations of MALL

<table>
<thead>
<tr>
<th>Very Unsatisfactory</th>
<th>Unsatisfactory</th>
<th>Neutral/Uncertain</th>
<th>Satisfactory</th>
<th>Very Satisfactory</th>
</tr>
</thead>
</table>

10. Price: Is the app free? Is the app paid? Is the price of the app appropriate and reasonable? Is the app a value for money and time?

<table>
<thead>
<tr>
<th>Very Unsatisfactory</th>
<th>Unsatisfactory</th>
<th>Neutral/Uncertain</th>
<th>Satisfactory</th>
<th>Very Satisfactory</th>
</tr>
</thead>
</table>

11. Reliability: Is the app free of bugs and breaks? Is the app stable without crashes? Does the app load quickly?

<table>
<thead>
<tr>
<th>Very Unsatisfactory</th>
<th>Unsatisfactory</th>
<th>Neutral/Uncertain</th>
<th>Satisfactory</th>
<th>Very Satisfactory</th>
</tr>
</thead>
</table>

12. Presentation: Is the content of the app presented clearly and logically? Is the user interface of the app attractive and friendly? Are screen displays effective and efficient?

<table>
<thead>
<tr>
<th>Very Unsatisfactory</th>
<th>Unsatisfactory</th>
<th>Neutral/Uncertain</th>
<th>Satisfactory</th>
<th>Very Satisfactory</th>
</tr>
</thead>
</table>

13. Organization: Is the app well organised? Is the content of the app well structured? Is the app interesting to look around?

<table>
<thead>
<tr>
<th>Very Unsatisfactory</th>
<th>Unsatisfactory</th>
<th>Neutral/Uncertain</th>
<th>Satisfactory</th>
<th>Very Satisfactory</th>
</tr>
</thead>
</table>

14. Navigation: Is the app easy to navigate? Are the on-screen instructions of the app easy to follow? Is it easy to retrieve information? Does the app use the touch screen effectively to explore?

<table>
<thead>
<tr>
<th>Very Unsatisfactory</th>
<th>Unsatisfactory</th>
<th>Neutral/Uncertain</th>
<th>Satisfactory</th>
<th>Very Satisfactory</th>
</tr>
</thead>
</table>

15. Multimedia: Does the app make effective use of graphics, sound and colour? Is the level of audio quality, the scale of graphics or video display appropriate for language learning?

<table>
<thead>
<tr>
<th>Very Unsatisfactory</th>
<th>Unsatisfactory</th>
<th>Neutral/Uncertain</th>
<th>Satisfactory</th>
<th>Very Satisfactory</th>
</tr>
</thead>
</table>

Overall Rating

1 Very Poor (Not recommended at all)
Chapter 6: Selecting and Evaluating Mobile Apps for Language Learning

_____ 2 Poor (Not appropriate)
_____ 3 Adequate (Acceptable with reservation)
_____ 4 Good (Appropriate for use)
_____ 5 Excellent (Highly recommended)

Additional Comments

Reviewer | Date reviewed
--- | ---

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Chapter 7: Principles and Strategies to Design Resources for Mobile-Assisted Language Learning Environments

Nicholas Yates  
*Zayed University, Abu Dhabi, United Arab Emirates*

Agnieszka Palalas  
*Athabasca University, Canada*

**Abstract**

MALL teachers seek to innovate their practice by designing new resources, including materials and activities, which encourage active learning and engage students in the learning process supported by mobile device features and apps. Mobile devices may increase access to authentic language in diverse modalities, act as a cognitive processes support, facilitate communication and feedback exchange, provide tools for the creation of student-generated learning artifacts, and motivate learners to interact with MALL resources. Teachers, at the same time, can make use of the mobile device to innovate their teaching practice while applying the same educational tools that they encourage their students to use. Mobile devices can serve equally well as learning and teaching technologies. This chapter aims to encourage language teachers to utilise mobile device features and apps to produce mobile-assisted language learning resources for their students. It outlines four selected principles that underpin the pedagogically sound design of resources. It also proposes four design strategies along with
practical suggestions on producing high quality resources on mobile devices. These principles and strategies are supported by recent literature and examples are given to illustrate them.

Keywords: MALL resources, instructional design, design guidelines, design strategies, materials development, English as a second language, second language acquisition

Introduction

Teachers of second language learning classes around the world are gradually adopting mobile-assisted language learning resources, which leverage the affordances of both the mobile device and mobile learning pedagogy that promotes active student-centered consumption and production of content. In terms of innovative consumption and creation capabilities, teachers and learners can generate, retrieve and interact with MALL resources relatively easily utilising an array of built-in mobile tools and apps (Elías, 2011). Students thus go beyond the consumption of mobile content and become producers of MALL artifacts, such as videos, e-books, presentations, animations, podcasts, and screencasts to mention a few, through which they demonstrate their knowledge and skills in more depth (Lazzari, 2009) in authentic ways (Kukulska-Hulme & Shield, 2008) and in different time frames and places (Kukulska-Hulme, 2012). MALL design has been shown to be effective in situations in which students are involved in projects and group work, communicating and collaborating across time and locations and in which mobile learning design promotes engagement in language-related activities (El-Hussein & Cronje, 2010; Palalas, 2012). For MALL designs to be effective they have to be created with specific learning objectives in mind and follow proven design
guidelines. Palalas (2012) as well as Palalas and Hoven (2013), for example, identified ten pedagogic characteristics essential for an effective MALL design, including the following:

1. Balanced combination of individual and collaborative (group work) tasks;
2. Learner-generated linguistic artifacts (audio, video, photos, images);
3. Game-like real-life communicative tasks;
4. Expert facilitation; scaffolding, feedback, and coordination;
5. Feedback mechanism (immediate and delayed);
6. Focus on authentic listening tasks in the dynamic real-world communicative situations;
7. Support of self-paced individual audio tasks feeding into/preparing learners for the real-life tasks;
8. Integrate all four language skills but focus on listening outcomes;
9. Linguistic resources (task-related): relevant vocabulary, dictionaries, pronunciation, clear task directions and explanations, examples of language usage;
10. Support of out-of-class learning with in-class (face-to-face) instruction and practice (a blend of in-class and out-of-class context). (Palalas & Hoven, 2013, p. 54)

This chapter presents a selection of MALL design guidelines for creation of MALL resources distilled based on personal teaching practice and literature review. The term “resource” is used hereby to include both the digital material(s) and the learning activity designed by teachers. In his task design framework, Ellis (2010) emphasised both the material and learning activity as necessary elements to create effective resources that
facilitate pedagogically sound learning supported by resources. This design approach views resources as a combination of both materials and activities as well as the “vital role of a teacher, who constructs pedagogically sound environments to promote learning” (Palalas, 2012, p. 27; Laurillard, 2007). This perspective on instructional design of resources corresponds with the chapter’s underpinning of social-constructivism. Accordingly, material is being viewed as information and the crucial aspect of the learning process is the activity in which there is “active engagement in authentic and meaningful pursuits” (Kaufman, 2004, p. 309). While designing MALL resources, teachers should be cognizant of the interplay of design and development considerations, including, affordances of the mobile device, language learning theory that should underpin the learning activity, the appropriate pedagogy to drive the use of the material for learning, and instructional design that promotes high levels of motivation and engagement (Bell & Gower, 2011; Kervin & Derewianka, 2011; Motteram, 2011; Tomlinson, 2010).

The remainder of this chapter outlines four principles and strategies that can assist teachers with design and development of MALL resources. These principles are founded in practice as they have risen from the author’s professional practice as both a language teacher and instructional designer. They are also informed by prominent literature in the fields of second language learning, second language acquisition, MALL, instructional design, and cognitive science (Clark & Mayer, 2011; Ellis, 2010; Pegrum, 2014; Stockwell & Hubbard, 2013; Tomlinson, 2010, 2011). Following these, a series of evidence-based strategies are presented to aid teachers with the implementation of the principles in resource development. The principles and strategies are demonstrated throughout the chapter using
literature-based examples as well as the authors' own resources. The chapter promotes MALL resources designed with foundations in socio-constructivist learning principles, in which students are using the resources in an active and learner-centered manner and knowledge of language is constructed individually and socially with peers and mentors (Gould, 2005; Twomey Fosnot, 2005). When applying this learning theory, MALL resources become the “information vehicles for exploring knowledge to support learning-by-constructing” (Jonassen, Peck, & Wilson, 1999, p. 13) and where students are empowered to take ownership and are motivated throughout (Twomey Fosnot, 2005).

**Section 1: Principles of Mobile-Assisted Language Learning Resource Development**

To instructional designers, design principles serve as a foundation for practical pedagogy leading to pedagogically sound design and development. They both connect to and emerge from instruction and learning theories (Herrington, Herrington, & Mantei, 2009) to strengthen the instructional design of the resources. The pedagogical principles presented in this chapter include the following:

1. Make Learning Authentic
2. Connect Resources to Theory
3. Learn by Doing
4. Balance Individual and Social Learning

The four principles are expanded upon below detailing the rationale for their inclusion as well as the evidence and examples from MALL literature.
Principle No.1: Make Learning Authentic

Authentic learning is characterized by active student engagement, simulation of real world problems, and the use of real texts, information, and discourse (Gilmore, 2007; Vygotsky, 1978). When defining authentic materials for foreign language learning, Gilmore (2007) observed that “an authentic text is a stretch of real language, produced by a real speaker or writer for a real audience and designed to convey a real message of some sort” (p. 98). Authentic learning for second language learners can include both language input and output where learning materials and activities are identical to, simulate or closely mimic real life (Kearney, Shuck, Burden, & Aubusson, 2012). With the affordances and ubiquitous nature of mobile devices, there are greater opportunities for MALL resources to facilitate authentic learning so that students access, encounter, and capture authentic language to serve as both input and output for students (Reinders & White, 2010).

Motteram (2011) discussed the role of technology in seeking and selecting authentic MALL materials. Mobile technology can be a very effective medium through which learners can conveniently find texts and videos to serve as language input or stimulus, especially at higher levels. He highlighted the sourcing of authentic texts as a way to help students make connections with the language used in the real world and to avoid using dated language that can often appear in textbooks. When referring to the use of authentic target language for second language acquisition, in terms of both input and output, Tomlinson (2011) noted that “learners need experience of how the language is used…[and] also need to notice how it is used and to use it for communicative purposes themselves” (p. 14).

When designing authentic learning activities and tasks as part of a MALL resource, a task can be viewed across three levels of varying degrees
of authenticity (Kearney et al., 2012). At the first level of task authenticity, activities reflect real-world practice. The second level is factual authenticity, in which details of the activity are similar to real-world practice. The third level of authenticity is a process, where the practice of our learners is similar to the real world. These levels allow teachers to utilise and even target the various aspects of authenticity to make pedagogically relevant MALL resources. Learning scaffolded by the MALL resource targets authentic learning, which in constructivist terms, is mediated by how the student interacts with both the material and activity (Vygotsky, 1978).

To summarise, there may be different levels of authenticity, but MALL resources should make learning authentic for the target audience whenever possible. The resources that make learning authentic will both use input and output that is either real-life or scaffolded; these experiences can be mediated by, captured, and documented on students’ devices.

**Example**

An example of a MALL resource with task authenticity is a presentation of real advertisements demonstrating the language of persuasion. This presentation includes several advertisements found in local shopping centers as input for the following class. Students download it while in a Wi-Fi enabled class to view anytime and anywhere in a presentation app (such as Keynote, PowerPoint). Included in the presentation are questions prompting reflections about specific issues. Students note their ideas down using another app (e.g., SimpleNote, Pages). Questions may include

---

evaluating student understanding of the advertisements, drawing students’ attention to language features, and applying language to advertise other products. The input to students is authentic advertisements and the learning activity focuses on stimulating discussions concerning the effectiveness of advertisements, and possibly producing student-generated ads for other products.

**Principle No.2: Connect Resources to Theories of Language Learning and Second Language Acquisition**

Research into resource development in second language learning suggests that resources should be built on foundations of language learning theory, second language acquisition (SLA), and methodology. If a teacher, for instance, selects to follow behaviourist principles, these have to be clearly reflected in the design of the MALL resource and incorporate, for example, rote memorization of vocabulary using repetition. Applying a more cognitivist lens, the resource would set out a process that guides students to cognitively engage with the material through higher order thinking activities (Ertmer & Newby, 2013). Accordingly, a socio-constructivist approach would encourage collaborative communicative activities, such as group storytelling or a treasure hunt. Resources do not have to be built solely on the foundations of a single theory but can incorporate a blend of theories and corresponding principles that have been proven to create effective resources customized for the target students in a specific MALL environment, bearing the unique m-learning affordances in mind (Palalas, 2012). Such a list of principles may “provide a menu of potentially profitable options for material developers” (Tomlinson, 2011, p.7).

Connecting resources to theories of language learning and acquisition can support student language development and provide the necessary
language learning principles to serve as the starting point for resource design. Behaviourist, cognitivist, or constructivist theories of learning are those broad frameworks that help us understand how people learn (Ellis, 2002). A behaviourist approach to learning may encourage repeated use of flashcards to memorise vocabulary. Constructivist learning theory argues that students construct knowledge and resources are tools that might foster active and deep learning with opportunities to reflect and discuss their experiences to build connections between their learning and the construction of knowledge (Jonassen, Peck, & Wilson, 1999; Kaufman, 2004; Twomey Fosnot, 2005). An augmented reality tour of a location would foster active learning and communication within the authentic environment and, used with the right questions, an augmented reality resource could promote thought and reflection on learner experiences that would be expressed using the target language.

SLA refers to the way students learn a language naturally and how teachers can stimulate this acquisition process (Ellis, 2002). Teachers may create an e-book resource in which students are engaged with questions and responses at the whole text level before returning to investigate focus on specific language items. Whilst teachers might have preferences for specific language learning and acquisition theories, flexibility contingent on learning objectives as well as specific contexts and student needs is essential to ensure the design and development of effective resources for students. Tomlinson (2011) encourages the use of resources underpinned by SLA theory and his list of principles for development of language learning materials includes “comprehensible input”, “noticing salient features”, and “achieve communicative purposes” (p. 7).

Digital technology has had a role in language teaching and learning, both as a tool to deliver resources and to use those resources, long before
the advent of MALL. Mobile-assisted language learning introduced new portable technologies allowing for innovative approaches to learning. Pegrum (2014, p. 88-9) identified “a progression over time through several major language teaching approaches and their CALL and MALL manifestations” and the significance of these approaches as the basis for a shift away from viewing language learning as a linguistics based subject area towards seeing language as an active, productive usage. These pedagogical perspectives range from the older behaviourist approach towards communicative methodology and from socio-cultural theories to a postmodern approach. Stockwell and Hubbard (2013) declared, “if the fundamental goal is language learning, then these [mobile learning] affordances and limitations should be directly connected in a principled way to second language learning research and theory” (p. 7).

MALL resource instructional design necessitates the underlying support of proven language learning theories (Palalas, 2012). Whilst teachers have beliefs in the way their students learn, resources should be designed with the target audience in mind to ensure tailored and flexible resources that meet the needs of students.

**Example 1**

To demonstrate this, positive gains in vocabulary retention were found in students who used enhanced podcasts to study vocabulary from a novel (Borgia, 2009). The enhanced podcasts utilised the audio as input with follow-up activities based on the behaviourist approach to learning. Fitting with this chapter’s definition of resource (being the material and activity), the enhanced podcasts sought to increase students’ vocabulary automaticity and decoding through strategies, such as:

“[U] sing context clues to define words, defining words using
synonyms or antonyms, examining shades of meaning of words, creating a visual representation of a word, using affixes or roots to define words, and making connections to new words that allow the reader to repeatedly practice and retain new vocabulary.” (Borgia, 2009, p. 263)

**Example 2**

This activity is based on social-constructivist principles. It combines composition writing with collaborative activities where students create discussion essays based on a debate. This promotes active, student-centered investigation in which pairs of students collaborate and negotiate in the target language about a chosen topic (Twomey Fosnot, 2005). Firstly, a video is shown to students modeling how to discuss pro and con aspects of an issue; the video models both the technique and the language to be applied in the debate. A follow-up quiz is then offered to help students focus on the key content, composition writing techniques, and the target language itself. Subsequently, students form pairs based on a topic of interest, together brainstorm the topic, research, and draft scripts in a form of a storyboard using paper. Paper is the best medium for the first draft because storyboards serve as visuals for the subsequent discussion. Paper is also selected to reduce the time spent on the drafting phase because many of the storyboarding apps have a steep learning curve and include unnecessary steps and details. Pairs swap their storyboards with the script with peers and edit each other’s work. Afterwards, pairs produce videos debating the chosen topic. Finally, students view the videos and choose one, not their own, to use as content input for their discussion essays. Students thus engage in making connections between the researched information, key issues related to the topic, their own ideas, and how their perspectives differ (Gould, 2005).
Principle No. 3: Learn by Doing

To support learning by doing teachers should develop MALL resources in which students are actively engaging and producing language, involving all four language skills (i.e., speaking, listening, reading, and writing). A well-designed resource aims to facilitate learning by doing and help develop linguistic, behavioural, and cognitive competencies. According to social constructivism (Vygotsky, 1978), students make sense of the world around them through dialogue, experiences, and tools. They have to actively interact with the world in order to learn. Proponents of active learning experiences describe learning in which problems are solved, higher order thinking is engaged, meaning is constructed, and knowledge is shared (Jonassen, Peck, & Wilson, 1999; Kaufman, 2004; Twomey Fosnot, 2005). Students are the center of this “doing” process as they develop their language through their hands-on involvement and creation of learning artifacts (Gould, 2005). Accordingly, resources should guide students toward an increasingly active role in their language learning through activities that focus on communication and collaboration (Pegrum, 2014).

Many educators advocate for MALL as an approach that engages students through active and student-centered learning with the help of mobile devices (Palalas, 2012; Pegrum, 2014; Stockwell & Hubbard, 2013). While designing and developing student-centric MALL resources, teachers should start by analyzing the particular student needs and conclude with relevant and engaging instruction that will foster active learning. MALL resources can leverage the mobile device features, connectivity options, and apps to create and produce language artifacts. Teachers, therefore, have all the necessary tools to support language processing and production through both individual and collaborative tasks (Kearney et al., 2012). MALL resources in which students produce learner-generated linguistic artifacts
have been shown to encourage learner involvement with students displaying more autonomous and creative learning (Palalas, 2012). This is not only restricted to one-on-one learning or small classes as a study in a blended English college course in a Chinese university demonstrated (Wang et al., 2009). The authors reported that resources, such as interactive polling and short text messages, engaged students intellectually, behaviourally, and emotionally, and created enhanced learning experiences in which students transformed into active participants.

This more student-driven approach towards resource design does not diminish the role of the teacher who is not only the designer, facilitator and the manager of the learning-by-doing process but, most importantly, the language expert who provides feedback (Palalas and Hoven, Chapter 2). In short, teachers should design MALL resources that promote learning by doing with students playing an active role in their language development under the expert’s guidance. Resources designed following these principles can enhance learners’ engagement and genuine participation in the MALL process through hands-on language tasks and involvement in the creation of resources.

**Example**

The creation of learning artifacts may not be a novel strategy in language teaching. A variety of tools offered by the handheld devices are certainly a new addition to the student’s toolbox, though, which results in unprecedented possibilities in terms of student-generated MALL content. To offer an example using a social constructivist framework, students can collaborate to produce an interactive e-book using apps such as Creative Book Builder\(^1\) or Book Creator\(^2\). The resource fosters intrinsic motivation

\(^1\) Creative Book Builder http://getcreativebookbuilder.blogspot.com/

\(^2\) Book Creator http://www.redjumper.net/bookcreator/
from the outset as students gather their own ideas for the e-book and collaborate to develop a shared understanding by researching and discoursing. Resources should encourage students to explore real-life examples and the authentic language used in those contexts (Gould, 2005). During the writing phase, the resource calls for peer editing and feedback cycles and afterwards the resource asks students to create multimedia pieces, which are put together with emphasis on language production. When creating video or animation for the e-book, students are expected to work on language accuracy and fluency that is achieved through multiple drafts, repetitions, and rehearsals. Based on this knowledge co-construction effort, students generate their own understanding of the content and language being practiced. At the same time, the e-book evolves as a product of the group collaboration to demonstrate the shared creation of knowledge (Stahl, 1999).

**Principle No. 4: Balance Individual and Social Learning**

Within the instructional design of the resource, there should be opportunities for students to work individually and socially in both the material and activity components of a resource. A resource might guide students to individually watch a video before completing a group discussion. Alternatively, a resource might require students to analyse and annotate a text for target linguistic features before students individually answer questions. Educators who promote this blend of individual and collaborative activities tend to observe the positive effect of multiple dimensions of interaction with language and other language learners (Herrington et al., 2009; Palalas, 2012; Pegrum, 2014).

MALL resources should provide a variety of language learning materials and activities that fall across the continuum of individual and social
learning. When designing materials for language learning, Tomlinson (2011) includes examples from both ends of this continuum with resources promoting, for instance, silent time for individual reflection before they guide students to use the target language for communicative purposes and require them to produce language. Drawing from the constructivist paradigm, resources should encourage creative thinking and exploring student’s interests (Gould, 2005). The target language is the vehicle in which they conduct their exploration. By integrating elements of social collaboration and group construction of meaning and knowledge, MALL practice can move along the continuum towards the social constructivism learning theory (Jonassen, Peck, & Wilson, 1999; Stahl, 1999).

Mobile devices lend themselves to individual learning due to their high portability and the wherever-whenver aspect. MALL resources can be completed autonomously and in self-paced self-contained modules of language learning (Elias, 2011; Stockwell & Hubbard, 2013). Mobile apps and the portability of “handheld computers” are two key affordances that resources can utilise to encourage communication and collaboration both in a synchronous real-time environment and at different times in an asynchronous learning environment (Herrington et al., 2009). While independent study might promote individual cognitive processes and further reflection in certain tasks, mobile learners are also more available to communicate the results of this reflection through collaborative tasks as they always take their work with them on the device. Palalas (2012) highlighted the need for a balanced combination of individual and collaborative tasks in her study of MALL resources in an English for specific purposes context. Students from the study reported that, while using the MALL listening resources in groups was preferable due to increased interaction, communication, and collaboration amongst students, some students still saw
value in individual practice that offered more flexibility in terms of location, time, and pace.

The pedagogical and technologic alaffordances of MALL foster more dynamic and active learning opportunities in and out of the learner’s everyday environment, which can be achieved through both individual and collaborative learning activities and utilising synchronous and asynchronous communication technologies in physical and cloud-based virtual environments.

**Example**

The MASELTOV digital game utilises mobile device affordances to provide real-time cultural and linguistic assistance to second language learners within the European Union (Paletta, as cited in Pegrum, 2014, pp. 175-8). The resource sets up tasks for users to do individually as they seek phrases they need for daily interactions; they are also pushed information when the context-aware system recognised they are physically in a specific location. For instance, when a user enters a doctor’s office, he or she can receive key phrases necessary to communicate with the doctor. There are also social elements to the MASELTOV game-the “geosocial radar” can identify nearby volunteers whom users can phone to speak about the local area. Depending on the location, the resource could push a task to complete a game-like activity. The tasks set users up for successful future interactions with the appropriate language through practice in the sociocultural tasks and assessment. Conversations and interactions could be recorded to be transcribed and analysed with feedback being given back to the user.

**Summary of Principles**

These four principles serve as a foundation from which to create
student-centered resources that are designed to promote active learning with authentic materials and activities. MALL resources can also leverage individual and social learning to provide meaningful language learning underpinned by the innovative pedagogy of MALL.

Section 2: Practical Instructional Design Strategies for Mobile-Assisted Language Learning Resources

Theory can be complex or appear impractical without strategies to apply it. These strategies are the practical instructional design ideas that will support MALL resource development and are based on ID practices that draw on theories of second language learning and acquisition, mobile learning, motivation, and cognitive science. These have been chosen as they relate to and are an extension of the principles discussed in Section 1. They are the key practical strategies and applications that will help teachers develop MALL resources. These include the following:

1. Design to the Affordances
2. Chunk to Build Incrementally
3. Create Interactivity
4. Make Feedback Count

Strategy No. 1: Design to the Affordances

An affordance is the perceived ability to complete an action that leverages a technological tool or feature (Norman, 1999; Hutchby, 2001). One tool on a mobile device may have multiple affordances for different purposes; for instance, the camera affords students to record themselves and demonstrate their mastery of a specific language item and the same camera
affords teachers the opportunity to record examples of real-life native speaker dialogues and interactions as language input for students.

Affordances can lead to the creation of resources that leverage mobile device features and options for potentially ubiquitous innovative and transformative instructional design. With their ever-present device, students can download resources and use them later, capture learning input or output, fulfill just-in-time needs instantly, use their device as a cognitive tool, and interact with content and people in an array of ways and using various modalities (Laurillard, 2007; Palalas, 2012; Pegrum, 2014).

A practical example is taking the listening practice out of the formal classroom and providing a podcast resource for out-of-class use. Listening to such a resource on a device affords not only the ability for students to retrieve it and autonomously listen to it as many times as needed but also to interact with it whenever and wherever convenient for the learners (Palalas, 2011). This also allows class time to be utilised for other student-centered activities in which students are not only consuming the podcast but also possibly creating one.

The utilisation of mobile device hardware and software affordances for the design and development of MALL resources leads to a wide number of instructional opportunities (Herrington et al., 2009). Designing inclusive resources with universal design and incorporating accessibility principles is now easier than before mobile technologies were available (Elias, 2011; Kukulska-Hulme, 2012). In terms of the technological affordances of mobile devices, there are numerous native features of these devices that assist students to reach their potential and overcome barriers while applying less physical and technical effort (Elias, 2011). Examples of native iOS 8 features that assist students with visual disabilities include the voice-over capability for reading text and images having meta-data that can be read
aloud. Moreover, students with physical disabilities can create custom gestures and switch control to take advantage of physical capabilities when interacting with the resource. These features can empower students within a resource to learn from the material and complete the activity. Additionally, designing with the anytime anywhere mobile mantra in mind, students can complete work whenever and wherever the conditions are optimal. A project working with young people with mental health issues discovered these people could manage their lives better through keeping a mobile diary as part of their cognitive behavioural therapy (Kukulska-Hulme, 2012).

MALL resources differ from other technology-based resources in that students interact with the material and activities in fundamentally different ways. These resources should leverage the mobile device affordances to provide differentiated and inclusive learning opportunities.

**Example**

The Heritage Trails Project exemplifies the design of mobile learning with the device affordances in mind (Png Bee Hin, as cited in Pegrum, 2014, pp. 182-4). The project leverages mobile device capabilities to provide interactive learning opportunities to students walking along historical trails in Singapore. The mobile app uses geo-location data and augmented reality (AR) software to provide students inquiry-based and situated learning experiences within their journey on the trail. As students reach specific locations along the trail, AR layered information, videos, quizzes, and activities are pushed to them. Students interact with local people, find real-life objects as tools or help, and use digital materials, such as video re-enactments, to complete the challenges sent to them. The trails weave throughout areas of Singapore that are ethnically diverse and thus students must use English as well as their native language to interact with classmates and locals. Each journey along the trail brings differentiated experiences as
the language that students encounter and its uses are different every time. This promotes “learning through linguistic and cross-cultural collaboration” (Pegrum, 2014, p. 182).

**Application of Strategy**

When appropriate, some selected strategies are to:

- include multimedia for a range of multimodalities in formats like e-books or presentations to leverage the affordances of mobile devices in displaying interactive content (Smith & Kukulska-Hulme, 2012);
- capture real-life authentic language communication and usage in video and audio formats and bring into student learning as a resource;
- capture student language production through video, audio, and text so that students can demonstrate their ability;
- promote collaboration through cloud-based storage solutions and also decrease device storage usage;
- utilise geo-location data to create situated-learning opportunities according to the students physical location;
- keep students involved in learning by creating push notifications to provide ongoing or just-in-time stimulus, feedback, and reminders (Elias, 2011).

**Strategy No. 2: Chunk to Build Incrementally**

When designing a resource, both the material and activity should be divided into smaller segments so that students can effectively engage at most optimal times, using their mobile devices (often with smaller screens) and
shorter learning episodes combined overtime into a complete learning experience (Palas, 2013). Applying the chunking strategy aims at grouping concepts that have strong associations with each other (Cowan, 2001) and also provide “lighter” files for download and consumption on mobile devices. How to chunk and combine the segments incrementally depends on the amount of material and language to be practiced as well as types of activities within the resource used to promote learning and memory retention (Cowan, 2001; Dirksen, 2012; Mayer, 1995).

There are positive correlations between chunking and students being able to focus on single sections of concepts (Dirksen, 2012). Chunking can also aid in processing input through the memory’s limited capacity in attention and working memory to long-term storage (Cowan, 2001; Gobet, 2001). Norman (1956) proposed that learners deal with +/-seven items of input before overloading the working memory. The number has been revised and reduced to four items with reference to input being distributed between audio and visual input channels (Mayer, 1995; Cowan, 2001). This has specific implications when integrating digital media into MALL resources. Intentional well-planned chunking within a MALL resource can help to focus a student’s attention on specific sections of concepts, encourage practice through the activities, and ultimately result in successful learning outcomes.

Stockwell and Hubbard (2013) include chunking as one of their emerging principles for MALL as they recommend to “keep mobile language learning activities and tasks short and succinct when on their devices” (p. 8). Breaking up written or spoken texts into manageable short and concise sections also aims to provide enough input to the learner with a consolidation activity. These learning bursts (Peters, 2014) reflect mobile usage patterns during which learners are mobile across topics, time, and space as they personalise the learning for their own needs and contexts and engage in
learning throughout the day separated by pauses in time, other learning activities or even comprehension check questions (Sharples, Taylor, & Vavoula, 2007). The size of a resource chunk, in terms of content length or activity time, depends on factors including what device students might be using to complete it and where.

Dirksen (2012) explains that chunking aids learners’ working memory by helping them “to understand where to focus their limited attention at any given point” (p. 92). At a content level, information may be organized around logically arranged modules, lessons, topics, or clusters of notions, including pointers to key information. The recommended order of interaction with the information should be built into the resource when appropriate, or left to the learner’s discretion when the order of resource completion is optional. Resources could be also chunked depending on the time and place of projected completion of the resource, especially when designing time-and place-dependent activities (Palalas, 2013). Chunking also happens at the screen level on a mobile device, for example, when the resource introduces a concept at a time and links background and new information together with practice within the constraints of the screen size. In fact, Clark and Mayer (2011) suggest that, when possible, teachers should organize the learning process in user-paced segments that introduce concepts one at a time so that they can be accessed easily anytime anywhere on a mobile device. Overall, chunking is part of the MALL instructional design process and it is implemented to ensure that resources provide the appropriate amount of language, practice, and support at the right time and place. Chunking also enables a more user-friendly experience when accessing MALL resources on mobile devices.

**Example**

Apps like Book Creator or Creative Book Builder or computer-based
programs like iBooksAuthor\(^1\) have a relatively low learning curve in order to produce high-quality e-books. An e-book for the iPad was created using iBooksAuthor. The e-book contained a series of chapters organized around thematic content highlighting specific grammar points. It was portable and could be used in downtimes away from the classroom and in Wi-Fi dead zones anytime anywhere. The target curriculum, audience needs, and their mobile usage habits were first analysed and their preferences were reflected in the chunking of topics, time, and space as well as the selection of text, videos, audio and widgets. Topics were accessed as the learning need arose. Chapters were divided into short activities that required the use of different grammar functions depending on a location and context. Each e-book chapter was designed to take students approximately 8-10 minutes to complete with videos being under two minutes, audio content under one minute, and text that would take students approximately two minutes to read. For inclusive mobile learning and highlighting universal design features for equitable and flexible use (Elias, 2011), the video included optional subtitles and the audio transcript was available as an appendix in the chapter. The video provided explanation of a grammar point and contained a limited number of concepts for students to focus on. New points were explained in relation to previously learned grammar and followed by examples. The audio component contained an interview dialogue and text was a written story demonstrating the grammar point in use. Lastly, the video, audio, and text were separated by questions checking the understanding of the grammar point being taught, not the comprehension of the dialogue or story.

**Application of Strategy**

When appropriate, some selected strategies are to:

\(^1\) iBooks Author https://www.apple.com/education/create-with-ibooks-author/
• analyse your learners’ needs and backgrounds and build a language learning profile;
• consider how and where the target student audience interact with the materials and activities;
• conduct the analysis of what devices are used and what mobile device habits prevail among the target group;
• chunk content by:
  * time,
  * content: concepts and skills,
  * length of text or multimedia content,
  * type of learning activities,
  * location in which they might be used,
  * levels of difficulty,
  * progression toward a learning objective,
  * learner mobile device affordances and constraints,
  * learner mobile device usage habits;
• integrate comprehension check questions or language production opportunities to break up and consolidate learning (Dirksen, 2012);
• allow time for learners to acclimatise and assimilate the information before introducing more increments of new information (Dirksen, 2012);
• provide appropriate levels of feedback with each chunk to encourage continuation and raise confidence (Dirksen, 2012);
• offer guidance in when, in what order (unless optional), and how to access chunks of the resource.
Strategy No. 3: Create Interactivity

In comparison to laptops and desktop computers, mobile devices can offer users a rich interactive experience as they consume and create content (Pegrum, 2014). Successful interaction in a MALL resource requires not only the appropriate blend of digital media (Clark & Mayer, 2011; Dirksen, 2012; Pegrum, 2014) but also textual enhancements, interactivity with the content, support and scaffolding, as well as communication and collaboration with other students and language experts across various device channels. There is a great potential for MALL resources to offer interactivity with content, with others, with the tool, and even with the context of learning, as suggested by Hoven and Palalas (Chapter 4) in this volume.

Teachers have at their disposal numerous mobile software and hardware tools for designing and producing engaging interactive MALL content for student consumption. When designing materials and activities, teachers need to consider the types of interaction available on mobile devices and ways to incorporate it in a pedagogically sound way. Resources should blend different interaction options to be inclusive of student learning preferences and to focus students’ attention on target linguistic features (Tomlinson, 2010 & 2011). Providing different multimedia options along with a choice of interactive resources and tools further promotes universal instructional design and engagement with content (Elias, 2011). Moreover, the technological capabilities of the device used for learning have to be taken into consideration in interactivity design decisions. Mobile devices inherently support tactile, oral, and aural interaction with content as well as communication and exchange with peers, teachers, and others. They also enable “continuity or spontaneity of access and interaction across different
contexts of use” (Kukulska-Hulme & Shield, 2008, p. 273). Hence, interactivity can be built in as a deliberate step of a language task or can be a spur-of-the-moment language practice opportunity (possibly triggered by the resource). An interactive activity can be part of a guided process situated within specific time and place constraints or it can occur as part of an autonomous learning journey. The list of possible language learning interactive resources is long. Some of these gaining more attention from teachers and learners are listed below.

E-books, for instance, can include not only text but also videos, discussion forums, quizzes, and other interactive widgets (Smith & Kukulska-Hulme, 2012). On mobile devices, text may be read or spoken using voice-over or talkback features, which promotes student choice and inclusive learning. Podcasts, videos, and animations can be produced as an alternative to text-based options and may offer the same content differentiated according to learning preferences of students. These multimedia options reach out to all students and enable them to interact with the target language. Interactive language supports can also be integrated, such as customizable audio dictionaries and glossaries, adaptive notes and explanations of grammar points in pop-up windows, which only appear when the software detects a need for them or when the user selects that option. Integrating task-related linguistic resources ensures that students have access to language in the way they desire and that they receive appropriate scaffolded support for language development (Palalas, 2012).

Interactive resources do not necessarily require very sophisticated technological solutions or advanced software capabilities. MALL resources do not necessitate “bells and whistles” as these features might ultimately compete for students’ cognitive attention and reduce learners’ capacity to filter and subsequently learn (Clark & Mayer, 2011). The limited capacity
assumption states that people can only process limited amounts of information in each channel, including the visually and auditory channels that are involved in the interaction with learning resources (Mayer, 2005). Substantial research has been conducted by Clark and Mayer (2011); hence, their multimedia learning principles should be considered to inform decision regarding the design of multimedia materials. These principles are incorporated into the strategies discussed below.

As discussed above, interactivity can be fostered not only through teacher-produced MALL materials but also through activities in which students are the ones creating language-learning artifacts. An array of tools is available to mobile learners who want to capture samples of real-world language and be creative in their language practice. The familiar PowerPoint\(^1\) software, now also in a mobile version, offers opportunities to publish multimedia rich resources with teachers and students being able to include text, images, audio, video, and animation, or even save the presentation as a video and share it through a YouTube channel. This student-created language output may be used as a presentation (for assessment or practice purposes) or a stand-alone resource for other students. Other creativity apps, such as Educreations\(^2\), Powtoons\(^3\), and TouchCast\(^4\) make it easier to produce and share multimedia-based resources. Additionally, users can input text as written with the keyboard or spoken through dictation by applying the device built-in options or adjusting app settings. This affords greater student choice and caters to learners with special needs. Learners can further interact with each other and with

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1. PowerPoint http://powerpoint.com/
2. Educreations https://www.educreations.com/
3. PowToon http://www.powtoon.com/
4. TouchCast https://www.touchcast.com/
language content when such tasks are completed in collaboration. Asking students to create and produce language artifacts in groups brings about deeper levels of interaction and engagement with peers and the target language as students communicate and collaborate. Pegrum (2014) recommends that MALL collaborative resources be designed with communicative and socio-cultural principles in mind. A thoughtful blend of interactivity and creativity are certainly essential to the creation of language learning resources…and mobile technologies provide the tools necessary to incorporate these ingredients in the mix. Pegrum (2014) aptly summarized the tools available to MALL teachers and learners: “the potential of digital technologies [is] to open up space for new skills and new ways to practice old skills” (p. 126).

**Example**

Chun (2006) designed foreign language reading texts for students with multimedia elements, including interactive word glossaries and annotated text. This resource facilitated interaction with word level input, such as glossary definitions, by adding reading support when needed during the reading process. She observes that there was an increase in vocabulary acquisition due to the in-text multimedia glossary support. In her study, Chun (2006) describes several features included in the mobile design with some of them following Clark and Mayer’s (2011) principles. She warns not to overload students’ visual and audio channels (Mayer & Moreno, 2003) but instead to include language support elements, such as text with images and videos. At the same time, these images and videos should encourage mental connections or visual representations of the text (Clark & Mayer, 2011).

**Application of Strategy**

When appropriate, some selected strategies are to:
• utilise multimedia as part of differentiated instruction;
• understand the environment (time and location) and device (screen size) on which learners will interact with your multimedia-based resource as this has implications for text, video, and audio;
• blend interaction types and provide choice to address diverse student learning preferences;
• design interactive materials and activities to focus student’s attention on target linguistic features and language skills;
• train students to use mobile features and apps to interact, create, and communicate;
• guide learners in selecting MALL resources that suit their learning goals and preference;
• leverage built-in device capabilities to produce and interact with student-and teacher-generated language artifacts;
• when using apps like Educreations, combine animation and narration rather than animation and on-screen text (Clark & Mayer, 2011);
• use words with pictures (rather than words alone) and present them close to each other on the screen (Clark & Mayer, 2011);
• remove extraneous words, audio, and images (Clark & Mayer, 2011; Peters, 2014);
• incorporate multimedia in presentation or storytelling formats; structure and mark (audio or text) all sections clearly to ensure learners understand and follow the organization (Clark & Mayer, 2011).

**Strategy No. 4: Make Feedback Count**

Feedback transforms a resource from being a one-sided “encounter” with the material and activity to a process in which students are engaged in
learning with and from the material and the corresponding activity. Mobile-mediated feedback may serve as a language expert helping to improve language accuracy and fluency, as a motivator supporting students in completing the resource, and as a facilitator guiding students along the learning path. Within a MALL resource, there are multiple opportunities for students to receive automated feedback, such as answers in an e-book widget, comments on how to improve performance in a mobile quiz, and instructions on how to complete a task. At the same time, individualized feedback from a teacher can be provided synchronously or asynchronously via device communication channels and can further assist learners by encouraging them, offering advice on how to improve performance and rectify mistakes, as well as guidance on how to progress toward learning goals and improve learning habits. Moreover, both in-person and automated feedback can provide cognitive support and scaffolding at various points of the learner experience.

How and when feedback is provided affects its effectiveness and learners’ response to the feedback. Corrective feedback is one of the essential components of an effective and engaging learning experience (Rosell-Aguilar, 2005; Quinn, 2011). Depending on its purpose, it should be offered close to the learning experience as either formative feedback during the resource (so that students can use it to continue their progress) or as summative feedback to review students’ learning process and outcomes (Dirksen, 2012). It is recommended to provide feedback visually not just orally, so that learners understand and internalize the feedback. It would be helpful to include in the resource some demonstration of possible consequences of errors, highlight mistakes without revealing the answer, gradually guide students toward a correct answer, and ask them to explain their choice of answers (Dirksen, 2012; Quinn, 2011). Peer feedback has
been found to be another effective strategy in language learning. It is crucial, though, to ensure students’ readiness to give and receive peer feedback. To empower students in the process, peer feedback training should be implemented and improve learners peer feedback skills. Once there is no learning curve, peer feedback has been shown to improve writing quality and enhance learners’ sense of audience and ownership while raising meta-awareness of the writing and feedback process (Berg, 1999; Tsui & Ng, 2000).

When designing the feedback process within a MALL resource, the content of the feedback message, its format and the channel through which it is shared (e.g., person vs. automated comments, synchronous vs. asynchronous) all affect the effectiveness of the feedback given. MALL resources need to incorporate teacher’s presence, with a facilitator and a language expert playing an active role. In a MALL study described by Palalas (2012), students referred to the need for the teacher to be present in the resource and provide feedback on language, learning, and technology as well as to push and encourage learners toward progress and enhanced outcomes. In some cases, such “teaching presence” (Anderson, Rourke, Garrison, & Archer, 2001) can be supplemented by carefully designed automated feedback. Publishing software, such as iBooks Author\(^1\) and authoring software, such as Camtasia\(^2\) and Articulate Storyline\(^3\), can be utilised to produce mobile learning objects with feedback incorporated into the resource. Video with annotations, for instance, can display consequences, alternatives, and explanations within a multiple-choice assessment to focus students’ attention on specific parts of the questions before they

\(^1\) iBooks Author https://www.apple.com/education/create-with-ibooks-author/
\(^2\) Camtasia https://www.techsmith.com/camtasia.html
\(^3\) Articulate Storyline https://www.articulate.com/products/storyline-why.php
resubmit their answer. A resource that requires students to explain their answers might be more difficult to incorporate into the materials, but with the appropriate use of the communication technologies native to many mobile devices, students are able to communicate with others relatively easily. MALL resource would benefit from a peer and expert feedback component that leverages mobile connection capabilities and a support network of the learner (for instance, via social networking tools) thus enabling feedback exchange in a timely manner. A student network may include the teacher, classmates, mentors, and friends who students could turn to for just-in-time learning anytime anywhere. Within a mobile learning context, peer feedback could also involve learners swapping devices to mark up and annotate the writing or asynchronously exchanging work through cloud-based solutions. Mobile-enabled feedback is an essential element of a well-designed MALL resource as it functions as a language teacher, academic adviser, motivator, and facilitator.

**Example**

In a resource designed to intrinsically motivate students practicing writing for the IELTS (International English Language Testing System) Academic Task 1, the author separated the tasks into three phases: research, surveying, and writing. In the research phase, pairs of students choose a topic and research key ideas by bookmarking websites and writing down keywords in Evernote\(^1\). Research is completed out of class with pairs of students researching and compiling website links in a shared Evernote folder. Pairs meet in-person with the teacher who gives them verbal feedback and points them to keywords for further searches as well as helps them notice specific language expressions and functions. Participants use

\(^1\) Evernote https://evernote.com/
their mobile devices during this face-to-face meeting to navigate easily between Evernote, their notes, and their web browser. During the survey phase, students prepare a survey for other students and teachers on campus. They use the app QuickTapSurvey\(^1\) on their mobile device to create the survey, ask survey questions, and record answers when they conduct the in-person survey. Students subsequently analyse their data for key themes and trends and, having completed peer editing and feedback training, collaboratively write their findings using Google Docs\(^2\). Again, students give access to their analysis documents to the teacher so that she or he can monitor each pair’s work and offer feedback to supplement the peer feedback process when necessary. Students verbally present their analysis to their classmates using a graph based on their findings. Finally, students individually write and submit their Academic Task 1 writing via Showbie\(^3\) and receive more feedback through the app. This workflow highlights the different modes of feedback provision available both online and in person, synchronously and asynchronously.

**Application of Strategy**

When appropriate, some feedback strategies are to:

- use visuals in feedback but ensure that:
  - words and images are presented simultaneously rather than successively,
  - narration and animation are used as opposed to animation and text (when multimedia based),
  - erroneous sounds and visuals are omitted (Clark & Mayer, 2011);
- promote learner ownership and agency by developing a peer feedback

\(^1\) QuickTapSurvey http://www.quicktapsurvey.com/index.php
\(^2\) Google Docs https://www.google.com/docs/about/
\(^3\) Showbie http://www.showbie.com/
network (Palalas, 2012);
• provide training on giving and receiving peer feedback;
• incorporate peer feedback in collaborative writing using cloud storage technology and collaborative online tools;
• give feedback via push notifications, social media and other platforms between classes to encourage learners and add an extra dimension to learning beyond the class (Stockwell & Hubbard, 2013);
• design feedback to be given at the time of learning (just-in-time);
• use scenarios to show direct consequences of language in communication;
• include feedback with conditional logic, using quiz making software, authoring tools or presentation software (examples listed above);
• incorporate teacher/language expert feedback when possible;
• blend teacher and automated feedback, both synchronous and asynchronous;
• leverage mobile access to a support network of the learner (for example, using social networking tools).

Summary of Design Strategies

Utilising the features and affordances of mobile devices, teachers can design resources that are interactive in terms of student consumption and creation of content in the target language. MALL resources benefit from chunking so that learners can engage with the resource at a time and place that is most conducive to learning. To ensure the effectiveness of a MALL resource, feedback mechanisms have to be included and students’ performance should be monitored to allow for more accurate feedback.
Iterative Evaluation

Ongoing evaluation of the resource is central to the success of the learners using that resource. It provides insight into the resource usage and interaction patterns, student satisfaction, and revisions needed to keep the resource effective and current. One of the models that can guide resource evaluation is the Successive Approximation Model (SAM) (Allen, 2012). SAM recommends smaller iterative cycles of design and development with evaluation taking place regularly in a formative way allowing feedback to be gathered regularly and be incorporated in the resource enhancements. This ensures that teachers receive feedback from colleagues and students during the resource production phase and afterwards when the resource is being applied in-situ. Teachers may discuss the resource design, offer a mock-up version, or create a digital rough draft to demonstrate their resource idea before producing the resource; however, nothing can replace feedback received based on the real-life application of the resource. McDonough and Shaw (1993) described the materials development evaluation process as never being static-teachers must continue making necessary modifications during pre-, whilst-and post-use of the learning materials.

Conclusion

MALL resources have the potential to be interactive and engaging for students if teachers leverage the mobile device and environment affordances when designing the MALL resource: both the material and activity. This chapter has offered pedagogic principles to underpin resource design and development as well as practical design strategies to ensure that the instructional design is effective and evidence-based. To ensure that the resources are effective, iterative feedback should be sought throughout the
design process and not as an added afterthought. Resource evaluation should continue when the resource is being used by learners to ensure its effectiveness and currency. Tomlinson (2011) concluded his book on materials development in language teaching with a call “to make more use of what we know about language learning in the development of materials” (p. 439). This chapter extends this plea to include literature supported evidence-based practice and findings from the fields of cognitive science and instructional design in the design of mobile learning resources. The design guidelines shared in this chapter have been based on the authors’ MALL practice and relevant literature. Much more research is needed in order to distil design guidelines that could be universally applied across other mobile learning contexts.

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PART II:
Practical Applications
Chapter 8: Using Mobile Devices and the LESCANT Model to Promote Cultural Awareness

Lara Ducate
University of South Carolina, USA
Lara Lomicka
University of South Carolina, USA

Abstract

To take advantage of mobile learning during two study abroad trips, students used mobile devices to photograph aspects of the target culture and share their pictures and comments with classmates through a wiki. Victor's (1992) LESCANT model was used to frame this project; students categorized their pictures into seven areas (Language, Environment, Social Organization, Context, Authority, Non-Verbal, and Time). Students’ photos and comments were then analyzed using Lussier’s (2009) framework to assess for the ways in which they demonstrated noticing and their awareness of these seven areas of culture through pictures and captions uploaded from a mobile device during their study abroad experience. Results indicate that students did become more aware of the target culture and were forced to notice and reflect on a variety of aspects, therefore increasing their intercultural awareness and, ideally, competence.

Keywords: MALL, intercultural competence, noticing, wikis, LESCANT, mobility, study abroad
Introduction

With mobile learning gaining popularity in recent years (Belanger, 2005; Chinnery, 2006; Ciù & Bull, 2005; Godwin-Jones, 2011; Kukulska-Hulme & Traxler, 2005), students have access to course-related material anywhere and anytime. Today’s learners can be both active consumers and producers of content; their learning transforms into something that is “on-the-go” and extends beyond traditional classroom walls. This study employs mobile learning to help students engage in learning about the target culture during study abroad in Germany and Senegal. During the two summer study abroad courses, students used mobile devices to photograph various aspects of the target culture and shared their pictures and comments with classmates through a shared wiki. Using Victor’s (1992) LESCANT model to frame this project, students, with their mobile devices, documented their cultural awareness in seven areas (language, environment, social organization, context, authority, non-verbal, and time) to help them notice potential cultural differences and similarities in the two cultures. To share their work with each other, students posted pictures and comments on a collaborative class wiki. This study investigates whether having students pay more attention to their surroundings by taking pictures and categorizing them helps them to learn and notice more about the culture they are visiting. Little research has addressed how students engage in mobile-assisted language learning for increasing awareness of intercultural competence.

After taking, commenting on, and categorizing pictures for 3-4 weeks, students reflected on the pictures they had collected during their study abroad experience and wrote a reflective essay in which they reviewed what they had learned about the target culture and themselves during the
experience. Due to the scope of this study, data for this project consisted of students’ photos and their submitted comments on each photo, documenting how and why it fits into a particular category. Student comments are coded to assess intercultural competence using Lussier’s (2009) intercultural competence conceptual framework. The results illustrate which aspects of intercultural competence students were able to reflect upon by focusing on LESCANT aspects of the target culture and how the act of noticing aided their development. The chapter begins with a review of the current literature surrounding MALL and intercultural competence, followed by a description of the framework and methodology and an analysis of the project, and concludes with insights into future MALL research in the context of study abroad.

Review of Literature

Mobile-Assisted Language Learning

Mobile-assisted language learning, or MALL, is a young but growing field in computer-assisted language learning. The definition of MALL has been somewhat murky but continues to evolve as evidenced in the chapters in this volume. Kukulska-Hulme and Shield (2008) put forth a definition of MALL as “mediated via handheld devices and potentially available anytime, anywhere” (p. 273). Jee (2011) cites Kukulska-Hulme and Shield (2008) to describe MALL as “any type of language learning using portable devices, such as mobile phones, MP3/MP4 players, PDAs, palmtop computers, portable radios and DVD players, and electronic dictionaries” and further adds that the portability of devices affords a range of significant advantages; in fact, MALL “offers specific advantages” (Kukulska-Hulme, 2013, p. 3701) to language learners. From these definitions, we can gather that any time access, portability and options in terms of device are all major
components of MALL. Perceived advantages of MALL are that it can offer learning that is personalized, spontaneous, informal and ubiquitous (Park, 2011). It also provides comprehensible input and extra-linguistic cues (McQuillan, 2006), extends learning beyond classroom space and time (Hoven & Palallas, 2011), and can build community through mobile blogging (Comas-Quinn, Mardomingo, & Valentine, 2009). Some perceived drawbacks are that MALL could impede on privacy and there can be issues with size, bandwidth, and Internet access. However, most agree that with mobile devices, teachers and learners are able to “transcend the boundaries of the structural stasis of classrooms and lecture halls and their associated modes of communication- [ devices] do not have to be confined to one particular place in order to be effective” (El-Hussein & Cronje, 2010, p. 13).

Recent research in MALL has found that results report on topics such as “technical specifications, mobile device ownership, pedagogical design, learning theory, user attitudes, motivational effects, institutional infrastructure, and teacher training” (Burston, 2013, p. 151). Stockwell and Hubbard (2013) define three domains in which research findings can be interpreted and that pave the way for future work: physical (how devices are limited by size), pedagogical (are tasks suited to affordances?), and psycho-social (as personal and social devices, what is the capacity for learning?).

Until recently, mobile phones represented the most frequent device explored, followed by PDAs. Kukulska-Hulme and Shield (2008) found that mobile phone related studies are often design or content related (ways in which content is delivered to learners), including topics such as text messages for vocabulary learning, iPads to listen to news broadcasts, or mobile phones for informal language learning. Preliminary MALL studies
have also reported on students’ attitudes regarding MALL, which have been quite positive (Beres, 2011; Nah, White, & Sussex, 2008). Other studies indicate that students do not always choose to use a mobile device when they have access to a computer (Stockwell, 2008; Ducate & Lomicka, 2009). Sharples (2009) emphasizes that MALL is still developing, and not until recently did MALL activities go beyond simply mirroring early CALL activities (electronic quizzes, grammar drills and vocabulary lists). There is a paucity of research using iPads and newer forms of mobile devices (smart watches, smart pens, Google glasses and so forth), but it is growing. MALL is a relatively new and growing field and with the impact of smartphones, iPads, and other new devices, research will continue to grow and expand over the next decade.

When considering future MALL research areas, Stockwell (2008) calls for more studies on students’ use of mobile devices outside of the classroom. One area where this use can be documented is in study abroad contexts. For language students, opportunities to participate in study abroad programs takes them to international destinations, providing encounters with a target culture that occur naturally and in their proper context, thus creating a likely path for the development of cultural proficiency, language growth, and intercultural competence. Using mobile devices while abroad also can facilitate taking and uploading pictures (Wong, Chin, Tan, and Liu, 2010), give access to authentic materials, and allow students to engage in mobile blogging (Comas-Quinn, Mardomingo, & Valentine, 2009). To summarize, MALL can potentially transform language learning. Whether studying domestically or internationally, MALL extends learning outside of the traditional four walls of the classroom and allows students to document experiences, collect authentic materials, and easily connect with others.
Intercultural Competence (IC)

In addition to the mobile component of language learning, the study presented in this chapter also draws from students’ experiences with regard to the development of intercultural competence (IC), the focus of this section. Over the past decades, IC has been a topic of considerable investigation, but Harden and Witte (2011) posit that the concept itself remains vague. Research has shown that IC can lead to the development of an inner sense of culture equality and an increased understanding of one’s own and other’s cultures (Tomlinson, 2001). IC is an important factor in gaining a positive interest in how cultures connect and differ (Tomlinson & Masuhara, 2004), recognizing their cultural identity in relation to other cultures (Knutson, 2006), developing a sensitivity to other cultures (Haldey, 2003), acquiring an understanding of the native speaker’s perspective (Stern, 1992), and broadening cultural awareness, increasing sensitivity, and deepening an understanding of other perspectives.

Even though IC has been widely studied, researchers point out the lack of consensus for a general definition of IC, which contributes to its complexity (Moeller & Faltin Osborne, 2014; Witte & Harden, 2011). In fact, Spitzberg and Changnon (2009) discuss more than twenty different IC definitions and frameworks. Recognizing the intricacy of the concept, Meyer (1991) defined IC as:

The ability of a person to behave adequately and in a flexible manner when confronted with actions, attitudes and expectations of representatives of foreign cultures; adequacy and flexibility implying an awareness of the cultural differences between one’s own and the foreign cultures and the ability to handle cross-cultural problems which result from these differences. (p. 136)
PART II: Practical Applications

Offering another perspective on the intricacy of this term, Deardoff (2004; 2006) discusses IC as organized into two stages (individual and interactional). At the individual stage, the first step requires that one should possess attitudes of respect or value for other cultures, openness and the ability to withhold judgment, and curiosity to discover while tolerating ambiguity. The second step requires that one should develop specific knowledge and comprehension that would include cultural self-awareness, deep cultural knowledge, and sociolinguistic awareness. The interaction stage also has two parts—internal and external outcomes. The internal outcomes include the development of several psychological traits (adaptability to different communication styles and behaviors or new cultural environments, cognitive and emotional flexibility in selecting and using appropriate communication styles and behaviors, the development of an increasingly nuanced ethno-relative view, and an increased sense of empathy toward cultural differences). Finally, the desired external outcome includes behavior and effective communication that is appropriate based on intercultural knowledge, skills, and attitudes to achieve one’s goals to some degree.

In addition to the complexities involved in defining intercultural competence, it has been challenging to determine how to quantify and measure intercultural competence (Schulz, 1997). A variety of frameworks for investigating intercultural competence exist: Byram’s Model for ICC (1997; 2000), Deardorff’s Pyramid Model of Intercultural Competence (2006; 2009), Borghetti’s Methodological Model of Intercultural Competence (2011) and Lussier’s conceptual framework (2009). Byram (1997), perhaps one of the first models, is based on three factors: knowledge (of self and the other), attitudes (toward those who seem different) and skills (of interpreting/relating and of discovery/interaction)
in order to create and maintain relationships. Next, Deardorff’s (2006; 2009) Pyramid Model stresses the (lifelong) process of intercultural competence and posits that learners can enter the pyramid at different levels, which include attitudes, knowledge and comprehension, desired internal outcome and desired external outcome. Borghetti’s (2011) model is a three-phase process including cognitive processes, skills and awareness. Finally, Lussier (1997) proposes a three part conceptual framework including knowledge, behavior, and affect, which she has developed from work by Seelye (1974, 1984, 1993), Nostrand (1996), Damen (1987), Byram (1989, 1997), and Kramsch (1993). Lussier’s (2009) framework will be discussed in more detail in the methodology section. Due to the difficulty in assessing IC, much of the research in L2 learning has focused on assessing IC through communication, and therefore measured ICC (Belz, 2003; Guth & Helm, 2012; Jackson, 2011; Schenker, 2012). In fact, some fail to distinguish between the two concepts. While research may seem to focus more on ICC, emphasizing the communication aspect, the current study is guided by the noticing of specific aspects of the target culture and the resulting reflection.

Deardorff (2014) emphasizes that IC is comprised of several factors, such as complexity and being a lifelong process. She concludes with a call to address IC in study abroad contexts, stating that IC should be addressed through global and experiential learning, such as study abroad or service learning. While the above models have been used to document IC in a variety of contexts, they have not been used as frequently to document study abroad experiences even though IC has been (and continues to be) a vital component of study abroad experiences. Harden and Witte (2011) note, however, that during study abroad, if students only live in another country, it cannot be assumed that intercultural competence is automatically
acquired. They note in their study, that when students returned from a study abroad experience, the majority of students felt “more familiar with aspects of German culture and the German way of life” (Harden & Witte, 2011, p. 4), but that they were not as familiar with other areas of culture such as daily life, literature, politics, and art. This point helps to support the justification for this study-in study abroad experiences, if students are not pushed to notice their cultural surroundings, then they might be less familiar with certain aspects of culture over others. In other words, they may not systematically notice a variety of cultural items.

What is noteworthy about this project is that it encourages students to interact with culture and language as a component of culture, whereas other research looks at development of IC through language (see also Belz, 2003; Guth & Helm, 2012; Jackson, 2011; Schenker, 2012). One key component of interacting with culture and language is focusing students’ attention on noticing items in their surroundings and environment.

**Noticing**

The idea of noticing originates from research based on the noticing hypothesis (Schmidt, 1990; 1994; 2001). Schmidt posits that input does not become intake for language learning unless it is noticed or consciously registered (Schmidt, 1990, 2001). Schmidt (1994) elucidates that input alone is not enough for language acquisition to take place, what is more important is the learners’ intake of the offered input. Noticing and awareness of linguistic features induce higher amounts of intake out of the presented input. For example, keeping a journal is not only noticing, but also reflective self-awareness, as it is known that attention controls access to consciousness and attention is responsible for awareness (Baars, 1996). As for the students in this study, they experienced a process of noticing culture, rather than language. Their attention was focused to various aspects
of the target culture based on a particular framework (LESCANT) and they were then asked to make observations, reflect, and record them as they observed cultural items that fit into the framework. Students therefore deliberatively attempted to notice cultural items.

In order to facilitate deliberate noticing and intercultural knowledge among the study abroad students, the LESCANT framework (Victor, 1992) was used to guide them. LESCANT is an acronym that represents seven areas (language, environment, social organization, context, authority, nonverbal, and time) in which cultural issues surface. Table 8.1 below outlines each LESCANT area and provides an example for each category from student comments on their photos in the current project.

<table>
<thead>
<tr>
<th>LESCANT Area</th>
<th>Definition (from Kelm, 2011; Victor, 1992)</th>
<th>Picture</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>At times, cultures differ due to language differences, which may include attitudes about your own language, insider relationships for those who speak a foreign language, decisions related to which language is used, and how to speak in ways that others will understand you.</td>
<td><img src="image" alt="Picture" /></td>
<td>This is a photo of the T-shirts created by the Bambe High School English Club. I chose to include this photograph in the Language category because of the awkward translation from French/Wolof into English of the words on the t-shirt. Many times English translations in Senegal stated the intended meaning of a phrase but would be either grammatically incorrect or the syntax would be structured in a way similar to Wolof rather than the natural linguistic structure of English.</td>
</tr>
<tr>
<td>LESCANT Area</td>
<td>Definition (from Kelm, 2011; Victor, 1992)</td>
<td>Picture</td>
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</tr>
<tr>
<td>Environment</td>
<td>This area includes the physical reality such as size, surroundings, population density, climate, food, topography, and so forth.</td>
<td></td>
<td>Bambev, Senegal is covered in trash, which varies in layers. Some of it may not be apparent because it is buried under the Sahara sand; some of it exists in a thin layer surrounding houses and along the sides of walking paths; a great deal of it is found in rolling mounds across the land, as if open space is an open invitation to become a community landfill. The animals love it. Goats, pigs, and sheep roam freely everywhere you go. Chickens are found in closer proximities to houses, and turkeys and donkeys are common too.</td>
</tr>
<tr>
<td>Social</td>
<td>This area represents divisions in society such as kinship and family, education, class, religion, occupation, and gender.</td>
<td></td>
<td>Traditional gender roles are easy to observe in Senegal. The women cook, clean, and take care of children, while the men are responsible for making enough money or catching enough animals to feed the families.</td>
</tr>
<tr>
<td>Context</td>
<td>This area includes how directly people communicate ideas and words versus how important it is to build a “context” within that communication.</td>
<td></td>
<td>The sign reads, “Drive carefully. It could be your child too.” This sign demonstrates context in two different ways—it tells you to drive carefully, because you are in a school zone (similar to America) and emphasizes personal relationships.</td>
</tr>
<tr>
<td>LESCANT Area</td>
<td>Definition (from Kelm, 2011; Victor, 1992)</td>
<td>Picture</td>
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<tr>
<td>Authority</td>
<td>This category deals with the role of authority figures and how power and decision making is accomplished. Authority also looks at leadership style and the relationship between bosses and their subordinates.</td>
<td><img src="image1.png" alt="Glass Ceiling" /></td>
<td>This photo depicts the glass ceiling of the Reichstag parliament building in Berlin. The design is intended to exemplify the transparency of German government and the ability of the German people to influence the political proceedings in their country. It shows that power and authority in Germany stems from democratic processes and ultimately flows from the will of the people.</td>
</tr>
<tr>
<td>Non-verbal</td>
<td>This area examines dress and adornment colors, touch, smell, and the quality of one’s voice.</td>
<td><img src="image2.png" alt="Hand Holding" /></td>
<td>My male host and his teacher (also male) are holding hands as they walk. In Senegal it is not uncommon for people of the same sex to hold hands and put their arms around each other, especially men, in order to express friendship.</td>
</tr>
<tr>
<td>Time</td>
<td>This area depicts how we organize our calendar and schedule, but it focuses on cultures that follow monochronic time (those that handle one task at a time) and</td>
<td><img src="image3.png" alt="Tea Time" /></td>
<td>This photo was taken at my guest-home in Wittenberg, Germany. In German culture, it is common to engage in a time referred to as “Kaffee” (Coffee), between lunch and dinner. During this time, after school or</td>
</tr>
<tr>
<td>LESCANT Area</td>
<td>Definition (from Kelm, 2011; Victor, 1992)</td>
<td>Picture</td>
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<tr>
<td></td>
<td>those that follow polychronic time (those that engage in many tasks at the same time).</td>
<td></td>
<td>work, Germans sit down and take a moment to enjoy a sweet snack such as coffee, tea, cookies, ice cream, or tortes (as depicted). It is a time for relaxation and conversation. It is similar to an after-school ice cream or Starbucks date in America.</td>
</tr>
</tbody>
</table>

While originally designed for international business, Kelm (2011) first implemented this model in language/international business contexts. Kelm (n.d.) created a visual database for students and faculty to take pictures and comment on cultural differences while studying abroad or traveling. In that sense, the LESCANT model forces students to notice cultural elements and justify why they fit into a particular category, thus utilizing both reflective and critical skills. Kelm (2011) noted that his students traveling to China experienced “a sense of empowerment in being able to make … connections, noticing cultural behaviors that students might have otherwise not appreciated” (p. 518). Due to the documented successes with the LESCANT model, it was deemed a promising framework to induce noticing among the students in the current study. Having examined MALL, IC, and noticing, the chapter now explores how these ideas helped frame the current project.

**Methods**

This study took place in two different study abroad contexts during the
summer of 2012. Twelve students of German lived with host families in Wittenberg, Germany for four and a half weeks and fifteen students of French lived with host families in Bambey, Senegal for three weeks. Students were enrolled in intermediate level language courses at a southeastern university and had previously enrolled in between 3-6 semesters of language instruction. While in their study abroad contexts, the German students attended German language and culture classes daily, participated in various enrichment activities in the afternoons, and traveled to other German cities, such as Berlin, Dresden, and Halle on the weekends with the sponsoring language institute. The main goal of the learners of French was to help students at a local high school improve their knowledge of English language, particularly with oral and conversation skills. During the week, the American students spent time at the local high school working in large and small groups providing assistance with basic conversation, pronunciation and grammar in the school’s English classes. Before going abroad, American students in both groups were given the opportunity to check out an iPod Touch from the language lab to take on the trip or to use their own mobile devices.

In order to encourage students to become more aware of their surroundings and the cultural nuances within their daily activities and encounters, they were required to contribute pictures to a class wiki page using either their personal mobile devices or a university owned iPod Touch. Having access to the mobile devices allowed them to take pictures from anywhere, and ideally upload them not long after shooting the picture. As one of their class assignments, they were asked to post two pictures for each LESCANT category on the class wiki and explain how the picture fit into the corresponding category in the caption. At the end of the trip, students wrote a two-page reflective essay in which they re-examined their pictures and
captions. Reflecting on all of the pictures at once helped them to contemplate what they had learned about Senegalese or German culture, as well as about themselves through the project. Before departing for Senegal or Germany, students received training on the LESCANT model and tips for categorizing their pictures.

As mentioned above, IC is a difficult trait to measure and there is a paucity of frameworks specifically designed for analyzing written texts. There have been many studies that investigate IC within telecollaboration (Belz, 2003; Belz & Hartmann-Mueller, 2003; Elola & Oskoz, 2008; Schenker, 2012; Schuetze, 2008) and while IC is normally measured by how one behaves in foreign cultures, including one’s flexibility and ability to communicate effectively in cross-cultural situations (Meyer, 1991; Beneke, 2000; Bennett, 2004), our study was designed to investigate students’ awareness and deliberate noticing of the other culture (via the LESCANT model) with the hope that this awareness would then lead to greater IC.

Research Question and Framework

The current study seeks to investigate the following question: In what ways does the LESCANT model help to increase students’ awareness of various aspects of the target culture while abroad?

In order to better understand what contributes to students’ intercultural awareness, their photo descriptions were analyzed using Lussier’s IC framework (2009). While there are several frameworks to choose from in order to assess IC, Lussier’s (2009) seemed the most appropriate for the current study, as there were no instances of communication to analyze. Instead, students provided snapshots of target culture aspects that they noticed and categorized. Byram’s (2009) and Deardorff’s (2006; 2009) frameworks, for example, examine more psychological aspects of IC, such
as the subject’s knowledge of his or her self and others, and attitudes towards those from a different culture that require an analysis of intercultural communication (Elola & Oskoz, 2008; Schuetze, 2008; Schenker, 2012). Since this study included only an analysis of photos and captions, it would be difficult to discover examples of students reflecting on their own growth, their feelings about the target culture, or how effectively they communicate in the target language, as is suggested in Byram’s (2009), and Deardorff’s (2006; 2009) frameworks. Lussier’s (2009) framework was therefore chosen because it was deemed most appropriate to analyze the data available in this study and was informed by a variety of other intercultural frameworks, including Seelye (1974, 1984, 1993), Nostrand (1996), Damen (1987), Byram (1989, 1997), and Kramsch (1993) and has been validated in multiple studies (Lussier, 2001).

Lussier’s framework consists of three interrelated components that complement each other, including intercultural cognitive competence, intercultural procedural competence, and intercultural existential competence (2009). Intercultural cognitive competence includes three categories: 1) the acquisition of information including formal and explicit knowledge, such as high culture or Big C culture, also referred to as the humanistic approach, 2) social aspects of the culture such as interpersonal relations and major values and beliefs, referred to as the socio-cultural approach, and 3) daily life also known as little c culture, including habits and customs, norms, politeness, dialects, dress, and facial expressions, also referred to as the anthropological approach (Lussier, 2009). The next domain, intercultural procedural competence or know-how competence, includes intercultural skills such as intercultural knowledge in authentic situations through using the language correctly, adjusting appropriately to the social and cultural environments, and employing knowledge of the
language and culture to adapt to other ways of living with, interacting with, and negotiating meaning with people from other cultures (Lussier, 2009). The final domain, existential competence, relates more to the psychological and affective aspects of interacting with other cultures and includes how one develops his or her own values and self-identity (Lussier, 2009). The three components of this final domain are cultural awareness (or being sensitive to other cultures), critical appropriation (respecting values from those in other cultures and being aware of one’s own self), and trans-cultural competence, where one integrates new values into his or her own self-identity (Lussier, 2009). As Lussier (2009) points out, since IC relates to affective and psychological domains, there will always be some subjectivity involved in assessment and research. However, a common framework seeks to alleviate some subjectivity. This research project, therefore, used this validated framework to assess the ways in which students demonstrated noticing and their awareness of seven areas of culture through pictures and captions uploaded from a mobile device during a study abroad experience.

Using content analysis, a research methodology that examines words or phrases within a wide range of texts, this project seeks trends within intercultural awareness and development in how students captioned their pictures according to the LESCANT framework. During the coding process, each of the captions for the pictures were categorized into one of Lussier’s categories to assess the types of intercultural noticing that occurred through students’ choice of pictures and the corresponding descriptions. For example, every picture in each LESCANT category was first identified by its LESCANT category. Then the caption for the picture was categorized according to the Lussier (2009) category to which it most appropriately corresponded. Photos and descriptions of national monuments or architecture, for example, were coded as “intercultural cognitive
knowledge; formal knowledge” because they had to do with more formal big C aspects of the culture. Pictures and descriptions that had to do more with what students perceived as the perspectives of a culture, such as eating rituals or the importance of recycling, were coded as “intercultural cognitive knowledge: interpersonal, values, beliefs.” To be placed in this category, students’ captions had to make a leap between what they witnessed and photographed and how they perceived that as either informing or being informed by the participants’ cultural values. The final category within intercultural cognitive knowledge, daily life, included pictures and captions of any aspect of what they might regularly see or experience, such as shopping at farmers markets or colorful clothing. The other category that was coded, know-how competence, included descriptions of pictures where students were taking part in activities, such as eating cake during an afternoon coffee break or engaging in the ritual of drinking tea with their family. To fit into this category, a picture and description had to illustrate that a student was experiencing a pluricultural situation or integrating something about the target culture into his or her own behavior. While some of the descriptions could have possibly fit into more than one category, the researcher only chose the Lussier (2009) category that seemed the most appropriate fit. Examples within the final domain, existential competence, were not found in the photographs, because more reflection was necessary to code for this category.

Results

Among the twelve German students, there were 210 picture posts, accounting for about two pictures per student in each of the seven LESCANT categories. Although there were fifteen French students on the Senegal trip, some students had difficulty posting to the wiki, and therefore seven students
posted a total of 93 pictures and captions. Within the first category, intercultural cognitive knowledge, content was identified and coded from all of the sub-dimensions, including formal knowledge, facts on interpersonal relations or values, beliefs, and attitudes, and daily life. In the second domain, know-how competence, it was clear that no examples would be found of students functioning in the target language or interpreting language to negotiate meaning, since all of the examples they discussed were in English. Examples were found from the remaining two categories, adjusting appropriately to the social and cultural environments, and “taking into account other contexts of ways of living traditions, behaviours, customs, and values” (Lussier, 2009, p. 321). The final domain, existential competence, which includes sensitivity to other cultures, respect of values from other cultures, and “integration of new values in the respect of self-identity” (Lussier, 2009, p. 322), was not evident in the picture captions, as evidence of those dimensions requires more reflection than was required for the picture descriptions. Those dimensions are evident in the final reflection essays the students wrote, but since this chapter focuses mainly on the mobile aspects of this project, namely the pictures that were uploaded from mobile devices, the essays were beyond the scope of this study. Table 8.2 provides an overview of how the majority of captions were categorized in terms of the LESCANT framework and how those captions corresponded to the Lussier framework (2009).

<table>
<thead>
<tr>
<th>Domain</th>
<th>Dimension</th>
<th>Germany</th>
<th>Senegal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercultural Cognitive Knowledge</td>
<td>Formal Knowledge</td>
<td>24 (11.4%)</td>
<td>1 (1%)</td>
</tr>
<tr>
<td></td>
<td>Interpersonal relations, values, beliefs, and attitudes</td>
<td>26 (12.3%)</td>
<td>28 (30%)</td>
</tr>
</tbody>
</table>

Table 8.2 Number of LESCANT Classifications for Each Lussier Category

• 240 •
As might be expected from a study abroad context, the majority of students’ pictures were categorized in the daily life and habits category. Since students were photographing their everyday events, most of what they saw were routine activities. Depending on how students described a picture, some of the descriptions fell into the interpersonal relations, beliefs, and attitudes category. Captions that were coded in this category contained references to how the picture related to how members of the target culture thought about a certain topic. For example, recycling containers symbolized to some students that Germans were concerned about the environment. Formal knowledge, such as architecture, was the least represented in the domain of intercultural cognitive knowledge. Students may have also noticed more daily life activities than formal examples of culture since that is what they encountered more regularly or because those examples affected them more directly. While it may have been possible for students’ pictures to fit into different categories or that a category they chose did not seem to fit appropriately, the students were not assessed according to how well the picture fit into the category. They were evaluated according to whether or not they posted a picture to the wiki and how well they identified the picture
with the category they chose.

Table 8.3 provides trends and examples of descriptions students made within the various LESCANT categories in each of the intercultural domains. In some cases, the topics were similar for both countries, but for others, they were completely different. The LESCANT categories were also not represented in each of the intercultural domains or in each country. For the first category, collective memory, students mostly noted architecture or monuments from the target cultures and these cultural icons appeared only in the Lescant categories of authority, environment, and social organization. For Senegal, only one student noted that mosques fell into the category of authority because of their influence on the Senegalese culture and prominence in Senegalese towns. Other students may have chosen to represent mosques with a different category. There were no other examples of formal knowledge for Senegal.

<table>
<thead>
<tr>
<th>Intercultural Domain</th>
<th>LESCANT Category</th>
<th>Germany</th>
<th>Senegal</th>
</tr>
</thead>
</table>
| Intercultural cognitive knowledge; Formal Knowledge | Authority | • Architecture – TV tower, Reichstag, churches, city halls, fortresses  
• Historical murals  
• Eagle in Bundestag  
• DDR passport  
• Door with 95 theses | | • Mosque |
| | Environment | • Architecture – old mixed with new  
• Graffiti as art  
• Memorials  
• Layout of city | | |
| | Social Organization | • Martin Luther statue  
• Prominence of church buildings in towns | | |
For the second category (see Table 8.4), students used what they saw to make a judgment about the culture’s values or beliefs. For example, the German students deduced that the environment was important to Germans based on their recycling practices, shorter showers, smaller cars, and prevalence of wind turbines and solar panels. Although the picture may have been of a wind turbine, a student added his or her belief that since he or she saw so many wind turbines, Germans must be ecologically minded. Students also inferred that neatness is an important quality to Germans because their gardens are well maintained, their houses are tidy, and that people who live in apartments with shared courtyards all work together to keep them clean. In Senegal, students deduced that the Senegalese are quite hospitable by the fact that they were very helpful and friendly to strangers (or people they had just met) and were happy to pick up hitchhikers. In contrast to the Germans, who tend not to cross the street on red, students noted that the Senegalese seem not to worry about obeying rules, as evidenced by their lack of attention to traffic and pedestrian rules. Many students commented on the lack of trash receptacles, which led them to believe that the Senegalese do not care about trash in their environment. Students also noted the importance of hierarchy in Senegalese families and respect for authority, as evidenced by eating rituals and respect for the father and teachers. Other examples of what students found to be common values and beliefs can be found in Table 8.4.
### Table 8.4 Intercultural Cognitive Knowledge: Interpersonal, Values, Beliefs

<table>
<thead>
<tr>
<th>LESCANT Category-Intercultural cognitive knowledge; interpersonal, values, beliefs</th>
<th>Germany</th>
<th>Senegal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Authority</strong></td>
<td>• Crosswalk-only cross on green</td>
<td>• Eating rituals&lt;br&gt;• Hierarchy at home&lt;br&gt;• Respect for teacher</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td></td>
<td>• Bargaining&lt;br&gt;• Hospitality</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td>• Different trash cans for recycling&lt;br&gt;• Wind turbines and solar panels&lt;br&gt;• Small showers&lt;br&gt;• Electric cars&lt;br&gt;• Yards kept neat</td>
<td>• People don’t seem to pay attention to pedestrian safety or traffic rules&lt;br&gt;• No trash cans and lots of litter</td>
</tr>
<tr>
<td><strong>Non-verbal</strong></td>
<td>• Leave items unattended</td>
<td>• Mural of black Mickey Mouse&lt;br&gt;• French flag painted on car bumpers&lt;br&gt;• Dress code for mosque&lt;br&gt;• Girls have stricter dress code than boys</td>
</tr>
<tr>
<td><strong>Social Organization</strong></td>
<td>• Public viewing for soccer games&lt;br&gt;• Colored glass recycling receptacles&lt;br&gt;• Importance of neatness in homes, outside, and in shared courtyards</td>
<td>• Religion an important part of society&lt;br&gt;• Senegalese have tight bonds</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td></td>
<td>• English club festival started 3 hours late, but prayer is 5 times per day at specific times&lt;br&gt;• Take time out of the day to relax, sleep, drink tea, visit with family and friends</td>
</tr>
</tbody>
</table>

For the final category in this domain, daily life in Table 8.5, students commented mostly on practices they noticed in the target culture, such as
people taking public transportation or biking, gender and authority roles, leisure time activities, and eating and drinking practices. This final category was the most prevalent since students interacted with aspects of daily life most often. Similar topics from the other domains arose again, such as the prevalence of trash and animals in Senegal, and sustainability topics in Germany such as smaller cars, access to public transportation, and parking for electric cars. Although it was not required, sometimes students compared what they discovered about the target culture to their own culture and commented on it. One student’s post about German practices was shopping; another noted how those practices differ from those in the US:

America is a society of instant gratification. We generally go to the store and buy a large quantity of food, less often. In contrast, the Germans seek quality, even if it means exerting more effort into food shopping. Another example of this is the fact that they have several bakeries and butchers, where they take the time to make sure everything is fresh.

Other shared topics were how everything seemed closer together in their cities, the influence of English on signs, clothing, and that members of both target cultures took time to relax during the day.

<table>
<thead>
<tr>
<th>LESCANT Category: Intercultural cognitive knowledge; daily life</th>
<th>Germany</th>
<th>Senegal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authority</td>
<td>• Gun laws</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Police roles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Mayoral duties</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Democratic government</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Status of religious leaders</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Police roles</td>
<td></td>
</tr>
</tbody>
</table>
## PART II: Practical Applications

<table>
<thead>
<tr>
<th>LESCANT Category: Intercultural cognitive knowledge; daily life</th>
<th>Germany</th>
<th>Senegal</th>
</tr>
</thead>
</table>
| **Context**                                                  | • Bike rules  
• Obeying crosswalk  
• Direct signs | • Animals and trash  
• Children alone  
• Importance of religion |
| **Environment**                                              | • Bike parking  
• Graffiti as art  
• Smaller rooms/bathrooms  
• Farmers markets  
• Parking for electric cars  
• Access to public transport  
• Jackets in June-cold  
• Well-planned cities  
• Lots of plants in houses  
• Playgrounds  
• Everything closer | • Traffic circles  
• Transporting goods/people by donkey  
• Animals all around  
• How to irrigate crops in dry season  
• Density of people and buildings  
• Pollution |
| **Language**                                                 | • Use of English on public signs or ads  
• Funny English translations or uses  
• English in Graffiti  
• Use of compounds in German | • British English taught instead of US  
• Main language (signs, business) French even though other languages spoken at home (Wolof)  
• English graffiti  
• Odd translations into English |
| **Non-verbal**                                               | • People walking close together  
• Clothing styles  
• Wearing slippers at home  
• Pedestrian zone  
• Knocking on table to signal praise or arriving/leaving  
• Staring at people | • Male students dressed in Western style  
• No smiling in pictures  
• Unhappy faces or shaking fingers when pictures taken  
• Women’s clothing colorful and expressive, but modest |
### LESCANT Category-
Intercultural cognitive knowledge; daily life

<table>
<thead>
<tr>
<th></th>
<th>Germany</th>
<th>Senegal</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Tattoos and piercings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Payment tray-don’t hand money to server</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Public displays of affection common</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Social Organization

<table>
<thead>
<tr>
<th></th>
<th>Germany</th>
<th>Senegal</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Habits regarding drinking beer</td>
<td></td>
<td>• Family hierarchy</td>
</tr>
<tr>
<td>• Public transportation</td>
<td></td>
<td>• Roles of women</td>
</tr>
<tr>
<td>• Kids unsupervised</td>
<td></td>
<td>• Children very social and have little supervision</td>
</tr>
<tr>
<td>• Luther’s Wedding festival</td>
<td></td>
<td>• Multiple generations live together</td>
</tr>
<tr>
<td>• Popularity of dogs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 2nd breakfast at 9:30 for elementary school students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Grown-up and child seats on train</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Popularity of soccer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Time

<table>
<thead>
<tr>
<th></th>
<th>Germany</th>
<th>Senegal</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Taking time for walks in nature</td>
<td></td>
<td>• Heat keeps people from doing much during day</td>
</tr>
<tr>
<td>• Light at 4:30 am in summer</td>
<td></td>
<td>• Time spent at mosque for meditation, worship, learning</td>
</tr>
<tr>
<td>• Everything closed on Sunday so streets more empty</td>
<td></td>
<td>• School doesn’t seem to start at an exact time</td>
</tr>
<tr>
<td>• Buy fresh food regularly from market, butcher, or baker</td>
<td></td>
<td>• 3 clocks in one hotel, but all wrong</td>
</tr>
<tr>
<td>• Slow-paced lives</td>
<td></td>
<td>• Everyone at home between 10 am-5 pm because so hot</td>
</tr>
<tr>
<td>• Clocks all around city</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Punctual trains</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the second domain, know-how competence, it was more difficult to find examples within pictures. For a picture to fall in the category of interacting, for example, students had to participate in the event or...
interaction they photographed (see Table 8.6). While there were likely more instances in which students participated in pluricultural situations, they did not always photograph or post them. In this category, the most common posts were students’ participation in activities with members of the target culture, such as the afternoon ritual of tea in Senegal or coffee and cake in Germany. Other meals that were mentioned were eating altogether around a big plate in Senegal or taking the time to eat breakfast together in Germany. The students of German also mentioned the community aspect of watching the World Cup in soccer at a public viewing event, and the students of French noted how they often left late for field trips or waited around longer than they would have expected for scheduled events to begin.

In the final category, integrating, students had to integrate the target culture way of living into their own life (see Table 8.6). This example was even harder to find in the pictures because students were told to take pictures of the target culture and did not think to photograph themselves integrating something from the target culture into their own lives, such as a picture of them recycling. There were, however, two examples of integration. In Germany, students commented that they had to walk closer together because of the closer proximity of everything in Germany and the crowded streets. In Senegal, a social organization picture was categorized in the integrative category because, as a student commented, “the marvelous part of this situation was that it taught us to relax a little and enjoy life the way it really is rather than constantly push to meet ‘busy’ time schedules.” The student integrated a more relaxed attitude about time into his own after seeing how the Senegalese reacted to leaving later than expected.
<table>
<thead>
<tr>
<th>Domain</th>
<th>LESCANT category</th>
<th>Germany</th>
<th>Senegal</th>
</tr>
</thead>
</table>
| Know-how Competence; Interacting-Experiencing pluricultural situations | Time | • Public viewing of the soccer world championship  
• Coffee and cake at 4pm every day  
• Taking time to take a break during the day  
• Take time for sit-down breakfast | • Everyone gathers around a large plate to eat. The older kids and adults usually eat together and the younger kids eat separately around a smaller plate,  
• Tea – Long process; boil the water, steep the leaves, pour it back and forth between cups and kettle, add sugar, let it reduce, pour it back and forth some more, then finally serve the Ataya to enjoy while friends and family sip, sit, and digest. |
| | Social Organization | | |
| Know-how Competence; Integrating-taking into account other ways of living | Environment | • Walking close together because the streets were crowded | |
As is evident from the tables above, students increased their awareness of various aspects of the target culture while abroad through taking pictures and posting them sometimes from a mobile device or from a computer when Wi-Fi was not available. By analyzing their pictures and captions according to the LESCANT framework, students were able to notice aspects of the target culture in categories of formal cultural knowledge, interpersonal relations, daily life, experiencing pluricultural situations, and integrating the target culture. While they did not illustrate intercultural competence in all of Lussier’s dimensions of intercultural competence due to the constraints of the project, they exhibited awareness in those categories that could be accessed through photography.

**Discussion**

The results of this project illustrate that by accessing the LESCANT model to attend to specific aspects of German or Senegalese culture, students were forced to notice and reflect on a variety of aspects of the target culture and thereby make gains toward IC. As noted by Witte and Harden (2011) “merely living in another country does not automatically facilitate the acquisition of intercultural competence, and studying other sociocultures
from a detached position remains at a purely detached cognitive level” (p.4). In order to develop IC, cognitive, behavioral, and affective dimensions must all be engaged. Using the LESCANT framework to notice aspects of culture helped students to cognitively engage with the target culture and notice their behavioral and affective changes associated with this new engagement. Data from their LESCANT descriptions, which were coded and analyzed using Lussier framework and categories, demonstrated awareness of formal culture such as architecture, values and beliefs such as (lack of) concern for the environment, as well as daily life, such as (not) obeying traffic/pedestrian rules. Although there were less examples of behavioral adjustments due to the constraints of the task, students’ participation in pluricultural activities was observed throughout rituals such as making and drinking tea together, watching the World Cup in a public viewing context, and drinking coffee and eating cake in the afternoon. In addition, students demonstrated two instances where they integrated cultural practices into their own; when they walked closer together on the street and learned to accept lateness and enjoy the slower pace of life. Unfortunately, the photograph task in this study did not allow for observing affective examples, such as sensitivity to others and other cultures or integration of new values. While some of these affective traits were likely developed through this project, a metric (such as the reflective essays) will assess how exactly students developed their existential competence. A discussion of the essay results is beyond the scope of this chapter. Based on the results of this study, it is apparent that the LESCANT model helped to increase students’ awareness of various cognitive and behavioral aspects of the other culture while abroad, which ultimately led to gains in their IC as defined by Witte and Harden (2011) and Lussier (2009).

Another outcome of this study was that by using a type of MALL,
students were able to capitalize on the affordances of MALL mentioned above, such anytime, anywhere learning (Kukulska-Hulme & Shield (2008), personalized and spontaneous learning, (Park, 2011), learning that extended beyond the classroom (Hoven & Palalas, 2011), and community building (Comas-Quinn, Mardomingo, & Valentine, 2009). At the end of the study, students reported that as they observed practices and products of the target culture that they otherwise may not have noticed, and found themselves reflecting quite often on the LESCANT framework both individually and with their group. This reflection led to discussions about what to photograph and which category the picture might correspond with and why, which ultimately resulted in analytical and thoughtful cultural discussions. Rather than just noticing the amount of wind turbines in Germany or pigs roaming the neighborhoods in Senegal, students took the time to consider the greater cultural implications and meanings of what they noticed. Having constant access to their mobile devices encouraged them to keep their attention on cultural questions in relation to the LESCANT framework.

While not all students had access to wireless Internet and could not immediately upload a picture, students were able to at least take the pictures and then upload them to the class wiki when they were in a larger city, in the case of the French students, or when they returned to the computer lab, in the case of the German students. Everyone was able to take pictures regularly, and even if they could not immediately transfer them to the wiki, the LESCANT framework was on their minds and informing their perspectives and understandings of the target culture.

Conclusion

This project encouraged students to deliberately notice their
surroundings by taking pictures and reflecting on how each picture might fit into the LESCANT model. It also engaged students in MALL in an effort to promote their awareness of IC. As seen in previous research, study abroad can help to increase cultural awareness, cultural sensitivity and cultural knowledge (Hadley, 2003; Knutson, 2006). The study abroad project described in this chapter offered diverse and unique cultural opportunities. At the same time, the projects each had their own challenges. Students who traveled to Senegal were forced to leave their comfort zones and to experience life as they had likely never done before—in conditions with which they were unfamiliar, in intense heat and using a new means of transportation around the town: donkeys and horses. While the students in Germany were not confronted with as unfamiliar conditions as the students in Senegal, they did have to adapt to being on their own in a new and unfamiliar culture. Both groups developed relationships with citizens of a different country that allowed them to come to a better understanding of themselves and of others. Students were also confronted by (and thus reflected on) situations that surprised them, such as the lack of public waste disposal in the town, and the lack of what they deem to be proper resources at the local high school.

The LESCANT mobile learning project helped students to notice things in the target culture that they may not have without the guidance, training, and the use of the LESCANT framework. For example, one student stated, “It forced me to think about the culture in ways that I otherwise wouldn’t have. I noticed a lot of interesting things because I was prompted to look for them by these categories.” Further, students processed some of the “different” observations they experienced and helped them to view these experiences in a less judgmental and more analytical manner. Instead of immediately thinking that the Senegalese are dirty, for example, students
thought about why it might be that trash was more visible on the street according to what else they knew about their environment. Another student commented, “It [LESCANT] made me think about actual aspects of Senegalese culture instead of looking at it as a whole.” In sum, students expressed that they were engaged with the target culture and returned with a greater sense of appreciation for it. One mentioned: “This is the beauty of the LESCANT project that it really does keep your eyes open to learning more about German history, culture, and language because it keeps it interesting.” The project also helped to build community among students as they shared, reflected and discussed cultural insights together during their stays in the target country.

Future research in this area could assess students’ reflective essays to search for more examples that fit into the remaining categories of the Lussier (2009) framework, including the more affective dimensions that require students to integrate new ways of thinking and acting into their own. There is also a need to continue to refine and build models and frameworks that can assess IC work in a variety of contexts, including MALL. Finally, MALL research in study abroad contexts could investigate how to access examples of students engaging in other aspects of the Lussier framework, such as incorporating video into the LESCANT framework and having students record themselves engaging in intercultural communicative exchanges. Additional research in the areas of MALL and IC can help to move the literature forward to explore and help students and teachers to make sense of their cultural experiences and observations.

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Chapter 9: Using Mobile Devices as an Immediate Feedback Tool to Improve Students’ Pronunciation in Language Learning

Chris Campbell
University of Queensland, Australia

Martie Geertsema
University of Queensland, Australia

Abstract

This chapter reports on a study on the use of mobile devices as an immediate feedback tool in order to improve students’ English. Voice recognition software in the English classroom aids student learning as when learners are unable to hear their mistakes, the voice recognition software transcribes their mispronounced efforts into a visible form and thereby creates that extra step for learners to recognise that they have made an error so that they can correct it. Furthermore, it provides immediate, personalised, and focused feedback, with the opportunity to increase learner autonomy. Data were collected in full from eight adult students who attended an English Language course in Brisbane, Australia, with the final survey being completed by eleven students. They attended this course from July to August 2013 and were placed in a class for learners progressing from a B2 to C1 level according to the Common European Framework. After the pre-test, the teacher analysed the pre-test samples and identified common phonological areas to address in the whole class. Results of the study were
positive with students in the treatment group improving their English language pronunciation. One benefit of using the voice recognition app DragonDictation is that learners were able to see their mistakes and were thus able to correct their own pronunciation.

**Keywords:** Mobile Learning, TESOL, feedback, apps, language learning, adult education

**Introduction**

Effective ways for teachers to guide learners in how to make meaning from symbols and sounds are constant challenges for both teachers and teacher educators (Baecher, 2012). With the boom in technology, the affordability and the availability of new technologies, “new types of meaning-making practices can now be afforded through digital devices” (Auld, Snyder & Henderson, 2012, p. 282). Not only do teachers now have the ability, but they also have the responsibility in language classes to ensure that new literacies are acknowledged and brought purposefully into the classroom (Wilbur, 2012). Learning strategies can also be provided that will help them successfully cope with potential communication difficulties that they may encounter in life outside the language classroom (Wilbur, 2012).

In English Language Teaching (ELT) teachers and learners are facing many fundamental changes. Firstly they are facing the challenge of the integration of new technologies and their accompanying literacies into daily learning, and secondly, they are also facing the challenge of a change in the kind of English learners are being taught. In ELT classrooms there has been a shift away from sounding like a “native speaker”, to being internationally intelligible as a speaker of English as an International Language (Cook,
2007). There are two main reasons for this shift in ELT. The first is due to globalisation and the accompanying movements of people that ensues (Appadurai, 1990). The second reason is the fact that there has been more learners of English and second language speakers, than first language speakers around the world (Pennington & Hoekje, 2010). For instance, in 2010, 400 million people spoke English as their first language, 430 million people spoke it as a second language and a further 1 billion people were estimated to be learning it (Pennington & Hoekje, 2010). Consequently, the notion of ‘Standard English’ has become a lot more fluid and impractical to strive for in the classroom, as well as a lot harder to achieve. Previously where a school or a teacher dictated the kind of “native speaker English” learners were exposed to it is now frequently the learner who dictates how they want to sound. Teachers increasingly respect the learners’ preference of pronunciation.

Mobile phones can be used to improve literacy levels of students, as suggested by Semali and Asino (2012) in their study in Namibia on the practicalities of 3G versus Wi-Fi in remote areas. Auld et al. (2012) add to the research with their study that focused on learners in remote Australia. In terms of digital literacy, they caution the need to see mobile phone usage within its cultural context of everyday usage and the need of the teacher to be culturally sensitive in acknowledging everyday practices within the learners’ culture. They argue however, that mobile phones in the classroom can be an effective tool to bridge the perceived divide between home life and educational life. Gee (2010) concurs, and makes the case that print-based literacy is very similar to digital literacy, because both literacies demand that the learner find “ways of acting, interacting, valuing, believing, and knowing’, which stem from their social situation” (p. 32).

This chapter illustrates the investigation of using mobile devices to
improve student pronunciation through the use of an app to provide immediate feedback on their phonological accuracy and understanding of their own language learning. This app, *DragonDictation* was successfully used with adult English language students in a language college in Brisbane, Australia.

**Review of Related Literature**

In an effort to make learning English easier for speakers of other languages, teachers try to apply and simulate real life situations in the classroom. Consequently, the place of digital literacy and the effective use of smart phones has become an emerging research area. It is important to teach critical digital literacy and not simply the avoidance of digital literacy (Burnett & Merchant, 2011). However, it is the teacher’s responsibility to show learners how to “use these technologies effectively to ensure they end up on the right side of the digital divide: the side that knows how to use social media” (Parry, 2011, p. 2). Ng (2012) concurs and makes the case that teaching learners how to critically use technology is vital. She warns of the dangers of using technology in class as a tool to pass the time, and points out that in order for technology to be effective, there needs to be an educational purpose.

The need to introduce new literacies that come with new technologies should therefore be prioritised. Lankshear and Knobel (2011) postulate that these new literacies need two elements, which are to be ontologically and paradigmatically new. One researcher agrees by stating, “for a new literacy practice to be paradigmatically new, it must change the ethos, or way of being, in the social contexts where digital technologies are used” (Wilber, 2012, p. 407). Therefore, it is the language teacher’s responsibility to help learners make meaning of life outside the class, by
PART II : Practical Applications

bringing life outside the class, into the class. One way for teachers to do this is through creating a safe class atmosphere and multiple opportunities for learners to experiment with new technologies and to assist with ways of troubleshooting when technology unexpectedly malfunctions, and honing expertise to become digitally proficient.

Current Use of Technology in Language Classes

There are various uses for technology in the language classroom at the present time. In fact, there are numerous apps created especially for the purpose of being used in the classroom for language learning. Kim and Kwon report that of the English language teaching apps on the market, “50% of the apps require learners to use recognition and recall” (Kim & Kwon, 2012, p. 49) and that most of the apps are targeted for children or young adults. The most common use of mobile phones now seems to be through various activities that use the function of SMS to increase vocabulary and one word responses (Golonka, Bowles, Victor, Richardson & Freynik, 2014). Kim and Kwon (2012) also found that the ESL apps being used in classrooms function primarily as a substitute for traditional methods. These are “teacher-directed [methods] such as tutorials (75%) or drills (40%). Only 17.5% of them are learners’ own reconstruction of text or voice. Quite a number of applications (40.6%) include activities such as games and tests” (Kim & Kwon, 2012, p. 41). Lu (2008), agrees and reports that in one study learners who regularly use the SMS function for educational purposes performed considerably better than students who had more exposure to the Internet or paper based exercises, especially if the focus was on extending learner lexis.

A possible explanation for this could be that using technology in class adds a fun element to learning and consequently learners were more
engaged, stayed longer, and focused better on the required tasks when they used technology (Golonka et al., 2014). They also found that despite the fact that technology is increasingly used in language classrooms in the last thirty years, much of the research focuses solely on either “describing the affordances offered by particular types of technology” (Golonka et al., 2014, p. 92), or on the affective impacts on learners. Another study by Campbell (2013) where students used apps on an iPod to support their language learning found mobile devices could be used to improve student learning.

Using technology that has been created specifically for learning purposes can bring real life into the class. However, a parallel could be drawn between the pedagogies of using textbooks vs. authentic material. Using apps created specifically for learning is not the same as adapting tasks so that apps, which have been designed with other real life purposes in mind, could be used for learning. At times these other designed apps can lack a sense of authenticity and purpose (Scrivener, 2011). Consequently, it is necessary to explore ways of making technology more authentic and relevant in aiding the learning process, as well as positively influencing learner outcomes.

**Speech Recognition Software**

The literature suggests there several criteria that should be in place in order for speech recognition software to be at its best. These include it should be able to analyse individual parts of uninterrupted speech into meaningful portions, it has to accommodate a variety of accents and unclear enunciation (Liaw, 2014), it should recognise variants of English to accommodate language learners, and in order to provide corrective feedback for learners, the software needs to have the ability to identify learner
mistakes in the same way a native speaker listener would (Derwing, Munro, & Carbonaro. 2000).

In 2010, Nuance introduced their free mobile phone app Dragon-Dictation (http://www.nuance.com/dragonmobileapps). It acknowledges three different varieties of English (UK, USA and Australian), at the time the biggest variety available. Their website promises:

Dragon Mobile Apps, powered by Nuance’s world-renowned Dragon NaturallySpeaking software, provides BlackBerry, iPad, iPhone or iPod touch users with fast, accurate and easy-to-use voice-enabled solutions for emailing, texting, surfing the mobile web, and much more.

Past studies have aimed to explore and verify whether Dragon Dictation adheres to all these different criteria and could therefore be used as an example of good voice recognition software. In Coniam’s study (1999) the possibility of using voice recognition software for testing purposes is explored. He pilot the desktop, commercial version of DragonDictation to investigate the claims of the company that it can achieve a 95% or higher accuracy. He found that the accuracy promised was based on “translating” words into written text and consequently claimed that the desktop version of DragonDictation was potentially a very useful teaching tool. The main reason for this was that the program typed the spoken form into normal, recognisable English and not into the phonemic script. For second language learners this feature is important because “since what might be called ‘standard deviant’ forms for a particular language group (e.g., /l/ and /n/, /v/ and /w/ confusion) do not appear in their incorrect forms in the output.” (Coniam, 1999, p.51), thereby showing the beginnings of using visual links to correcting errors that might not be audible for learners.

In Derwig et al.’s (2012) study comparing the ability of native speakers listeners and DragonDictation to detect second language learner
mistakes, they found that the live listeners were better at detecting pronunciation mistakes, but that the software did perform at 90% accuracy on native speech and 71-73% for non-native speech. They do however conclude with “These findings demonstrate that the properties of ESL speech that adversely affect the software tend not to interfere with comprehensibility and intelligibility for human listeners” (p. 601).

From the literature it would therefore appear therefore that DragonDictation is worth testing out as a viable option, because it adheres to the criteria necessary in good voice recognition software. The 1997 version of DragonDictation had a verified high level of accuracy and in the 2010 mobile phone version the same features are present, with the main difference that now the app is free and available on mobile phones, using the iOS operating system.

One other important aspect to investigate is the distribution of smart phone users, and consequently the availability of DragonDictation. Kim and Kwon (2012) report that in 2011 43.4% of the market users were using Android, and 18.2% iOS, and 22.1% Symbian. However, there were 250 apps available for Androids, and 499 for iOS, specifically for the use of ESL, but that many of the Android apps were also able to run on iOS and that consequently, it is “statistically relevant to say that iOS apps can represent the overall trend and features of current apps in the ESL field” (p. 38). The fact that DragonDictation only operates on iOS needs however still to be investigated to see if a larger market could be reached.

**Considerations for Corrective Feedback**

Although the DragonDictation app assists learners with their pronunciation, it will also assist with feedback. It is only through effective feedback, can learners modify their output (Lee, 2013) and ultimately
improve both their accuracy and fluency. The importance of teachers selecting the appropriate corrective feedback method is therefore crucial. In English language teaching different feedback techniques are used to help learners hone their productive spoken competencies. Teachers are trained to differentiate between feedback for fluency or for accuracy; delayed feedback is commonly used to help learners improve their fluency. This is where the teacher does not interfere during the activity but only once the activity is completed. Feedback on target language accuracy and content is provided.

Commonly, immediate feedback (also called “on the spot” correction) is used to help learners increase their accuracy (Scrivener, 2011). There are various ways to provide learners with feedback on their accuracy such as Lyster and Ranta’s (1997) six different types of corrective feedback commonly employed in English language classrooms with adult learners: explicit correction, recasting, clarification request, meta-language feedback, elicitation and repetition. However, despite the fact that it has been shown to not be the most effective, teachers most frequently opt for recasting (92.02% of the time) as that is what teachers are perhaps more comfortable with. Moreover, adult learners at higher levels prefer a combination of methods, depending on the context of the class and the focus of the lesson. It was found that most adult, high-level language learners (83% of the participants) preferred explicit correction (Lee, 2013). This data are backed up by McKay and Bokhorst-Heng (2008) who found a distinct correlation between learner correction preference, their country of origin and therefore their learner history. They found that learners from Expanding Circle countries, who learn English as a foreign language, most often prefer explicit correction and repetition.

However, Liaw (2014) warns that only repeating individual sounds in a specific context is not enough for second language learners to increase
their pronunciation accuracy. She puts forward that in order to maximise the learning process and outcomes, learners need to receive precise feedback on what to listen for so they can consequently hear the separate sounds and distinguish between the important elements that create meaning in phonology. “Pertinent corrective feedback at this point may be necessary so that users do not become frustrated by their random attempts of trial-and-error” (Liaw, 2014, p. 11). This is not always possible for the teacher to do for all learners in one class and as a result, voice recognition software could potentially be effective in these contexts. It is therefore important to make use of voice recognition software that helps the learner break down both the segments and the rhythm of language so that the learner can correct it with the help of focused corrective feedback (Eskenazi, 1999).

Not only does DragonDictation provide individualised, customised, immediate feedback, but it also offers the opportunity for learners to receive a combination of corrective feedback methods and it appears to work on the three most preferred methods: explicit correction, recasting, and repetition. It also, to a lesser degree, provides opportunities for the teacher to elicit the correct version and ask for clarification. With the transcription of the student dictation, it could help learners target specific sounds they might not be able to hear, and breaks the language down into segments. Based on the theory in literature discussed so far, DragonDictation should therefore prove effective in increasing learner accuracy, even though it was not designed as a learning and teaching tool.

**The Research Problem**

The ability to communicate effectively in English has become a priority for learners of English, often to improve their chances of securing employment. Policy makers in non-English speaking countries also see the
benefits and thus encourage English language learning (Guo, Guo, Beckett, Li, & Guo, 2013).

There is a variety of teaching tools in use to help foster increased intelligibility in spoken English. One popular computer program in helping learners create meaning is *Audacity*, with which learners can listen to a model sample and record their own voices, play it back, analyse, and compare their own samples with the model. Individual feedback from the teacher however, is time consuming and can be open to the teacher’s skill and interpretation. With the free mobile phone voice recognition application *DragonDictation*, speech is turned into text thereby making it possible for learners to compare the original written text with the transcription on their phones. The potential benefits are that this app might firstly help to raise linguistic and phonetic awareness in case learners could not hear their own mistakes. Secondly, it underscores one belief in ELT that many learners learn better when supported with visual links. Finally, it may function as an immediate, objective, individualised feedback tool for each learner. *DragonDictation* has the added advantage that learners can email their transcribed samples to themselves or the teacher for future reference and record keeping.

The ubiquitous nature of mobile phones makes them an appealing teaching resource in language classrooms. Moreover, they can potentially be highly instrumental in increasing literacy in adult learners.

**Methodology**

This study uses the exploratory sequential design in which to explore a phenomenon. The rationale behind using a mixed method design is that it offers a clearer understanding of the phenomenon under investigation than they can offer separately (Creswell, 2012).
In this study, there are three research questions:

1. What are the perceived barriers of learners in using mobile phones as a learning tool in English language classes?
2. To what extent does increased use of an app add to learner confidence and pronunciation accuracy when learners use mobile phones as an immediate feedback tool in class?
3. To what extent can the *DragonDictation* App be a suitable teaching tool in English language classes?

Prior to data collection, ethics approval for the study was obtained through The University of Queensland and permission to collect the data from a Brisbane city Language College and the participants was also acquired. Qualitative data from observations and in-class group discussions were used to gather data on how participants feel and what they believe about using mobile phones as an immediate feedback tool in an English language class. In small groups, learners discussed the questions that were placed on card, recorded their conversations on their phones with Voice Memos, and emailed their records to the teacher. Finally, quantitative data were collected through an in class paper based survey.

There was also a pre and a post-test to establish a measure of effectiveness of the treatment. With the teacher in the pre and post-test, the meaning of unknown words was briefly covered as well as the meaning of the text. Learners selected their English language preference on their iPhones (UK, Australian or US) and then dictated an Aesop’s Fable into their phones and emailed their records to the teacher. The instructions to the participants were that they could pause their recording at any time, but that they could not delete anything or use the keyboard on the left bottom of the
app to alter anything in their samples.

After the pre-test, the teacher analysed the pre-test samples and identified common phonological areas to address in the whole class. Material from Hooke and Rowell (1982) as well as from Mortimer (1994) were used to practice the identified target areas of phonological weaknesses the participants had in common. To help learners see and practice the place of articulation, the ‘Sounds of Speech’ website http://www.uiowa.edu/~acadtech/phonetics/# was used. Half way through the treatment, a mini-progress check was conducted through various types of tongue twisters from www.englishclub.com/pronunciation/tongue-twisters.htm.

Data were collected in full from eight adult students who attended an English Language course in Brisbane, Australia, with the final survey being completed by eleven students (this number increased due to the rolling nature of student numbers with students coming and leaving the class each week). Students attended this course from July to August 2013 and were placed in a class for learners progressing from a B2 to C1 level according to the Common European Framework. As there was a constant influx and turnover of students, only those who could be tested both on the first day and on the last day have been used for the results section. The full data that were collected included four male and four female students aged 19 to 39. In total, 10 school lessons (roughly 10 hours over 3 weeks) were spent practicing with the app. Ethics approval for the project was obtained prior to the data collection and as such, names have been changed in the results section.

There was a control group from one of the other classes at the same Language Centre in Brisbane, Australia. This class had students learning at the same level of English as the study group and included a total of six students, with one male student and five female students in the group. The
control group did the pre-and post-test only and did not use *DragonDictation* in class at any other time during the course of the study. However, after the end of the study some professional development training by the researcher was conducted with the teachers at the school on how to use *DragonDictation* so that the control group and other classes could use the app to improve their pronunciation.

**Data Analysis**

The participants were placed into groups and given discussion cards, using the Communicative Approach and current dominant ELT methodology. In these groups, learners discussed the questions that were on the discussion cards, recorded their conversations on their phones and emailed the audio files to the teacher/researcher. The teacher/researcher circulated the room to support learners in their discussions and to monitor their progress.

By comparing word for word the emailed pre-test transcriptions from *DragonDictation* to the master copy, common problem areas were identified to address in class. For verification of typical phonological patterns in specific language groups, the book by Swan and Smith (1999) was used.

By following Clay’s (1993) method of counting words in running records, each learner sample of the pre-test and post-test was analysed by counting not only in each instance how many words were accurately transcribed by *DragonDictation*, but also how many words it recognised each time. This made it possible to attribute to each participant a mathematical percentage of increased or decreased accuracy. Not all learners recorded the title and the moral of the story, and consequently only the content paragraph was used for analysis.

The participants in the treatment group completed a paper questionnaire once the project was completed. This took the form of a cline with a
mathematical value to express their beliefs: five representing “strongly agree” and one representing “strongly disagree”.

Results and Discussion

As part of the study, students were asked to do a pre-test at the beginning of the study. This involved checking the students understood the meaning of the words and the text as a whole, after which the students read a paragraph, (Aesop’s Fable, The Dog and the Shadow) into the DragonDictation app. The file transcript and the audio file were then emailed to the teacher and the data collected.

Interestingly after the pre-test, students from various countries had the same type of errors, as shown in Table 9.1 (Note: names have been changed throughout).

<table>
<thead>
<tr>
<th>Name</th>
<th>Country/Region</th>
<th>Learner Errors</th>
<th>List of Common Errors</th>
</tr>
</thead>
</table>
| Anita Nelly | Taiwan         | • Word stress at the end of each word  
• /v/ or /ð/ or /θ/  
• /z/ or /ʃ/ or /ʒ/ (or /ʧ/)  
• /ð/ or /θ/  
• /k/ or /g/  
• consonant clusters (/fr/, /dr/,  
/sw/ or /sp/) | • /s/ or /z/  
• /ð/ or /θ/  
• linking with /n/ or /ʃ/ or /ʒ/  
• /w/ in connected speech  
• diphthongs |
| Sally     | Japan          | • /l/ or /r/  
• /z/ or /ʃ/ or /ʒ/ or /s/  
• /v/ or /b/  
• /t/ or /d/  
• consonant clusters                  |                                                                                      |
The treatment for the group, which was in class time, was quite extensive for each of the ten lessons (see Table 9.2). The students were taught the ten lessons over a period of three weeks with each lesson lasting approximately one hour and with each one focused on a different type of phonological area.

### Table 9.2 The Activities Each Day That Focused on Various Types of Speech

<table>
<thead>
<tr>
<th>Day</th>
<th>Area</th>
<th>Example</th>
</tr>
</thead>
</table>
| 1   | /s/ or /z/ | Sounds in the beginning, middle and end positions, as well as in sentences  
For example: soap, assume, miss / zip, buzzer, nose  
*The boss is always out* |
| 2   | /ð/ or /θ/ | Sounds in the beginning, middle and end positions, as well as in sentences  
For example: thing, toothbrush, with / that, wither, smooth  
*I can’t go with Alan* |
<p>| 3   | Connected speech with /w/ between two vowels | Two apples-to wapples/ Do I have to do every question? |</p>
<table>
<thead>
<tr>
<th>Day</th>
<th>Area</th>
<th>Example</th>
</tr>
</thead>
</table>
| 4   | Tongue twisters | A proper copper coffee pot  
Red leather, yellow leather, read leather, red leather  
Long legged ladies last longer |
| 5   | Linking /ŋ/, /j/ or /r/ | I expect you know Ian Green?  
Why, I wonder? Is he influential?  
Mummy always knows best. |
| 6   | Front vowels | meet, mit, met, mat, mutt  
Pete, pit, pet, pat, putt  
bean, bin, Ben, ban, bun |
| 7   | /dʒ/ or /ʧ/  
/b/ or /v/ | George, it’s not possible! You can’t judge a beauty contest!  
bet-vet, boat-vote  
This van is going very fast  
The bus was very full containing /θ/ /ð/ /w/ and /z/, /v/ /f/ |
| 8   | Word and sentence stress | Can I have a coffee and a pot of tea, please?  
Would you like another one?  
Thanks for a lovely meal. |
| 9   | Long vowels vs. short vowels, sliding diphthongs | heard, hurt, heart  
peer, pair, pure  
How dare you disobey me?  
What about giving me my share? |
| 10  | Clusters with /tr/, /dr/ or /tw/, /kl/, /gl/, /kr/, /gr/ or /kr/ | A: How are you travelling, Trevor?  
B: By train. The twelve twenty  
A: Shall I drive you to the station?  
A: You’re back quickly. Didn’t you go to the cricket club? Was it crowded?  
B: I went. It was quite crowded and Greg was there too. |
Table 9.3 is an example of two students’ noticeable improvement throughout the period of practice. Results were similar for all students in the class. Practice was completed in class with the most common mistakes being focused on. This did not include the focusing on vowel sounds as these sounds are where accents occur and because English as an International Language is being taught, the learners’ choice of accent was respected.

Table 9.3 An Example of One Student’s Results with the Text on the Left Side and the Pre-and Post-Test Results

<table>
<thead>
<tr>
<th>Learner</th>
<th>Sample</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sally (Japan)</td>
<td>The dog and the shadow; It happened that a dog had got a piece of meat and was carrying it home in his mouth to eat it in peace. Now on his way home he had to cross a plank lying across a running brook. As he crossed, he looked down and saw his own shadow reflected in the water beneath. Thinking it was another dog with another piece of meat, he made up his mind to have that also. So he made a snap at the shadow in the water, but as he opened his mouth the piece of meat fell out, dropped into the water and was never seen more.</td>
<td>it happen ... Cahaba Glotfielty assailed me on my scatting it Kukhwan in his Mosside to eat it in peace not all his way home he Hototo costs upon crying a call sidelined Breuk as he crossed David down on saltiest Longshadow if it did Ingala beansies thinking it Clasara Dock this RFLP's centimeter she made up his mind to habitat also sashimi adopts not at the shadow in the Waka back as he opened his mosque episode Maidenfair out talked into the Wallpack on last Nablus Simoron</td>
<td>It happened... Have you got that piece of meat and was carrying it time... Must do it in peace now on his way home he had the Kill-cross apparent lying across the Luning broke as he crossed you get down and saw his shadow effective in the water Beneze thinking it that another dog with another piece of meat Humana up his mind to happen. also saw him at the snap at the shadow in the water but I'll keep up on his mask that piece of meat fell apart stopped into the water and life never seen more</td>
</tr>
</tbody>
</table>
The control group performed worse in the post-test than in the pre-test, thereby supporting Ng’s (2012) claim that learners need to see the purpose of an activity, or else technology in the classroom will not contribute to the ultimate learning experience. Although the purpose of the activity was explained to the control group, they perhaps did not see the importance, as they did not receive any treatment as part of the project.

Table 9.4 represents the pre and post-test results from the treatment group and lists the overall differences.

<table>
<thead>
<tr>
<th>Name</th>
<th>Gender</th>
<th>Pre-test words recognised</th>
<th>Words accurately produced</th>
<th>Post-test words recognised</th>
<th>Words accurately produced</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victoria *</td>
<td>F</td>
<td>102</td>
<td>67</td>
<td>99</td>
<td>64</td>
<td>-1%</td>
</tr>
<tr>
<td>Sally *</td>
<td>F</td>
<td>87</td>
<td>35</td>
<td>99</td>
<td>67</td>
<td>27.4%</td>
</tr>
<tr>
<td>Anita *</td>
<td>F</td>
<td>105</td>
<td>55</td>
<td>109</td>
<td>73</td>
<td>14.6%</td>
</tr>
<tr>
<td>Nelly *</td>
<td>F</td>
<td>83</td>
<td>57</td>
<td>84</td>
<td>65</td>
<td>8.7%</td>
</tr>
<tr>
<td>Hamdi *</td>
<td>M</td>
<td>93</td>
<td>42</td>
<td>86</td>
<td>40</td>
<td>1.4%</td>
</tr>
<tr>
<td>Mustafa *</td>
<td>M</td>
<td>106</td>
<td>82</td>
<td>95</td>
<td>55</td>
<td>-17.6%</td>
</tr>
<tr>
<td>Steve</td>
<td>M</td>
<td>110</td>
<td>77</td>
<td>109</td>
<td>80</td>
<td>3.3%</td>
</tr>
<tr>
<td>Sami</td>
<td>M</td>
<td>110</td>
<td>64</td>
<td>106</td>
<td>68</td>
<td>6%</td>
</tr>
</tbody>
</table>

Note. * iPhone owners

As can be seen in the post-test results, the treatment group showed overall increased accuracy, with the exceptions of Victoria (−1%), and Mustafa (−17.6%). In fact, the average increased accuracy for the whole sample is 5.35%.

Following the treatment and the post-test, the paper based survey results in Table 9.5 indicate that there was a change in the learners’ beliefs
about the usefulness of mobile phones as a learning tool in class.

<table>
<thead>
<tr>
<th>Questions</th>
<th>1 strongly disagree</th>
<th>2 disagree</th>
<th>3 neutral</th>
<th>4 agree</th>
<th>5 strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I learn best by hearing new words</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I learn best by seeing new words</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3. The correct English pronunciation is important</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I like speaking English</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>5. I think other people can understand my English more easily now</td>
<td>1</td>
<td>7</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I now think mobile phones are useful tools in learning</td>
<td>1</td>
<td>2</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I like using technology to learn English</td>
<td>1</td>
<td>1</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I want to learn more about how to use technology in my daily life</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. I want to learn more about how to use technology in my own learning</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. I think DragonDictation is a useful phone app</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>11. I will continue to use DragonDictation in my private life</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>12. We spent too much time working with DragonDictation in class</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. I will introduce my friends to DragonDictation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals:</td>
<td>7</td>
<td>32</td>
<td>45</td>
<td>58</td>
<td></td>
</tr>
</tbody>
</table>

As can be seen by the answers of the post survey (Table 9.5) the learners had a favourable experience with high numbers that agree and
strongly agree. This is particularly true for questions 3, 6, and 7. It is clear that the students feel that correct English pronunciation is important (Q3) and they now like using technology to learn English (Q7). Furthermore, these results show overwhelmingly that learners’ beliefs regarding the place of technology and mobile phone usage in particular, shifted during the treatment phase as they experienced the cycle of awareness-raising, practice, immediate feedback, corrective practice and immediate feedback with DragonDictation (Q5). During the pre-test discussion, numerous learners expressed their belief that technology and mobile phones specifically had no place in the classroom, as it might distract them. However, as can be seen from their answers for Question 6, 8 and 9, their beliefs have shifted in this regard too. They now believe technology can be useful in their own learning.

This study aimed to explore a way in which teachers can start to empower adult learners by using new technology and new literacies not only in the classroom, but also in their lives outside of school. Moreover, the study aimed to explore whether regular exposure and focused use of a free mobile learning app could help increase learner intelligibility in their effort to learn English as an International Language.

*Research Question 1*: What are the perceived barriers of learners in using mobile phones as a learning tool in English language classes?

In the focus group discussions, almost all the participants expressed their beliefs and concerns about using mobile phones as a learning tool in the classroom. Their reasons varied from the fact that it is a distraction to suggesting that social media and IM would make it hard for them to focus on the lesson.

One student, Victoria, voices her concern that mobile phones and learning are mutually exclusive as phones are a distraction. Sami agrees by
saying that phones are a distraction, because you will then have to multitask:

Sami: I can’t use... in class.

Victoria: Yeah. I think that is for all student, in every place... in every country. Well, if you use that in class, it’s... of course, the teacher will say “No, you can’t use that.” It’s normal, but... because you are in class so you have to learn and if you do that you are doing two things so you are in two parts different... So, you are... one is... half...

Sami: I can’t multi-task

Some students also felt that their social life should stay outside the class because a classroom is for learning, and that using dictionaries in paper format had been good enough for years when they were at school, it could be useful then too. By the end of the study, eight of the eleven students surveyed ‘strongly agreed’ and two ‘agreed’ that mobile phones were useful in aiding learning, and nine participants thought they liked using technology to learn, whereas in the discussion many participants said they preferred more traditional methods like books and speaking to other students. In the post study survey, almost all the participants had changed their minds in this regard by reporting that mobile phones are useful in learning English and these students reported they would recommend DragonDictation to their friends. This is a positive change in their attitudes and suggests that the students worked through the barriers that may have limited their learning if they had not changed their attitude.

Research Question 2: To what extent does increased exposure to an App add to learner confidence and pronunciation accuracy when learners use mobile phones as an immediate feedback tool in class?
The learners became increasingly more confident as they used the app and saw their immediate, personalised results. On the first day learners said, “This app is broken!” and one threw the phone across the table. On day four while reading a text on the benefits of chewing gum, the teacher pointed out the meaning difference in “shoe” and “chew” when learners mispronounced it. Learners then autonomously produced their phones, started dictating “shoe/chew” into their phones to check their own pronunciation and persisted until they got it right. This is a practical example of the teacher focusing learners’ attention on specific sounds to listen for, and getting precise feedback, as suggested by Liaw (2014), as well as focused corrective feedback (Eskenazi, 1999). On day six, learners self-identified that /b/ and /v/ were an area they need to address, and asked for help. While on day seven learners independently started peer correcting each other by showing the correct mouth movements to make certain sounds and on day 9 learners said: “We are ready. Test us tomorrow!”

As can be seen from the samples of the treatment group, the improved results on learner accuracy are clearly visible. In fact, on analysis of the results the treatment group increased their accuracy with 5.35% whereas the control group’s accuracy declined with 7.1%. Individual student scores of the treatment group improved between 27.4% and 1.6%, although two students had worse post-text scores.

The distinction between the performance of the male and female participants should also be noted. On average, the female participants increased their accuracy by 12.4% and the male participants by -1.7%, despite the fact that three of the four male participants showed a small increased in their accuracy. Only one showed a significant decrease and a follow-up interview would have been exceedingly useful to ascertain the
reasons for this decrease in performance. Regarding the female participants, three of the four showed a significant increase in their accuracy varying from 27% to 1%. Again, follow up interviews would have been insightful as to the participants’ beliefs on why they performed the way they did.

Research Question 3: To what extent can the DragonDictation app be a suitable teaching tool in English language classes?

There is evidence from the data collected that DragonDictation is a useful teaching tool, when used regularly in a focused manner in the classroom. The learners in the post treatment survey stated that two of them ‘agreed’ and four ‘strongly agreed’ that DragonDictation was a useful app and five in total said they would like to continue using it outside class in their personal lives. Almost all of them said they would introduce their friends to DragonDictation.

The fact however that it works only on iPhones was problematic, and the fact that it only registers three different varieties of English (albeit seemingly the most sought after pronunciation variation for learners) is possibly something the creators of the app would like to reconsider in the future.

Limitations of the Study

There are some limitations to this project with those being the type of phone, the small sample size and other limitations such as the size of the group. The main limitation of the study is that the app worked only on one type of phone, the iPhone. Consequently, learners with Android type phones were sharing with others so that everyone could access the phone. This resulted in much more time than anticipated spent on the project in class with roughly an hour spent each day, whereas the initial expectation was around 20 minutes. The fact that learners were sharing phones accounts
for the extra time spent and, may also account for the fact that some students (iPhone owners) performed better in the post-test than other students (Android owners).

Another limitation was that it was a small sample conducted over a short period of time with only eight students (four male and four female, aged 19 to 39) participating in both the pre and the post-tests. In total, only 10 hours (roughly 10 hours over 3 weeks) were spent practicing with the app. Although the app caters for the biggest variety of English on the market (US/UK/Australian), it does not accommodate speakers of World English, or even other English accents which means that students need to choose the type of English they are more closely aligned with. *DragonDictation* does not register intonation, which is an important feature for learners of English to practice.

One final limitation is the treatment group consisted of eight participants, from five different countries. The treatment consequently prioritised common errors as much as possible, but in a homogenous monolingual group, the practice activities might be more applicable to everyone.

**Conclusion**

When it comes to keeping up to date with emerging pedagogies and teaching approaches, the effective use of mobile phones as a learning and teaching resource deserves more attention. In helping learners on their quest to create meaning, improve their intelligibility and increase their autonomy as English learners and competent speakers, mobile phone technology may be indispensable in the future. This study would be a practical example of bringing real life into the classroom, making learning concrete and practical thereby preparing learners for real life situations, using real language.
Mobile phone technology was used to help learners encode their message more effectively so that the decoder does not have to work so hard to create meaning. This study links to studies by Golonka et al. (2014) and suggests that voice recognition software can help learners to increase their pronunciation accuracy and that it can provide effective feedback. Moreover, it shows a practical way a teacher can help learners to navigate new literacies by helping them through the use of a mobile app to interact, value, believe and know (Gee, 2010).

In the future a further study might be to investigate how and where students are practicing their pronunciation using the app DragonDictation. This would follow on very nicely from this initial study with a small number of students that only investigated students’ in class use of the app.

Voice recognition software as an immediate feedback tool on a smart phone will certainly have a place in future classrooms. Not only are mobile phones readily available, they are relatively cheap, easy to operate, innocuous and there are copious amounts of phone apps available for free download.

A positive outcome of this study is that DragonDictation is potentially a viable resource that can support learning, help address fossilised pronunciation errors and increase learner autonomy outside of class. With the more frequent, targeted use of mobile phones in class it might be possible for teachers to start addressing some of the factors that marginalise learners, and help them end up on the right side of the Digital Divide.

In conclusion, using free voice recognition apps on mobile phones is advantageous because mobile phones are innocuous and most people have one. They can be used in places where Wi-Fi is not available, but where 3G is. Instead of treating the presence of mobile phones in the classroom as a menace, it is important to note they can be employed as an effective
teaching and learning tool that can help learners encode their messages more effectively so that listeners can create meaning more easily.

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References


Chapter 10: The Development of Listening Comprehension via Mobile-based Social Media and the Role of e-Leading Students

Timothy Read
National Distance Education University, Spain
Elena Bárscena
National Distance Education University, Spain

Abstract

Mobile-assisted language learning (or MALL) offers great potential for the development of listening comprehension, since it is something that requires considerable practice, which the “anytime, anywhere, any device” nature of MALL would seem to support. Furthermore, the widespread adoption of smartphones and tablets by the student population means that its use as part of language courses is becoming a reality. While progress has been made in this direction, especially using podcasts, there is still little evidence in the literature that students are prepared to use MALL apps in the medium term to develop listening competences, once a given research experiment or course module has finished. In this article, the authors consider peer interaction in social media as a way to motivate, support and scaffold the individual student experience in a listening comprehension learning process. An experiment undertaken on the use of a MALL app designed by the authors based upon news recordings and connected to Facebook suggests that such interaction could foster a longer and more frequent exposure to the app, and is benefited by the special role played by
a particular student profile, termed the e-Leading Student (e-LS).

**Keywords:** MALL, Listening Comprehension, Audio News Trainer, Social Media, e-Leading Students

### Introduction

Mobile learning has been argued to offer great possibilities when applied to languages where the devices can be used to increase learning opportunities, encourage active learning, enhance learner feedback, emphasize task time, and provide easy access to content, as well as increasing ‘anytime, anywhere’ learning possibilities (Burston, 2011; Kim, 2011; Kukulka-Hulme, 2006; Kukulka-Hulme, 2009; Lan & Sie, 2010; Nash, 2007; Sharples, 2000)\(^1\). Furthermore, it has been argued in the literature that mobile learning applied to languages, or mobile-assisted language learning (henceforth, MALL) does motivate students, so, in principle, it encourages them to spend more time interacting with the second language than they would if they were restricted to classroom only studies and activities (Facer et al., 2004; Furuya, Kimura, & Ohta, 2004; Huang & Sun, 2010; Jones et al., 2006; Kang & Kim, 2007; Kukulka-Hulme, 2005; Kukulka-Hulme, 2009; Naismith et al., 2005; O’Malley et al., 2003; Roschelle, 2003; Thornton & Houser, 2005). Length of exposure, in turn, has been argued to be a decisive factor in language learning (e.g., Hakuta, 2000; Unsworth et al., 2014).

In general, it can be appreciated that the use of mobile devices can be motivational for students due to their portability, the immediacy they offer to students (Norbrook & Scott, 2003), and their intrinsic social/ludic nature.

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\(^1\) The research work presented in this chapter has been funded by the Spanish Ministry of Science and Innovation (ref. no. FFI 2011-29829).
The affordances of such mobile devices in this sense can be divided into four groups: firstly, as a way to access online resources and communications. It is very common these days to see people sat in cafés and other public places openly discussing things and then reach for a smartphone to check something online relevant to the conversation. Students, hence, no longer have to take the word of a teacher or expert for something but can immediately check it for themselves. They might want to expand what they have just been taught or contrast it with other positions, all of which enriches their learning process. Secondly, these mobile devices are useful clients for learning management systems, online courses or other relevant networked systems. Given the physical characteristics of the devices, they may not be ideal for entering a lot of textual information or even reading large documents, but they are always to hand for students to log into a course to see if a teacher/tutor, or even a peer, has answered a question previously asked by them. Thirdly, these devices are sensor-enabled, thereby permitting students to gather data from the world around them (e.g., geolocation coordinates, photographs, audio recordings), which can be used later as part of their work. Fourthly and finally, they represent app-oriented handheld computers, since all three main smartphone and tablet operating systems (Android, iOS and Windows Phone), enable small programs, or apps, to be installed on the devices to extend their functionality.

An additional aspect to be considered here is that as the number of people with their own mobile devices started to reach significant numbers, then a new social phenomenon appeared, namely that of BYOD (Bring Your Own Device) (Ballagas et al., 2004). This tendency, which is standard practice these days, can also be argued to be intrinsically motivating for students. Interaction with information and online resources can be undertaken at any time by students and logged as they go along, thereby permitting them to continue at a later time or date. However, practical
experience shows that there are also problems when using mobile devices for learning, namely the typically small screen size they have and the difficulty of textual data entry. Furthermore, even with protective cases, they are somewhat fragile and in the majority of cases, cannot be made wet. Network connection is also a source of problems when away from Wi-Fi, since the use of cellular networks can be unreliable and is also expensive. Finally, when using a smartphone or tablet intensively, as might be the case in learning activities, the battery life is limited, which can affect what can be undertaken.

Nonetheless, since the affordances outweigh the problematic aspects of MALL, the large number of students that have smartphones and tablets with access to the Internet, then the large number of online educational resources available could be argued used to facilitate the development of second language competences (e.g., www.bbc.co.uk/languages; http://learnenglish.britishcouncil.org/en/). Such tools provide students with an opportunity to extend and integrate their learning into everyday life. MALL has been applied to most areas of second language development, including listening competence. Listening occupies around 40% -50% of the time spent communicating (Gilman & Moody, 1984) and is, as Ghaderpanahi (2012) argues, the first language skill we learn as children. While the results in the literature present different degrees of success, partly due to the approaches adopted to the question of how listening occurs and hence can be learnt, the results are arguably limited since the students often work well when they are coached, mentored, or their MALL activities form part of a larger formal language learning course, but do not continue to practise once this period has finished (e.g., Berk & Cebeci, 2005; Cebeci & Tekdal, 2006; Kazlauskas & Robinson, 2012; Robinson & Kazlauskas, 2010;).

In this chapter, the authors consider peer interaction in social media as
a way to motivate, support and scaffold the individual student experience in a listening comprehension learning process. An experiment undertaken on the use of a MALL app designed by the authors based upon news podcasts and connected to Facebook suggests that such interaction could foster a longer and more frequent exposure to the app, and is benefited by the special role played by a particular student profile.

Mobile-Assisted Listening Comprehension

The development of listening comprehension requires considerable practice that is not easy to obtain purely in classroom time. Hence, MALL offers interesting possibilities to students to practise second language listening outside of their formal learning periods. For such an approach to be effective, it needs to support and complement the face-to-face techniques used in class. Vandergrift (2011) notes that students who are effective listeners successfully apply these strategies, while less effective ones continue to translate what they are hearing; try to proceed in a purely bottom up fashion; or have difficulties processing the information in real time. Language classes can, therefore, be used to help students develop these strategies and provide them with suitable listening activities and opportunities to check their own comprehension. Typically, listening comprehension training focuses on helping students to establish a series of strategies that can be applied before, during and/or after the listening task takes place (Flowerdew & Miller, 2005; Gilakjani & Ahmadi, 2011; Rost, 2002; Vandergrift, 2004; Vandergrift, 2007; YaMada, 2012). Gilakjani and Ahmadi (2011) argue that activities undertaken prior to listening help activate relevant real world knowledge and provide support. Those undertaken while listening help students use key information in the formation and validation of predictions. Finally, subsequent activities help by extending the listening and encouraging interpretation and reflection.
Guikema (2009) further argues that any help provided to the students should decrease as progress is made. There are studies that show that the use of mobile devices can successfully support listening and speaking skills (Demouy & Kukulska-Hulme, 2010; Edirisingha, Rizzi, Nie, & Rothwell, 2007; Kim, 2013). One such application of MALL was undertaken by Azar and Nasiri (2014) who presented data on how the use of audiobooks may lead to the improvement of listening comprehension. Kim (2013) showed that a group of students using smart phone apps for English listening practice improved consistently more than the control group.

The most widely applied MALL technique for the development of listening comprehension is that of podcasts (first reported to have been used in Japan in 2005 by Lomicka & Lord, 2011). Since then, a myriad of different studies have been undertaken that suggest their benefit for improving second language listening competence (e.g., Chinnery, 2006; Dudeney & Hockly, 2007; Lee et al., 2008; Maikat et al., 2007; McGarr, 2009). However, as in other areas of MALL applications, research also shows that students’ use of podcasts is limited and not something that is incorporated into their everyday life as a medium term strategy to improve listening (e.g., Copley, 2007; Evans, 2008; Hasan & Hoon, 2013; Lee & Chan, 2007). Sometimes their use substitutes other computer-based learning that they would have done instead if the podcast was not available and does not increase the amount of practice obtained (Robinson & Kazlauskas, 2010). While it is clear that tools and techniques like podcasts and other MALL applications intended for developing listening comprehension may motivate students to practice, the authors argue that these results are inevitably limited since if the students are left alone with their mobile devices, then they are unlikely to continue practising over a sustained period of time. This is particularly true for students studying in a distance-learning modality, who are especially prone
to stop using educational tools, since they have little if any contact with their teachers or peers. Furthermore, they typically stop (due to their professional or personal life pressures) using any educational resources that they feel are not directly relevant to their overall academic goals.

Social Media Interaction in the Audio News Trainer

As part of the Audio News Trainer (henceforth, ANT) research project (Read & Kukulska-Hulme, in press; Read et al., in press), the authors have been studying the way in which student social interaction that is directly included in the ANT listening comprehension app can affect second language practice, the students’ associated motivation levels, and the effect this has for continued use of the app in the medium term. Previous research shows that social activities can potentiate learning in general (e.g., Breen, 1985; Ellis, 2003). This also reflects the authors’ experience of working on second language distance-learning courses for almost two decades, where (technology and network permitting) social interaction in the student groups and related activities motivate them and enhance their disposition to work in the given course. Before analysing the way in which the students used ANT in an experimental context, it is important to appreciate how this app was structured and how social media interaction was included.

The workflow for a student using ANT is presented in Figure 10.1, which shows the progression of screens as the app is used. As has been detailed elsewhere (Read & Kukulska-Hulme, in press; Read et al., in press), ANT was developed to present a series of audio news recordings to students in a structured way. As can be seen in the figure, once students log in, they are presented with links to the news recordings grouped together in three colour-coded levels (green, orange, and red), from easier to harder, depending upon accent and speed. As well as the sequencing, ANT has been argued by the authors (Read et al., in press) to offer two other
pedagogic advantages over just listening to the radio news on a mobile device directly from the Web site. Firstly, the pedagogic structure of the interface helps students enhance self-regulation and metacognition (important and relevant processes within adult SLL). Secondly, the way students can use social media to work collaboratively after listening to the news to clarify and refine what they think they have understood, following a social constructivist approach. There are two versions of the app, an individual learning version, and a second social learning one. The difference between them is that the latter, as illustrated in Figure 10.1, has an additional text box where the students are intended to provide a brief summary of the news item that they have just listened to, which is automatically posted to the ANT Facebook page, as the starting point for subsequent interaction. In the former, there is no such possibility and the students, once they have finished listening to a news recording, answer some closed questions about it and then go back to listen to other ones if they wish.

![Figure 10.1 The ANT Screen Progression](image-url)
The structure of a summary on the app page can be seen in Figure 10.2. It illustrates the identifier of the student who has posted the summary, the title of the news recording listened to, and the summary itself. Directly after listening to a recording and entering a summary, the student can either continue to listen to other ones or leave the app and go to Facebook to undertake subsequent related social learning activities.

![Facebook ANT Page](image)

**Figure 10.2 Facebook ANT Page**

The experiment undertaken with ANT included two research questions related to the effect of social media on mobile assisted listening comprehension development. Firstly, does the use of social media potentiate and prolong the use of MALL? Secondly, does the way in which social media is used alter this effect? The experiment was structured as follows. A call for participation was circulated to students on an English course that is taken as part of the mandatory university entry process at UNED (Universidad Nacional de Educación a Distancia). Ninety students voluntarily signed up and were randomly divided into two groups, one for each version of the app (henceforth, referred to as the Individual and the...
Social Learning groups). Their profile was very heterogeneous, with self-reported English language competences that ranged from A1 to C1 (using the nomenclature of the Common European Framework of Reference of Languages; Council of Europe, 2001). Members of each group were not informed of the existence of the other group or even that there were two different versions of the app. Documented help and guidance was provided to both groups.

Before starting to use ANT, the students in the social learning group were provided with a guide on how to interact on the social media (a fragment of which can be seen in Figure 10.5). When a student enters the page, she/he searches for summaries of the recording that has just been listened to. If another student has already reached the same conclusion, then she/he can click on the “Like” button to show his/her agreement. Otherwise, a comment can be added to the other student’s summary, noting the presence of his/her own summary on the page and highlighting the differences between the two. The next step in this case is to search for supporting evidence for his/her understanding on Facebook, other social media, or the Web, which should also be added back to a subsequent comment on the summary, as a way of facilitating qualitative debate. This kind of written digital interaction is arguably useful practice for the students, since as well as reinforcing the results of the listening comprehension activity in ANT, it also prepares the students for what is an important means of communication these days (Maggiani, 2014).

In order to scaffold qualitative interaction, the authors also included in the guide a kind of “netiquette” similar to what they had previously developed for a Professional English MOOC in 2012 (Barcena et al., 2015). In essence, three aspects of interaction were emphasized: firstly, tightly focussed interventions (e.g., the necessity to include a clarifying
subject line, etc.). Secondly, a relaxed attitude toward making mistakes (i.e., the need to focus on the content of any messages, acknowledging previous comments, and not worrying excessively about formal considerations). Messages obviously had to be revised to limit sloppy work but anxiety about the accuracy of one’s written production should not hinder interaction. Thirdly, the emotional component of the interaction (i.e., the tone of the messages, respecting the opinion of others and using language with care not to offend); for example, not writing everything in capitals (since it can be interpreted as shouting); avoiding “flaming” (exaggerated language and signs such as !!! and ???); using asterisks surrounding words to indicate italics used for emphasis (*at last*), words in brackets, such as (grin), to show a state of mind, common acronyms (e.g., LOL for “laugh out loud”), appropriate emoticons (emotion icons), “smiley’s” or punctuation such as :-) to convey emotions, etc. Students were encouraged not to give importance to what appears to be silly responses or personal attacks since it is easy to sound impolite or be misunderstood in written comments, especially by non-native speakers.

The experiment ran from November 2014 to January of 2015 (from 10/11/14 until 18/1/15) with 90 students on a university English access course, forming a highly heterogeneous population regarding their level of this language. Data about the way the students worked with ANT was obtained in several ways. Firstly, two questionnaires (both containing 28 questions) were given to the students, as part of the sign-up process (a pre-questionnaire about language level, learning styles, news habits, preferences, expectations), and as part of the finishing process (a post-questionnaire about the experience and the fulfilment of the initial expectations). Secondly, data was logged directly from the app on the project server about the way the students used ANT, including what news
items were listened to, the answers given to the questions in the app, and whether a summary had been sent to the Facebook page. Thirdly and finally, the ANT Facebook page itself provided a log of student interactions (posts from the app and follow up activities undertaken directly on the social network, such as adding “likes” and related comments and contents). The results obtained during the experimental period show a marked difference of usage between the individual learning group and the social learning group. In the former, only nine of the 45 students (20%) registered actually used the app to listen to 121 news recordings. The number of recordings listened to by the respective students in each group is presented in Table 10.1.

### Table 10.1 Comparative Usage Results from Both Learning Groups

<table>
<thead>
<tr>
<th></th>
<th>No of students</th>
<th>No of recordings</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Individual Learning Group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>&lt; 10</td>
<td></td>
<td>67%</td>
</tr>
<tr>
<td>1</td>
<td>≥ 10</td>
<td></td>
<td>11%</td>
</tr>
<tr>
<td>1</td>
<td>≥ 20</td>
<td></td>
<td>11%</td>
</tr>
<tr>
<td>0</td>
<td>≥ 30</td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td>1</td>
<td>≥ 40</td>
<td></td>
<td>11%</td>
</tr>
<tr>
<td><strong>Social Learning Group</strong></td>
<td>9</td>
<td>&lt; 10</td>
<td>28%</td>
</tr>
<tr>
<td>13</td>
<td>≥ 10</td>
<td></td>
<td>39%</td>
</tr>
<tr>
<td>6</td>
<td>≥ 20</td>
<td></td>
<td>18%</td>
</tr>
<tr>
<td>1</td>
<td>≥ 30</td>
<td></td>
<td>3%</td>
</tr>
<tr>
<td>4</td>
<td>≥ 40</td>
<td></td>
<td>12%</td>
</tr>
</tbody>
</table>

In the social learning group, 33 of the 45 students (73%) used the app to listen to a total of 654 news recordings. They followed up with 236 “likes” and 116 comments were made on the news summaries there. As can be seen in Figure 10.3, showing a typical example of the relation of the number of posts over the experimental period, the number of news recordings listened to did not diminish over time. This distribution is similar...
for other students where the actual number of posts changed.

A question needs to be asked about the students who actually signed up for the experiment and then did not actually take part (i.e., those who did not even download the app and use it at all). The authors note that this result confirms and reproduces previous experience of working with distance learning students. The very nature of the way that distance-learning students work, which is typically something that they do in parallel to other activities, such as working, means that to a certain extent their level of commitment, and hence participation, is somewhat unpredictable. As their occupational and personal lives change, so do the slots of free time they have for academic activities, such as the participation in this MALL experiment. Furthermore, taking part here was presented to the students as something that could help them improve their oral comprehension competence but that would not in itself count toward the end mark of the actual course they were undertaking at UNED. This is also an important factor when predicting student behaviour. If they find themselves with less
time than they would desire, they often leave those parts of the course that are not directly evaluated as part of their overall grade. Finally, it should be noted that signing up for the experiment only required a student to fill out an online questionnaire, whereas actually taking part in it required time, effort and dedication over the experimental period, as well as the initial logistics of having to download and install the app, configure it for the news sources and then read documentation about how to proceed and make effective progress.

A comparison was made about how long students in each group actually spent listening to news in the app. Initially, in the pre-questionnaire, both groups of students reported that they expected to dedicate 30 minutes or more a day to using it (including the Facebook-based activities in the case of the social learning group). However, the data showed that in most cases the students in the individual learning group had only used it for up to 10 minutes at a time, whereas students in the social learning group, had actually achieved the goal of working in sessions of at least 30 minutes. For the former group, the reasons given for this difference in the post-questionnaire were varied, essentially reflecting difficulties in finding time for professional or personal reasons. However, it can be conjectured that since the actual use of the individual learning version of the app was arguably less “psychologically rewarding” than the Facebook enabled version, the motivation level of the students was lower.

It is clear from these results that the version of ANT that included social activities on Facebook was more popular, not only in terms of how many students in the social learning group actually used it during the experimental period but also in terms of how many news recordings they consistently listened to over that period. Furthermore, as well as the students’ behaviour during the experiment, it is also worth noting their
intention to carry on using ANT once the experiment had finished. Students in both groups who completed the post-questionnaire stated their intention to carry on using the app if they were provided the opportunity of doing so. However, the subtle difference between the two groups is that in the case of the social learning group, some students actually contacted the research team to request this possibility as the end of the experiment approached. They did not wait for it to end to make the request, as they were not aware that there was a question about this possibility in the final questionnaire. It should also be noted that the actual participation of the students in the experiment reflects their motivation level since it did not just last a week or two but eleven weeks in total, as noted previously, including the holiday period.

As well as the quantitative data about the number of recordings listened to (as per Table 10.1), which shows the difference between the two groups, a further analysis was undertaken of the way in which the students who used Facebook actually interacted. In a similar way to the authors’ experience in other types of online courses (Barcena et al., 2015; Martín-Monje et al., 2013), it was noted that there is a type of student whose social and academic influence in the group stands out from the rest in the way in which she/he aid and support others in the accomplishment of the common learning goal(s). This kind of student has been termed an e-leading student (e-LS) (Barcena et al., 2015). An e-LS presents a series of behaviours that set him/her apart from others, namely most of the following, she/he: connects on a very regular basis and essentially keeps on task; dedicates considerable time to participating in social tasks; answers messages and peer queries showing concern and attention to detail; searches for supporting evidence to support debates; undertakes tasks for the benefit of the group; corrects others’ mistakes with grace; acts as a “coach”,
praising good work and encouraging demotivated students; serves as a voluntary intermediate with the teachers when there are problems with the methodology, contents or materials of the course; shows an attractive positive and extrovert attitude and, thus, becomes popular with the group.

Specifically, in the ANT social learning group, of the 33 students who connected to Facebook to participate in follow on activities, six were identified (18%) who had all/most of the characteristics of an e-LS. In a similar way to online courses where evidence for this type of student has been found (Barcena et al., 2015), e-LSs gain the attention and respect of their peers (which is easy to detect in scenarios that include peer voting). This effect can be seen in ANT from the way in which the e-LSs’ interactions were received by other students, as can be seen in the example shown in Figure 10.4. Here, a student (sn110) listened to a news recording and, from there, posted a summary. An e-LS connected via the Facebook app on a smartphone (substantiated in the post-questionnaire) some time later and clicked on “Like” to show that s/he was in agreement with the summary (as indicated that they should do in the social learning guide), and further added a reinforcing comment. Student sn110 then also connected using the Facebook app over six hours later, saw the e-LS’s comment and reacted to it by leaving his/her own comment. Finally, in this example, it should also be appreciated that it is quite a long summary which, given the obvious difficulties of writing on a smartphone, arguably reflects the degree of motivation of the student to work with ANT.

The e-LS is not a new figure who only exists in the context of MALL-related social learning, but one whose presence in online courses such as Language MOOCs has been documented before (Barcena et al., 2015). Depending on the nature and relation of a teacher to his/her students in a face-to-face taught class, there have always been opportunities for students
to take a more pro-active participative role in learning. What is argued in
this case, and would need to be substantiated and further explored in future
work, is that e-LSs have a motivational effect on their peers (as reported in
the post-questionnaires) since, as well as scaffolding less advanced students
by calling their attention to aspects of their contribution, they also improved
the overall participation in Facebook, which is arguably a factor in the
continued use of ANT over the experimental period.

Figure 10.4 An Example of a Student Interaction on the ANT Facebook Page

Furthermore, the e-LS in ANT also possesses an important degree of
self-motivation since s/he received no direct feedback from the research
team on the activities s/he was undertaking on the Facebook page. In
previous work, where students expected to be helped by the course teachers
(Barcena et al., 2015), and could not always receive such help, due to
the very high student-teacher ratio, questions and interventions from the e-
LSs were prioritized so that these students’ needs were attended to, above
and beyond others. The authors observed that such attention further
increased their tendency to voluntarily answer similar questions from their
peers, leading to a positive cascade effect of interactions.

**Figure 10.5 A Fragment of the Social Learning Guide**

It should be emphasised that e-LSs were not tutored to prepare them for this role, nor did they receive any specific guidance to the effect. The only indication that this type of pro-active behaviour would be extremely beneficial in promoting a student’s own learning was the indication provided in the social learning guide, a fragment of which can be seen in Figure 10.5. It should be noted that the information was given in both English (the target language) and Spanish (the source language) due to the linguistic heterogeneity of the student population.

**Conclusion**

This chapter has presented mobile-based peer interaction in social media as a way to motivate, support and scaffold the individual student experience in a listening comprehension learning process. Firstly, it has been shown here that the incorporation of an engaging social component to a MALL listening app, such as ANT, can be undertaken via social media.
This social component can be seen to clearly promote a continued use of the app over the experimental period, increasing the time the students actually spend interacting with peers about the news stories. The data gathered about how many students used the app, how many news stories were listened to, and “liked” and commented on the Facebook page, together with the answers to the questionnaires, showed the popularity of the social media-based interaction in the app.

Since Facebook was already a popular tool with the students (almost all of the 90 students who took part in the experiment said that they already had accounts and used it regularly before taking part in the experiment), they were accustomed to using it for personal networking, such as interacting with friends and colleagues. Hence, having learning activities included there let the students rapidly pass from ludic personal activities to educational ones (and back again) with very little effort on their part. Furthermore, it can be argued that the very presence of the ANT page within a student’s timeline on Facebook acted as an implicit reminder to him/her to check up on what peers were listening to and interact with them, since it is always visible on the social media. Once they have “liked” the page, they are automatically notified of other students’ interactions. Finally, in the case where new summaries of news stories appeared on the page that a given student had not listened to, then s/he might be motivated (or at the very least reminded) to go to ANT and listen to them.

Secondly, a research question was asked about whether the way in which the social media is used actually influenced this effect. It has been observed here that within the social learning group, a number of what has been termed “e-LSs” has been identified and that their presence has positively influenced the way in which their peers work with the app. With respect to this research question, it can be argued that their pro-active
attitude and the degree to which they used Facebook, led them to be exposed to interact with the target language and the related news recordings more than the students in the individual learning group. Following the simple but generally accepted view that “more is better”, these students are arguably better situated to benefit from using the app than their peers.

Even though the presence of the social interaction on Facebook did increase the quantity and quality of the use of ANT, there were still two characteristics of this interaction that needs to be studied in future experiments. Firstly, for the interaction to take off and the students to start to participate, there needs to be a “critical interaction mass” on the Facebook page. It almost seemed that initially the students did not actually feel comfortable at the prospect of participating. However, once the process had been seeded with an example interaction by the researchers, then the process gradually started to take place over a period of a few days. Secondly, even though the news recordings reflected significant world events that were taking place at the time (for example, the possible conversion of the spread of the Ebola virus into a pandemic), the summaries and subsequent interactions on the Facebook page lacked any emotional component on the part of the students. This would obviously not have been the case if the students had been together discussing these events face-to-face, for obvious reasons. Furthermore, the interactions were essentially shallow in nature, often limited to only clicking “like” and adding very short comments showing agreement (or not), and did not actually include any profound reflections. This may represent the way in which the students viewed using the app and social media as “part of their learning”, and not part of their genuine social interaction, typically carried out in a relaxed, emotive way. Alternatively, it might reflect the essentially superficial nature of interaction on Facebook, where people are not prepared to spend large
amounts of time reading and reflecting on the information there. Future work will need to address ways to make the student interaction more spontaneous and exploratory and fully harness the role of the e-LS.

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Chapter 11: Strategies for Supporting Teachers in the Implementation of MALL

Karen Woodman

Queensland University of Technology, Australia

Abstract

This chapter explores the results of a study using the well-known social networking site, Facebook, to investigate graduate Education students’ perceptions on the use of mobile and other technologies in classrooms around the world. This project explored tele-collaboration and the use of online discussions involving graduate students in an online program based in Australia, and students in a graduate Education program at a regional university in Greece. Findings reveal many similarities between the situations and perceptions of the participants from the different countries, including the fact that even when technologies were available in schools, there is frequently a critical need for professional development to increase teachers’ understanding and use of ICT, especially MALL. Based on these findings, the chapter outlines a number of strategies to support teachers in implementing MALL in their classrooms.

Keywords: Facebook, ICT, CALL, MALL, teacher education

Issues in the Use of Mall in the Language Classroom

This chapter synthesizes the findings of an international tele-collaboration study using Facebook, in which in-service language teachers
from eight different countries studying in M. Ed programs in Australia and Greece explored the potential use of ICT and MALL in the language classrooms in their home countries (e.g., Woodman & Kazoullis, 2007, 2013; Woodman, 2014). The chapter examines some of these issues through the prism of a study in which graduate students (mostly in-service teachers) from universities in Australia and Greece discussed issues related to the use of technology in the language classroom on a shared Facebook page. Of the discussion questions posted, there were three which specifically related to the use of mobile phones (see Woodman, 2014), as well as a number of discussions which revealed a high degree of similarities regarding the concerns of teachers in countries as diverse as Australia, South Korea, Malaysia, Saudi Arabia, the Philippines and Greece (Woodman & Kazoullis, 2013). Based on these findings, a number of strategies are proposed to address the concerns of the key stakeholder groups: teachers, students, parents and administrators.

Key issues identified in this research include: (1) invisible barriers to using mobile phones in the classroom (e.g., Woodman, 2014); (2) teacher perceptions concerning mobile phones as non-pedagogically useful devices (e.g., Woodman & Kazoullis, 2013); and (3) the need to clarify the definition of access for educational purposes in MALL (e.g., in-class, in-school, extracurricular). The study also discovered a surprising level of international consensus amongst teachers concerning issues related to the use of ICT and MALL (Woodman & Kazoullis, 2013). Based on this research, the chapter proposes a number of strategies which may help to address concerns with respect to the implementation of MALL to different stakeholder groups, including teachers, students, parents and administrators, such as the benefits of MALL in the classroom in terms of mitigating infrastructure limitations; the potential of mobile devices as
“personal learning devices” and portable audio-visual departments; workload benefits of asynchronous teaching; and helping teachers develop classroom management strategies to address problematic behaviours which have been identified with MALL devices.

Background

While the uptake of computers has been fully embraced by educational establishments over the last two decades, the acceptance of mobile technologies—especially related to the use of 3G or 4G mobile phones in the classroom—has not followed a similar path. Despite the increasingly widespread availability of mobile phones with internet capabilities (e.g., “smart phones”), which could theoretically be used to supplement or even replace large scale infrastructure costs of computer labs (e.g., Ali & Irvine, 2009; Buck et al., 2013; Godwin-Jones, 2010, 2011), the willingness amongst teachers and administrators to consider the use of these devices in the classroom seems to be at odds with their general receptivity towards technology. For example, schools that embrace tablets or iPads for pedagogical use often continue to ban the use of mobile phones in the classroom (Woodman, 2014).

While there has been an increasing focus in literature on m-learning, and/or the use of mobile devices such as mobile phones for teaching and learning (Ali & Irvine, 2009), the majority of the studies appear to make assumptions about the relative ease in which such innovations could be incorporated into the classroom (Buck et al., 2013; Kukulska-Hulme, 2009; Pettit & Kukulska, 2007; Schmiedl et al., 2010; Scornavacca & Marshall, 2009). In fact, most studies seem to assume an innate good in the use of such technologies, and focus more on how specific technologies and/or specific uses or apps can be used with different populations (Buck et
al., 2013; Schmiedl et al., 2010). However, only a few studies have considered psychological, pedagogical and/or administrative barriers to the use of such technologies, especially mobile phones, in schools and in the minds of teachers (Clayson & Haley, 2012; Kafyulilo, 2012; Keengwe et al., 2012; Roblyer et al., 2010; Shudong & Higgins, 2006; Tindell & Bohlander, 2011; Wei et al., 2012; Williams et al., 2011; Woodman & Kazoullis, 2013; Woodman, 2014). Specifically, some evidence suggests that many schools still ban the use of mobile phones in the classroom (Kafyulilo, 2012), while, in many cases, encouraging the use of other mobile devices such as iPads, which, arguably have virtually the same functionality. In addition, much of the research appears to involve older students (e.g., college or high school students), and often occurs in developed countries (Ali & Irvine, 2009), thus, potentially, breeding concern regarding the generalizability of said findings.

To date, little research has explored the views of teachers or the educational contexts in which they teach the use of mobile phones in the classroom (Kafyulilo, 2012; Woodman, 2014; Woodman & Kazoullis, 2013). However, some research that has looked at these issues may raise some concerns, including evidence that texting during classes negatively impacts learning and distracts others students, and issues such as students using phones for “sexting” or other inappropriate activities (Clayson & Haley, 2012; Kafyulilo, 2012; Kuznekoff & Titsworth, 2013; Tindell & Bohlander, 2012; Williams et al., 2011; Wei et al., 2012). Furthermore, Kafyulilo (2012) found differences between students, pre-service teachers, in-service teachers, and college instructors in terms of perceptions towards the use of mobile phones in the classroom. Despite the fact that all teachers and instructors had mobile phones (or access to them), the majority of in-service teachers were against classroom use. By
contrast, the students, pre-service teachers and college instructors were in favour. The reasons the in-service teachers opposed the use of mobile phones are notable and included: concerns regarding prohibiting teachers to communicate with students by phone, and bans on the use of phones in schools (e.g., administrative issues); lack of knowledge about how to use them in class (e.g., pedagogical issues); concerns about students using phones for flirting or non-academic purposes (e.g., classroom management); and concerns about students using phones to cheat or plagiarize (e.g., class management). These types of findings contradict the general implication in m-learning literature that the use of mobile phones is (1) inherently good and (2) can be easily integrated into the school context (Buck et al., 2013). However, Kafyulilo’s findings were replicated by Woodman (2014).

The Study

In this study, the social networking site, Facebook, was chosen as the virtual environment for the tele-collaboration as it was identified as a site that virtually all students could access easily (e.g., without having to navigate different universities’ log-in systems, or go through complex access processes). It was also identified as a site with which many students would have some familiarity due to the popularity of its use (Hew, 2011). It was believed that previous familiarity could minimize possible interference of the technology itself on interactions (e.g., the navigation of the system would be less problematic than having to learn a new system). All of these issues are relevant both to the design of the research reported here on teacher perceptions regarding MALL, as well as in the design of MALL tasks in general. In addition, based on the findings of Woodman and Kazoullis (2007), specific tasks were designed to encourage interaction between the
two groups of participants, and to engage discussion on a specific topic (e.g., ICT in the language teaching classroom). Research by Woodman and Kazoullis (2007) and others (e.g., Belz, 2002) using tele-collaboration has indicated that important factors in successful tele-collaborations include ease of use and access, familiarity with the platform or site, and providing targetted discussion questions—often involving self-reflection and application to students’ own experience—for participants to share with their classmates while online (e.g., to facilitate and engage social interaction). It was shown that these questions should create a purpose for interaction between students who do not know each other, by encouraging them to share similarities and differences in perceptions about a shared experience via social networking (e.g., in this case, the use of technology in their classrooms). The online discussions were frank and open, and it was found that the participants responded in their identities as in-service teachers (e.g., professional identities), reflecting on their own professional practices and experiences, rather than in their identities as graduate students (e.g., where they may respond in terms of hypothetical situations) (Woodman & Kazoullis, 2007, 2013).

Included in the discussion topics was the use of mobile phones in teaching languages. For example, one discussion question was, “Here’s a new challenge for you: create a language teaching task or activity that could be done with the mobile phones available to your students (e.g., in your teaching context).” The responses to this question, and two subsequent related questions, were explored in detail in Woodman (2014), but will be re-examined here to provide a basis for recommended strategies to support teachers in implementing MALL. Research by Woodman and Kazoullis (2013), which explored in detail similarities and differences in perceptions of graduate Education students from six different counties, will be
considered in terms of implications and recommendations for professional
development to increase the use of MALL.

Methodology

Subjects

Participants in the study included twenty-one pre-and in-service
teachers studying in Masters of Education in Australia and Greece, and their
two academic lecturers. Twelve of the students were studying in Greece, and seven were studying at the Australian university. While all of the participants from Greece were ethnically Greek, the “Australian” group actually included participants from diverse cultural and linguistic backgrounds, including two students from China, one student from Malaysia, one student from the Philippines, one student from South Korea, one student from Saudi Arabia, and one Australian student. In total, there were five male participants and sixteen female participants. This diversity of background allows a cross-cultural comparison of perceptions toward the use of technology.

Data collection

A Facebook page was specially created for the project, and within the page, a specific discussion group called “Scenario Discussions” was created. Weekly scenario questions were posted to stimulate discussion between the graduate students in Australia and Greece on issues concerning the use of technology for teaching languages via social networking to explore shared experiences: to discuss, share and interact with each other. Because participants shared a common profession (e.g., as language teachers), but did not know each other offline, discussion questions included issues which might be common to teachers in different countries, such as access and use of technology in the classroom, and problem-solving via discussion of real-
life issues facing teachers in different countries. To ensure participant privacy, access to both the Facebook page and the specific “Scenario Discussion” group within the Facebook page were controlled by the authors (who were also the course instructors). Only participants in the study could access and participate in activities. Approximately once a week, a new “Discussion Question” (DQ) was posted, and participants were invited to comment. All participants had 24/7 access to the site, so they were able to participate at their convenience. The study ran for approximately three months, which included the academic semesters of both institutions.

**Analysis**

Data in the study was analyzed in two ways. First, overall tendencies were observed in terms of number of participants, number and types of postings, number and types of postings/participant, etc. (Ali & Irvine, 2009; Hew, 2011). Second, “target” postings—or those which triggered responses from participants—were identified and classified into four main categories: discussion questions, online questionnaires, resources, and other. In the analysis reported here, postings were further explored in terms of content relating to teacher perceptions of the use of mobile phones in the classrooms (Kafyulilo, 2012). The responses were analyzed based on three main categories: number of responses, whether responses were positively or negatively oriented towards mobile phones in the classroom, and identification on any specific examples of reasons for use/non-use of phones (Ali & Irvine, 2009; Hum et al., 2011). Analysis also examined forum postings on Facebook in terms of the content of responses as related to the use of ICT and/or MALL in the classroom. These responses were compared based on country of origin/teaching context, and are discussed in terms of similarities and differences of teaching contexts, countries of origin, and content of response. All quotes are provided as written by participants,
Results and Discussion

The DQs were designed to encourage participants from the different programs to compare their experiences in different countries and teaching situations, in terms of the use of technology in the language classroom. For example, the DQs which received the most individual responses included: “What kind of equipment does your schools provide, in order to support teaching ICT” (n = 10); “In your opinion, what are the key issues in your country’s teaching context related to CALL or use of technology in teaching? Why?” (n = 9); “What learning environments do you prefer” (n = 8); and “Create a language learning task that you could do with a mobile phone” (n = 7).

The most popular discussion questions were those which encouraged and allowed participants to draw on their own experiences, and to share their personal experiences in teaching with others who shared this identity and interest (Woodman & Kazoullis, 2013). There were a number of issues identified by the teachers, which remarkably consistent across diverse teaching contexts: access, teacher training, administrative restrictions, context-specific factors.

Specifically, there were three main discussion questions (DQ) identified as relevant to the specific issue of mobile phone use in language teaching (Woodman, 2014):

1. “Here’s a new challenge for you; create a language teaching task or activity that could be done with the mobile phones available to your students (e.g., in your teaching context)”.

2. “Thanks for everyone who has commented on the use of mobile
phones. We know that some schools don’t currently allow students to use them in class. However, mobile phones are a technology that is one of the most democratic (e.g., most students have them), perhaps we as teachers should be thinking about how best to make sure of this access—either in-class OR for homework or practice outside of class. For example, think about how your students use their mobile phones—could they learn vocab by texting? Practicing speaking using Skype? Download grammar program apps?”

3. “Can you (or anyone else) think of an actual task/activity that could involve students sending each other (e.g., icebreaker questions where they need to ‘find someone who’ by SMS in English only?” (p. 114).

All of the DQs related to mobile phone use were posted by the instructors, although some resources were posted by a student.

Some examples of responses to these DQs included CM who comments, “I am not sure that mobile phones can really help education. I have a lot of reservations about this issue…” [Greece]. CM’s general concerns appear to represent the concerns of many teachers, who do not see mobile phones (even smart phones) in the same light as computers (or tablets) for educational purposes. This general unease should be of interest to m-learning advocates since such non-specific ambiguity around mobile learning may translate into lack of interest (or passive resistance) in incorporating the technology into the classroom.

Another related issue for many of the participants was restricted access to mobile phones in the classroom. For example, SK notes that “only two or three students in a class have a cell phone and they are only allowed to use mobile [sic] phones with their parents or in the emergency situation.” [South Korea] These concerns included identifying a lack of phones
amongst the students in general, and lack of access in the classroom setting, as hindrances to use for teaching purposes.

In fact, the main reason cited by teachers for not using mobile phones for teaching was institutional restrictions on the use of phones in the classroom. Both KH from Australia and LQ from the Philippines agree that phones are not allowed in the classroom, and in fact may need to be left in the office.

KH: Our students are not allowed to use mobile phones during school hours. They have to leave them at the office when they arrive and pick them up before they leave. [Australia]

LQ: In our school mobile phones are not allowed in the classroom for regular classes. [The Philippines]

In addition, KH believes “mobile phones are probably not an age-appropriate CALL device for [KH’s] teaching context [in Australia]. Our students are not allowed to use mobile phones during school hours.” Such restrictions were also cited by teachers from the Philippines: “in our school mobile phones are not allowed in the classroom for regular classes,” LQ; South Korea: “only two or three students in a class have a cell phone and they are only allowed to use mobile [sic] phones with their parents or in the emergency situation,” SK; and Greece: “In our school, normally forbidden to use mobile in classrooms,” EP. These responses are interesting in that they not only indicate that many teachers are aware of institutional restrictions of phone use, but also because they strongly suggest these kinds of restrictions are wide-spread internationally (Kafyulilo, 2012). The international nature of the responses should be of concern to advocates of m-learning, since such administrative restrictions at the school level
(minimally) may be onerous for classroom teachers to overcome on their own.

**International perceptions of issues in the use of ICT in the classroom**

Similarly, when participants were asked about key issues related to CALL or use of technology in teaching in their home countries, more agreement was found than differences (see Woodman & Kazoullis, 2013). For example, in response to the question, “In your opinion, what are the key issues in your country’s teaching context related to CALL or use of technology in teaching,” key issues included:

- lack of training for teachers
- teacher education and confidence with ICT
- perception of use of technology

Other issues were:

- use of new software
- lack of hardware
- keeping up with software
- student numbers
- administration/decision-making

These findings underline the importance of teacher education and professional development for teachers across the spectrum and in diverse cultural and linguistic teaching contexts as key to successful integration of MALL. These findings are consistent with the literature on the use of ICT in language teaching (Godwin-Jones, 2010).
Teacher education

The key issues identified by teachers from Greece, Australian and South Korea related to the need for more teacher education to make teachers more confident with using technologies in the classroom (Woodman & Kazoullis, 2013). For example, KH notes that “in Queensland [Australia], teachers’ levels of confidence and skill with technology and the availability of suitable resources seem to be the main issue.”

Within the Greek context, MM suggests “the teachers need immediate training on the use of ICT. Some of them have to start from ‘...and this is how the computer turns on’.” NM adds that most teachers in Greece think “that technology is used only in Informatics (IT) and not in other fields [such as education].” NM also emphasized the fact that large class sizes also make teaching with ICT more challenging.

In addition, SK agrees, stating:

(South) Korea has similar problem. Technology for teaching has been progressed a lot and so quickly but the teachers can’t really follow it up. There are some teacher training programs but teachers don’t really use them much as they normally like to use something that is already familiar (to) them.

Therefore, it is recommended that the format and content of teacher education and professional programs will need to build on “what is familiar” and “how different technologies can be used for language teaching” in order to meet the needs and motivations of many teachers.

Access

The issue of access to technology-based resources and the internet was a subject which generated the most discussion between participants
(Woodman & Kazoullis, 2013). In general, there were consistent similarities in terms of access across the different countries and teaching contexts. This result is perhaps not surprising, since all of the participants shared backgrounds as language teachers, and they were studying in courses on the use of technology for language teaching. However, the findings underline the importance of professional development programs not assuming access is universal across institutions or across devices.

For example, in all of the countries represented in the sample, at least some access was available in schools, and all had access outside of the classroom (e.g., extracurricular access). However, there were also some interesting areas of variation by country. For example, the Peoples Republic of China (PRC) and South Korea appeared to have the most general access to ICT and internet (notwithstanding the restrictions in the PRC on certain types of social networks). The PRC, South Korea and Greece appeared to have the best access for students. Interestingly, in-class access was found to be the most contentious issue, with only the PRC appearing to have full access across different types of schools (see Woodman & Kazoullis, 2013).

Recommendations: Strategies for Increasing Use of MALL and ICT in the Classroom

Due to the lack of technology education in many TESOL programs, most teachers do not have a solid set of skills for accessing and implementing ever-changing technologies for the most appropriate pedagogical purposes. As busy professionals, they often do not have a lot of time to do so. Based on the findings of this study, a key recommendation is appropriate professional development for teachers. In encouraging teachers to use ICT and MALL, there appear to be a number of key strategies and focuses.
First, it’s important for teachers to recognize and understand that there are, in fact, a number of possible technologies that could be used for teaching (e.g., desktop computers, laptop computers, tablets, smart phones, other mobile devices, etc.), and that each type of technology has advantages and disadvantages. The key pedagogical development strategy then is learning to match appropriate technologies to specific learning tasks.

The use of the term “appropriate” is deliberate here. There is no “one-tech-fits-all” answer to the use of technologies in teaching. Therefore, providing teachers with the skills and interest to investigate, analyze, and make decisions about the most appropriate technologies to use in their unique learning contexts not only helps them develop as self-reflective teachers, but also empowers them to take control of their teaching process into the future. It is also important for teachers and administrators to recognize that most students are already using many technologies for other purposes, so that their task is to adapt pre-existing behaviours (e.g., Twitter) for pedagogical purposes (e.g., developing literacy skills), rather than having to introduce or teach a new set.

Specifically, using appropriate technologies can:

- help teachers teach more effectively
- be motivating for students and teachers
- help students learn more effectively
- help learners become more autonomous
- help overcome infrastructure issues

Key to supporting teachers in the implementation of MALL are four main strategies, which are outlined below.
**Strategy 1: Changing perceptions of mobile devices**

The first strategy is to encourage teachers (and other stakeholders) to recognize that there are diverse technologies which may be considered for teaching and learning as ‘personal learning devices’ (PLD) (Woodman, 2014). The term PLD is introduced to address the perceptual double standard that seems to exist in the educational context, where use of tablets (e.g., iPads, etc.) and laptop computers is usually encouraged, but slightly smaller devices with very similar functionality-smart phones—are banned. Given that most people use their smart phones for texting and internet access rather than calling, the similarities between the smaller devices, which are abnormally banned, versus the larger ones, which tend to be encouraged, are evident. Perceiving smaller mobile devices as “not equally good” ought to be reconsidered.

**Strategy 2: Assessing access to different technologies**

Second, teachers need to assess their students’ and their own access to different types of technology (e.g., “new” and “old” technologies) in terms of what tools are available and what possible barriers to expect. In this case, “old technologies” could include desktop computers, projectors, electronic whiteboards, laptop computers, audio/video recorders, video-games, internet resources, basic mobile phones, etc.), while “new technologies” would comprise tablets, smart phones, portable reading devices (e.g., kindle), and other smart devices. Access issues may include administrative structures that allow (or do not allow) those technologies to be used in-class, in the school, and/or in extra-curricular contexts. Other stakeholders, such as administrations and parents may need to be involved in this type of consultation, to ensure “buy-in” to the use of MALL.

For example, in a school with a computer lab, actual access may be
limited to a few hours a week. Limited Wi-Fi and internet connection in classrooms can also influence the types of activities used. Similarly, as noted above, many schools have official bans on mobile phone use in the classroom for students (Woodman, 2014), which may limit the implementation of MALL in the classroom, so teachers may need to consider developing MALL-based homework (e.g., extracurricular learning activities). However, if the majority of their students have mobile phones (particularly smart phones), limited access in school may be supplemented by “MALL homework”; for instance, students can use phones to do internet-based research, use apps to access dictionaries and learning support programs, download e-books to alleviate a lack of books in the target language, and use Skype to practice speaking with native speakers.

**Strategy 3: Develop classroom management strategies for MALL devices**

Many of the criticisms and concerns raised about the use of MALL devices in the classroom appear to relate to classroom management issues (e.g., bullying, distraction, cheating), rather than the technology itself. In spite of MALL technologies being new, many traditional strategies for classroom management may still be employed in managing the use of MALL devices. For instance, asking students to put their devices away when not needed for pedagogical activities is a simple proven tactic to limit off-task behaviors. At the same time, having students work in pairs to do pedagogical tasks in-class can encourage peer-learning, as well as address limited access to MALL devices (e.g., if some students do not have them).

**Strategy 4: Applied self-reflection activities**

The author often starts workshops and classes on using technology in the classroom by asking teachers, what they can do using mobile phones...
(i.e., what functions mobiles have) and how they habitually use them.

In discussing this question, teachers usually realize that even non-smart mobile phones can be used for calls, texting, audio/video recording and taking photos. In other words, the phones can be utilized for activities that teachers may have already employed in some form in their practice to develop literacy or productive language skills; however, mobiles can augment these activities by offering additional capabilities such as better access. Similarly, the fact that smart phones can be used for reading e-books, accessing internet resources (both language specific and general), and social networking, helps them to recognize how mobiles could be used to replicate most of the functions of a desktop computer, without having to book the computer lab.

Both advantages and disadvantages of each type of device should be taken into consideration. Phones are best used for some types of activities (e.g., apps, quick searches, updates, calls, texts), than others (e.g., reading or writing long documents or watching movies). They are highly portable, and are carried everywhere, so could be used for simple practice activities. By contrast, tablets are slightly less portable, but have advantages in terms of screen size for reading, watching video, and possibly typing. In addition, for writing long documents, laptop or desktop computers are certainly the preferred device for many teachers and learners.

Other examples of discussion/self-reflection questions that can be asked to encourage teachers to explore alternate uses for available technologies include:

1. Think for a moment-what types of technology do you personally use? What do you use them for?
2. Do your students have access to these technologies? If yes,
when and for what?
3. How could they be used in the classroom? For homework?

Given that one of the potential attractions of mobile technologies is access to functions that used to require pre-booking equipment from the A/V department, or booking access to the computer lab, it can be eye opening for teachers (and administrators) to consider the following questions:

1. Think of some of the resources or infrastructure to which you currently need to plan access-can any of it be done in-class (or as homework) by students using mobile devices?
2. What are some pros and cons of these uses? If there are disadvantages, are these issues that can be addressed by classroom management strategies?

Overall, the key strategy is to support teachers in learning to identify the most appropriate technology(s) for specific learning tasks, and to recognize that all technologies have potential benefits and limitations.

Conclusion

The research explored in this chapter reveals many similarities between the situations and perceptions of the participants from the different countries, suggesting that school systems around the world deal with the use of technology, including MALL, in the classroom in similar ways. Most participants indicated that while they and their students had general access to mobile devices, computers, and the internet, they did not necessarily have this access in the classroom. Given the rising importance of e-literacy to the global economy, access to computers and MALL in the classroom
needs to be addressed internationally.

Strategies to incorporate MALL in the language classroom include increasing awareness amongst educational stakeholders that computer-based functionality in the class could be accomplished by introducing m-learning technologies (e.g., making use of smart phones, tablets and laptops), in pedagogically appropriate ways. Smart phones, for example, can provide individual access to the internet for task-based searches, dictionary and reference use, or access for specific learning sites. They can also replace the need to book video or audio recorders, literally putting a whole A/V department into students’ and teachers’ hands.

Finally, participants identified a critical need for professional development to increase teachers’ use of ICT. The implications for administrators and governments is the need to provide specific and targeted professional development such as curriculum and pedagogical tasks specifically developed for m-learning devices if they target maximal use of technologies in the classroom. There may also be a need to change perceptions of devices, such as smart phones, so that they are seen not just as for entertainment, but also as personal learning devices. In conclusion, the findings of this research and recommendations are relevant to educators and policy development in terms of the implementation of MALL in the language classroom.

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Chapter 12: Transforming Brazilian Contexts into Immersion Environments via Mobile-Enabled Language Learning: The MapLango App

Thomas Petit  
*University of Technology, Brazil*

Gilberto Lacerda Santos  
*University of Technology, Brazil*

Bruno Ferreira  
*University of Brasilia, Brazil*

Abstract

This chapter presents the early phases of the design and development of MapLango, a mobile application for digital devices, such as smartphones, conceived as an educational digital network for Brazilian language learners on the go. First, the choice of methodology is discussed and the research problem identified. Then the phases of analysis and design are presented in order to situate the creation of MapLango in the context of intervention. The analysis phase highlights the theoretical and practical contributions of the mobile language learning community. A review of the related literature allowed the identification of guiding elements and current needs in the area. This oriented the design phase, which led to the creation process of the system architecture of MapLango, whose final prototype is illustrated here with screenshots. This study aims to contribute to reflections on mobile language learning and proposes to connect theory to practice. Innovative and
useful design guidelines, which arise from the work of researchers, could allow for the production of suitable materials and environments, which could in turn guide learners in their learning process and enable new practices and new opportunities for language learning in the twenty-first century.

**Keywords:** Mobile-enabled language learning (MELL), educational digital network, Design and Development Research (DDR), MapLango app

### Introduction

Since the dawn of the twenty-first century, society has witnessed the convergence of the digital and the mobile ages. Nowadays many people are mobile for work, holidays, or academic exchanges across cities, countries, and continents, and most of the time they are connected to their digital life. Given this setting, in which it is common to transcend cultural and linguistic boundaries, in both a physical and a virtual sense, learning a foreign language has most certainly become a necessity.

Starting from this observation, mobile language learning appears to be a crucial area for research and application in order to increase learning opportunities for people on the go. Over the last few years, and especially since the mass adoption of smartphones, with the release of iOS in 2007 and Android in 2008, researchers and practitioners have pointed out many challenges in this area, from both technological and pedagogical aspects. The study presented in this chapter aims to bring these challenges to the Brazilian context, in which two elements reveal an environment conducive to mobile learning research and practice.

According to a report published by IDC in April 2015, Brazil is the fourth largest smartphone market in the world and demonstrates a certain democratisation of smartphone ownership. Due to the considerably large size
of the country, finding opportunities to practice foreign languages in real world settings can be quite challenging. Mobile language learning could bring to Brazil new ways of learning and practicing languages.

Among the groups concerned with language learning in the country, college students were chosen as the target audience for this study. Within this sample, two kinds of students have specific language learning needs. On the one hand, graduate students coming from departments of foreign languages and literature, because of class schedules or class size, for example, do not always have enough space and/or time to practice the target language that they will be teaching in the near future (Aranda, Petit, & Fernandes, 2014). At the same time, the Brazilian government, through the mobility program called “Ciência sem fronteiras”, is currently giving students coming from hard sciences advantageous scholarships to allow them opportunities to spend time abroad in academic institutions. The four most popular destinations chosen for 2015 are the United States of America, the United Kingdom, Canada and France. For this reason, the government is proposing two courses entitled “English without borders” and “French without borders”.

Mobile language learning, according to Al-Shehri (2011), can transform local contexts into rich sources of input for authentic language practice. In this sense, Brazilian contexts through which local students transit could be enhanced as immersion environments for the practice of foreign languages via their smartphones. In this context of networked mobility (Sharples, Taylor, & Vavoula, 2007) in authentic settings, smartphone applications (apps) might provide a suitable technological support to promote continuity of learning by amplifying the social environment of students’ language practice. Based on this idea, design and development research was identified as a convenient methodology for this
study, in order to transform and apply current knowledge in mobile language learning.

Design and Development Research for Mobile Language Learning

Given the large number of theoretical reflections already made in the areas of mobile learning and mobile language learning, this study intends to propose a more practical approach. The specific aim is to bridge the gap between research and practice in order to enable a reciprocal dialogue. Design and development research (DDR), as an applied research methodology, allows precisely this connection via knowledge transformation that “lends itself to the immediate solution of practical problems” (Richey, Klein, & Nelson, 2004, p.1101). In other words, DDR “[…] is intricately connected to real world practice. It creates a loop with practice informing research and research, in turn, informing practice” (Richey & Klein, 2005, p.35).

The first step of this study consisted of the identification of the research problem in such a way as to evaluate if it would be consistent with the contemplated methodology. Richey and Klein (2005) called this “developmental twist,” which “is done by focusing the research problem on a particular aspect of the design, development, or evaluation process, as opposed to focusing on a particular variable that impacts learning” (Richey & Klein, 2005, p.26). Ellis and Levy (2010) stated that DDR is a methodology that “results in production of some form of artifact, and the process is indeed research, not to be confused with product development” (p.108). This confusion can be avoided by conducting a “comprehensive evaluation” of the process (Richey et al., 2004), which should be
formative, summative and confirmative. According to these authors, it is one of the most important differences between creating instructional products and doing or studying DDR.

In recent research, Petit and Lacerda Santos (2014) presented mobile learning as an ergonomic alternative for long-awaited educational changes indicated by Dewey and Freire in the last century. This ergonomic alternative is mainly supported by networked mobility and the unique affordances of smartphones, to promote the following Dewey and Freire ideals: consideration of everyday life environments, democratisation and freedom for designing learning experiences, intercommunication, and collaboration in communities. The review of mobile language learning literature reveals that current apps are not yet representative of this ergonomic alternative.

Therefore, the main problem of this study is related to the conditions for creating innovative material that could satisfy ergonomic and pedagogic principles of mobile language learning. The development of a smartphone app was considered as an appropriate method to evaluate the relevance and the effectiveness of this ergonomic and pedagogic focus given to mobile learning theory and practice.

The field of educational software engineering suggested valuable guidelines for the design part of the research. Thus, after the identification of the problem, another fundamental step was to understand the learning context in which the artefact would intervene, remembering that educational software must focus on learning instead of teaching, and promote learning based on collaboration and free discovery (Lacerda Santos, 2009). The main elements of analysis, owing to their recurrence in most language learning interventions, are summarised in Table 12.1.
Table 12.1 Summary of Main Elements Considered in the Analysis Phase of This Study

<table>
<thead>
<tr>
<th>Description of target audience</th>
<th>Brazilian college students looking for new ways to learn and practice languages in their local contexts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audience’s needs</td>
<td>- Appropriation of linguistic and cultural knowledge;</td>
</tr>
<tr>
<td></td>
<td>- Extension of linguistic interactions to real-life settings.</td>
</tr>
<tr>
<td>Target objective of the Map-Lango app, related to the research problem</td>
<td>Propose a social media app as an alternative for:</td>
</tr>
<tr>
<td></td>
<td>- Practicing languages (on the go; during physical mobility);</td>
</tr>
<tr>
<td></td>
<td>- Enhancing local contexts as authentic learning environments;</td>
</tr>
<tr>
<td></td>
<td>- “Capturing and sharing resources for further study” (Kukulska-Hulme, 2013, p. 7).</td>
</tr>
<tr>
<td>Challenges</td>
<td>Encourage participation in an educational social network.</td>
</tr>
<tr>
<td>Technological prerequisites for target audience</td>
<td>Students have their own smartphones and are already familiar with the use of mobile apps.</td>
</tr>
<tr>
<td>Choice of programming environment</td>
<td>Xcode (Apple) in order to develop a native application; better execution speed and better access to device hardware compared to a web app (Godwin-Jones, 2011).</td>
</tr>
<tr>
<td>Timeline for the project (Corresponding to a doctoral study of 4 years)</td>
<td>- Analysis; 1 year</td>
</tr>
<tr>
<td></td>
<td>- Design and development; 2 years</td>
</tr>
<tr>
<td></td>
<td>- Implementation and evaluation; 1 year</td>
</tr>
<tr>
<td>Participants of the project</td>
<td>- Instructional designers and language teachers;</td>
</tr>
<tr>
<td></td>
<td>- Developers and graphic designers;</td>
</tr>
<tr>
<td></td>
<td>- Design and development researchers;</td>
</tr>
<tr>
<td></td>
<td>- Learners (during the implementation phase).</td>
</tr>
</tbody>
</table>

Once the problem and the learning context had been identified, research questions were formulated in order to frame the study (Richey et al., 2004) and identify objectives (Ellis & Levy, 2010). Considering the adoption of ADDIE (Analysis, Design, Development, Implementation and Evaluation) as an instructional design framework, the questions relating to the phase of analysis gave special emphasis to requirements. According to
Ellis and Levy (2010, p. 113), “the requirements serve the vital role of connecting the product being developed with the problem driving that development”. The questions were the following:

- What requirements must the mobile app meet in order to address the problem? (Adaptation of an example of typical question given by Ellis and Levy, 2010)
- To which extent are these requirements able to connect pedagogical, technological and linguistic affordances?
- What requirements must the app meet in order to play the role of social and participatory media for language learning on the go?

The two next sections of this chapter aim to share the main elements that constituted the phases of analysis and design of the research procedure. In order to do this, the process of creating a beta version of MapLango®, the mobile app especially conceived and designed as an educational digital network for Brazilian students “on the go,” will be presented as follows:

- Analysis phase: identification of guiding elements and current needs in the literature, related to the above-mentioned research questions;
- Design phase: consistent decisions and choices made among the available options in terms of instructional design and technological development.

① Mobile Application to Practice Languages on the Go.
Mobile Language Learning: Guiding Elements and Current Needs

Over the past few years, as handheld technologies have quickly evolved, so has the understanding of what mobile learning is. Although specific visions can still differ and are still evolving from one theoretician to another, or can depend on different realities in the field, valuable references can be found in 2015 for the definition of a mobile learning theory unique and clearly different from other models such as e-learning, distance learning, and so on. Furthermore, besides contributing to this better understanding, several authors also give strong orientations to put this theory into practice.

Although the reflections on general mobile learning can be quite interdisciplinary, this study assumes that its concrete pedagogical application depends on the didactic principles of each field of knowledge. On this level, the mobile language learning community relies on active researchers playing important roles in the identification of challenges in the area. This section proposes a selection of theoretical and practical elements identified in the related literature as decisive for the design of MapLango.

In 2012, in Design-Based Research, Palalas suggested the terminology mobile-enabled language learning (MELL) as an alternative for mobile-assisted language learning (MALL), itself derived from computer-assisted language learning (CALL). According to her findings, this modified term “emphasizes the role of mobile technology as an enabler of the learning process” (Palalas, 2012, p. 3). Moreover, “MELL” is more than a simple matter of terminology to the extent that the author elaborated a new theory, the Mobile-Enabled Language Learning Eco-System (MELLES). Some of the corresponding design principles were used as guidelines for some aspects...
of the design phase presented in the next section.

The term “enabled” expresses exactly what learning a language on the go with a handheld device means in the mobile and digital age. Indeed, more than this, it defines the profile of the mobile language learner: a user able to identify a language or cultural learning opportunity, in appropriate time and space, since he/she is fully aware of the possible (inter)actions afforded by his or her personal handheld device. In this configuration, mobile technology also enables the active participation of the user-learner in the design of his or her learning experience (Kukulska-Hulme, 2012).

The contextual and technology-oriented framework for mobile learning, proposed by Petit and Lacerda Santos (2014), illustrates how a learning opportunity happens when, through the mediation of mobile technology, a dialectical relation (Sharples et al., 2007) takes place between the technological subject (user) and the semiotic subject (learner). Nevertheless, some researchers revealed tacitly that this dialectical relation is not so evident. According to Kukulska-Hulme (2013, p. 2), “although they may be proficient users of mobile phones and tablets, and use social media on these devices in their everyday lives, the majority of learners have not had the chance to consider the finer points of mobile language learning.”

This could be explained by the type of activities proposed in current apps, associated in the latest studies in MALL to traditional approaches of language learning such as memorisation, repetition of vocabulary, and grammar (Arús Hita & Calle Martínez, 2013; Kukulska-Hulme, 2013). At the same time that these recent studies admit the importance of such materials for the area, they also point out the need for more innovative supports.
In 2010, Kukulska-Hulme presented three models of participation in mobile language learning in a continuum considering the mobility, the actions and the needs of learners, as well as the freedom that their handheld devices gave them. The first is the “specified activity” model, in which the freedom of learners is limited given that activities are mostly teacher and/or content-driven. The above-mentioned apps belong precisely to this first activity model, with limited pedagogical innovation despite some innovative technological elements, such as interactive activities (drag and drop, voice recording and recognition, etc.) and game-based mechanics, as a way to motivate and make traditional learning more fun (Petit & Lacerda Santos, 2013). This is favourable, but technological progress in 2015 allows researchers and practitioners to think and go further. Mobile learning may promote the establishment of new teaching and learning methodologies.

The second model suggested by Kukulska-Hulme (2010) is the “proposed activity” model, which gives more freedom to learners since they can decide whether they will do an activity or not, according to their needs or goals. They can also share activities they consider useful with others learners. In this model, learners seem to be aware of the material’s suitableness for their learning; consequently, this implies a certain degree of autonomy.

Finally, the third model of participation in mobile language learning is the “learner-driven activity” model (Kukulska-Hulme, 2010), which “gives special mention to social interaction and communication initiated by learners and taking place among them, as well as with teachers” (p. 127). In this model, the learner’s freedom and autonomy are greater, and the approach of language learning corresponds to the latest methodologies, based on social interaction and language practice in real-life settings.
Furthermore, the main characteristics of MELL are inherent parts of this model, which is mobile technology as an enabler of the learning process instead of an assister and learners as active participants in the design of their own learning experiences.

The MASELTOV app (MApp) (MASELTOV, 2015), designed and developed to address immigrants’ linguistic and cultural needs, is an example of innovative design situated in the continuum between the second (“proposed”) and the third (“learner-driven”) activity models. Indeed, its context-aware learning approach allows different services to adapt to the geolocation and to the profile of users. Examples of these services are the suggestion of language learning activities and the possibility of social interaction in two different settings: with other learners in a forum or with local volunteers thanks to a geo-social radar that “enables [users] to identify local volunteers who may be able to help resolve a specific problem” (Gaved et al., 2014, p. 357).

Over the past few years, the link between the “learner-driven activity” model and the use of social networks became apparent. Already in 2011, Al-Shehri had highlighted the increased engagement of students, as well as their initiative and motivation “to implement contextual elements from their own environment” (p. 8) through the use of the Facebook app. Búrcena and Read (2013, p. 101) affirmed that it was “inevitable that MALL and social networks would converge as they enable and facilitate interactions between users/students both beyond and within their classroom.”

In this sense, LingoBee represents an innovative design of social media application for mobile language learning. This app allows learners to create and share vocabulary items, captured from the authentic input of their environment by taking advantage of their handheld devices’ affordances.
Researchers involved in the SIMOLA project (SIMOLA, 2012) identified the users of LingoBee as social networkers (Procter-Legg, Cacchione, & Petersen, 2012), despite finding some limits to the social network functionalities of the app, such as reduced interaction capabilities offset by the creation of a Facebook group as a complementary environment.

The use of social networks in a MELL perspective implies a new vision of language practice. There is a need to move from a fragmented practice, which clearly separates language skills or types of activities, to a more systemic vision (Arús Hita & Calle Martínez, 2013; Palalas, 2012). Palalas and Anderson (2013, p. 973) encourage “whole language learning” that considers the whole system, context, community and environment. This is probably one of the biggest challenges of social network exploration in MELL.

While traditional skills of reading, writing, listening, and speaking remain the foundation stones of language learning, the new century calls for greater learner autonomy, flexible use of new tools, and sophisticated use of social networks to keep up with the pace of change. (Kukulska-Hulme, 2013, p. 11)

From the identification of these guiding elements in mobile language learning, a parallelism was found between the continuum of three models of participation proposed by Kukulska-Hulme (2010) and the transition from MALL to MELL suggested by Palalas (2012). This parallelism, illustrated in Figure 12.1, implies changes in four main aspects that might be considered for the design of a new application: the role of technology, learner involvement in the learning process, the approach of language
learning, and the vision of language practice.

![Diagram: Parallelism between MALL/MELL and Models of Participation in Mobile Language Learning]

**Figure 12.1** Parallelism between MALL/MELL and Models of Participation in Mobile Language Learning

In this illustration, our study situates current needs in mobile language learning in the continuum between the second and the third model of participation. Consequently, focus should be towards MELL alternatives in which:

- Handheld devices are enablers more than assisters;
- The learner’s involvement in the design of his/her learning experience is maximised;
- The language learning approach is more innovative and based on social interaction;
- The vision of language practice, instead of fragmented, would be more systemic.

These current needs are in general coherence with the research problem of this DDR study in that there is currently a lack of apps representative of the ergonomic and pedagogic alternative in mobile language learning. Thus,
with all the elements of analysis in mind, the phase of designing MapLango started in 2013 at the University of Brasilia. The main parts are presented in the next section.

**Designing MapLango for a MELL Intervention**

The literature review represented a decisive part of the analysis phase of the study, considering that “it is important to anchor the process of designing and developing the artifact in the literature” (Ellis & Levy, 2010, p. 112). Therefore, in order to address the above-mentioned current needs as well as the research problem of this DDR, it was found that MapLango should give priority to social networking and learner-driven content and activities.

Among the identified guiding elements, social networking appeared to be a connecting point between smartphones and language. Indeed, smartphones are largely used for social networking, and social networks serve as environments for interactions. In this sense, the design of a social media enabling interactions in the target language was considered pertinent to this study. The lack of interaction found in LingoBee (Procter-Legg et al., 2012) was a good indicator of what users/learners\(^1\) could expect from an educational digital network. LingoBee is a learner-driven content app, yet it is clear that its focus on vocabulary limited learners’ interactions as social networkers. Taking this into consideration, it was decided that MapLango should integrate the basic functionalities of typical social networks.

The term “typical” here refers to the action of posting content, usually

\(^1\) From now on, the term “learner” will be used for “user/learner,” given that in the design and development phases it was vital to always consider a user as a learner in order to ensure the dialectical relation mentioned in the previous section.
multimodal, with user freedom regarding topics, aims, and so on. At the same time, this freedom had to involve a systemic vision of language practice instead of focusing learners on specific skills or activities. However, MapLango could not be limited to the function of a typical social network; why create another when many already exist? Thus, the key question at the beginning of the design phase of MapLango was: what requirements should this app meet in order to operate as an educational digital network for mobile-enabled language learning? The instructional design of MapLango evolved with this question constantly in mind.

The process of designing MapLango was partly oriented by the design principles, guidelines and frameworks proposed by the MALL scientific community. Among them, the MELLES design principles (Palalas, 2012; Palalas & Anderson, 2013) were relevant for the DDR presented in this chapter. The main interest here was the suggested interconnections between pedagogical and technological dimensions. The previous section mentioned the lack of pedagogical innovations in some current material despite their technological innovations. These interconnections might be used to minimise this problem insofar as the degree of innovation should be proportional in both technological and pedagogical aspects.

This study considered the guidelines of researchers and practitioners of the community in two different ways. Some principles guided the design of MapLango architecture, keeping in mind that it aims to be an educational digital network and that such an artefact must propose suitable architecture and functionalities instead of pre-conceived content and activities. Therefore, this involved the macro context of use and a more technology-oriented focus, in coherence with the findings of the scientific community, which has often involved learner participation and/or feedback (Kukulska-Hulme, 2012; Palalas, 2012; Procter-Legg et al., 2012). Besides the
architecture, expected pedagogical uses by learners had to be considered. In this sense, other more learner-centred design principles helped to contemplate these micro contexts of use. This current chapter focuses only on the macro context and the choices regarding the architecture of MapLango.

In 2012, Kukulska-Hulme suggested a framework for next generation designs defined by time and place: “[a]t that moment in time, in that place, or perhaps in a nearby place just moments before, a mobile device can support language learners in their interactions, but only if relevant support can be obtained spontaneously, instantly” (p. 10). The MapLango team considered place as a first requirement, assuming that geolocation is one of the major smartphone affordances, and that it would be of particular interest for the target audience in order to practice languages on the go. Thus, it was decided that one of the usual social network functionalities of MapLango would be organising interactions in the form of posts on a map. As noted by Godwin-Jones (2011), “with the good connectivity now available on mobile devices, adding a social dimension to location-aware learning apps would be beneficial, allowing users to share context-specific learning experiences,” (p. 8). This also explains the name “MapLango,” which highlights its specific focus on time and place.

The pedagogical framework proposed by Kearney, Schuck, Burden, and Aubusson (2012) also give time and place a central role. According to these authors, this involves authenticity (contextualisation and situatedness), collaboration (conversation and data sharing) and personalisation (agency and customisation). These three pedagogical dimensions were considered more than relevant for this research and consistent with a social interaction approach to language learning. In MapLango, authenticity is enhanced through the situatedness enabled by the map view, and by means
of posts that are a concrete result of learners’ interactions with authentic environments. Furthermore, the use of tags and of different icons for each category of post (activity, challenge, tip, and help) was decided in order to help contextualise the content (see Figures 12.2A and 12.2B).

![Image of MapLango app](image1)

**Figure 12.2 Authenticity in MapLango (Contextualisation and Situatedness) ; A. Posts on the Map with Different Icons Depending on Their Category ; B. Example of Post**

Authenticity is also enhanced in MapLango with the “Carnet” menu (see Figure 12.3). This is a private repository—not shared with peers, as is the case in LingoBee for example—that a learner can supply with input coming from his or her daily surroundings, or from the content posted in MapLango. This promotes “a new connection between language and the physical environment” by allowing learners to save items in their repository as “reminders of what was previously learned in a particular location” (Kukulska-Hulme, 2012, p. 11). In this sense, the repository is also
available offline, because the learner must be able to use it in any situation as a linguistic or cultural support. Besides enhancing authenticity, this repository was considered as an efficient tool for personalisation in relation to the learning process and customisation of the app itself, since each repository will be unique.

![Image of the Carnet screen in MapLango](image)

**Figure 12.3 Personalisation in MapLango:**

“Carnet” (List of Entries)

Personalisation is strongly promoted in MapLango through “learner-generated linguistic artefacts (audio, video, photos, images),” the second design principle proposed by Palalas (2012). This is based on the idea that the app must take advantage of the device affordances in order to increase agency and customisation. According to Palalas (2012), this might encourage and/or promote autonomy, creativity, sharing, motivation, engagement, and ownership, by means of strategies such as providing “tools for recording, editing, upload and viewing/listening on-the-go (or
demonstrate the usage of device built-in tools)” (p. 251). This is possible in MapLango through the integration of multimodal input and output, by posting in the network or by saving items in the repository. Consequently, the text integrated into posts or repository entries is limited to 200 characters, to promote multimodality and in order to fit onto smartphone screens, judged somewhat inappropriate for long texts.

An important element of personalisation in social networking is the user’s profile. In this project, this was a crucial point for the “pedagogical twist”-as a reference to “developmental twist”-of the digital network. Thus, keeping in mind that in MapLango social networking is related to language practice, users’ profiles gather what really matters for the community, as summarised in Table 12.2:

<table>
<thead>
<tr>
<th>Elements of learner’s profile</th>
<th>Pertinence for the language practice community</th>
</tr>
</thead>
<tbody>
<tr>
<td>User name and profile picture</td>
<td>Help identify the learner</td>
</tr>
<tr>
<td>Gender and Nationality</td>
<td>Guide cultural and linguistic approaches</td>
</tr>
<tr>
<td>Short biography</td>
<td>Allows the learner to share a personalised description that he/she judges interesting for the community (his/her context, motivations, aims, interests, etc.)</td>
</tr>
<tr>
<td>Email</td>
<td>Allows private contact outside the use of the app</td>
</tr>
<tr>
<td>Language level</td>
<td>Aggregates learners according to their level of proficiency</td>
</tr>
</tbody>
</table>

Language level is a key element of the profile for personalisation defined by time and place. The first aim of every social network is the creation of communities by “following” other users. In the case of MapLango, social networkers’ main interest is to create a community of target language practice. In this sense, the app facilitates this process using geolocation in
real time settings to suggest a list of users of similar language level.

Level of language proficiency is determined through placement tests available in the app. The instructional designers and language teachers of the team, following partly the indicators proposed by the Common European Framework of Reference for Languages (CEFR), created four placement tests with eight questions each. Instead of the official indicators (A1 to C2), easier identifications were chosen: levels 1 to 4 correspond to user-learners and level M is for user-mediators (see Figure 12.4A).

![Figure 12.4](image)

**Figure 12.4** Language Level in MapLango: A. Placement Tests; B. Example of Test Activity; C. List of Tests Activities That Mediators Randomly Receive from Local Learners

Level 1 (A1), for which it was not necessary to create a test, is the default level when a learner signs up to MapLango. Once the account has been created, a learner can take a placement test in order to update his or her level. These tests, in MapLango, consist of automated questionnaires
that have to be answered by the user via his or her own output: text, picture and/or sound (see Figure 12.4B). Local mediators randomly receive these outputs and verify the answers (see Figure 12.4C). This is a way to involve action, creativity and human evaluation in the tests. When a learner obtains 75% of correct answers, his or her level is updated, and he or she has access to the corresponding community of learners.

Level M (Mediator) corresponds to proficient users (C1 and C2), who can be teachers or not, interested in undertaking mediation and helping learners of Levels 1 to 4 in their language practice, just like local volunteers do in the MASELTOV app (Gaved et al., 2014). However, unlike the target audience of the MASELTOV app, MapLango’s learners will not have urgent linguistic and cultural needs related to their immediate social environments. That is why the term “proficient users” is preferred in this study instead of native speakers. In this way, Brazilian mediators are also included in the social network. In order to become a mediator, a user need only pass the corresponding placement test. Consequently, he or she will appear in the list of suggested mediators present in the location.

Considering some limitations of the research, placement tests are currently only in the French language. Although for the moment, this prevents learners from choosing other languages, this is not decisive in the architecture of MapLango, since only the interface language and placement tests involve the target language. Furthermore, other languages will certainly be integrated in the future when MapLango can count on a broader community. Nonetheless, for the context of this research, which implies implementation and evaluation in the near future, the beta version of the app will focus on French-speaking communities.

During the design phase, it was vital that choices were made step by step, from various options, and always considered, among other aspects, available human resources, technological feasibility, pedagogical consistence and the timeline of the DDR.
Besides language level indication, a learner should be able to follow some suggested contacts according to his or her own criteria. Therefore, public access to profiles and posts was judged coherent in order to give learners more freedom in the creation of their community. Having free access to posts can be helpful for each learner in deciding whether to follow another learner or not. In non-formal learning, for example, which is structured and intentional but not controlled by an institution (Werquin, 2010), a learner might follow another that demonstrates regular or pertinent participation and could, consequently, collaborate in his or her learning process.

Social networks are known for stimulating conversation and data sharing, so it seems participation would not be a problem. However, this might be more of a challenge in MapLango because of its “formal” dimension. Despite typical social network functionalities, we must account for the fact that MapLango will be used with a learning aim. Be it non-formal or formal learning, a certain degree of formality is always involved in mobile language learning due to the intentionality of the learner, unlike informal learning.

Nowadays mobile apps are designed for specific uses, so the focus on language practice proposed by MapLango seems appropriate, otherwise users would not perceive its specificity in relation to other apps. In this sense, native apps are supports extremely associated with specific uses. Current social networking apps focus the attention of users on specific utilisations, such as the sharing of instant pictures, tourism tips, traffic information, and so on. Nevertheless, most of these apps involve informal uses, so it is vital to understand that users should not use educational digital networks in the same way they use informal ones in private life. Accordingly, this study considered that special care had to be taken to ensure participation in more formal contexts.
The objective of the app is to ensure and motivate, as much as possible, active participation and collaboration in Brazilian cities, with virtual communities that could supplement face-to-face interactions taking place during more formal group lessons. Although some elements relating to authenticity and personalisation can be factors of motivation, the literature review revealed that the use of game-based mechanics and dynamics could be a good strategy to enhance participation.

The “game-like real-life communicative tasks” design principle (Palalas, 2012) gives strong orientations for MELL design, like the inclusion of “elements of educational games (challenges, awards, bonus system, group or individual competition, engaging visual interface, progress record keeping),” the injection of “fun, enjoyment and challenge” and “interactivity with others, content, technology, environment (context affordances)” (p. 254). In MapLango, game-based mechanics use the most basic functionalities of social networks, as summarised in Table 12.3:

<table>
<thead>
<tr>
<th>Social network functionalities</th>
<th>Game-based mechanics</th>
<th>Pedagogical and technological implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posting</td>
<td>The user earns a number of participation points depending on the type of post;</td>
<td>Pedagogical:</td>
</tr>
<tr>
<td></td>
<td>- Text: 10 points</td>
<td>- Ensures participation</td>
</tr>
<tr>
<td></td>
<td>- Text + picture: 15 points</td>
<td>- Enhances creativity and multimodality</td>
</tr>
<tr>
<td></td>
<td>- Text + audio: 20 points</td>
<td>- Promotes a systemic approach to language practice</td>
</tr>
<tr>
<td></td>
<td>- Text + video: 25 points</td>
<td>Technological:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Makes the most of device affordances</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Fits with common use by students (for more detail see Palalas, 2012, p. 129-130)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Rewards automatically</td>
</tr>
</tbody>
</table>
The points system (see Figure 12.5A) involves two game-based dynamics: the treasure hunt narrative and the validity of points. The treasure hunt narrative, in MapLango, consists in accumulating participatory and collaborative points in order to acquire five tools needed to unlock different features of the app. It was concluded that awarding users with “treasure hunt tools” (see Figure 12.5B), instead of badges, could motivate them to collect more points by participating and collaborating, to the extent that the discovery of the treasure represents a concrete goal.

The validity of points is a way to challenge users’ participation and collaboration. An inactive period of 10 days, without receiving any points, was considered as a reasonable challenge for users. This is also a way to confront them with a situation of possible loss, as in a game. After this period of 10 days, users lose 5 points per day in the corresponding point...
section (collaborative or participatory).

Figure 12.5 Illustration of the Application of Game-Based Mechanics in MapLango: A. Notification after Posting Content; B. Treasure Hunt Narrative in User's Profile

Finally, in MapLango game-based mechanics and dynamics promote:

- Better personalisation of the profile: gives an idea of how participative and collaborative a learner is;
- Implicit classification of best users: the most participative and collaborative learners appear at the top of the list of suggested contacts (see Figure 12.4C).

Learners receive notifications when they appear among the best-suggested contacts in a location. This is a way to add value to their efforts for participation and collaboration, as well as to integrate implicit competition and challenge. Procter-Legg et al. (2012) identified “language
learners as a new type of social networker: Competitors and Motivators,” and according to their recent findings “a competitive spirit is indicated as a means of motivation and recognition among peers” (p. 120).

In the design phase of MapLango, system architecture was created with Xcode, the programming environment of Apple for the design and development of native apps. This choice was made in the analysis phase, in which native apps were identified as better than web apps in making the most of device affordances (Godwin-Jones, 2011). The screen captures used as illustrations in this chapter come from the final prototype of MapLango, which is now in the development phase.

This prototype, the document of software requirements specifications, and the relational data model, are the result of a constant and necessary dialogue between instructional designers, language teachers, developers and graphic designers. Working together on this collaborative project, all of these figures are students, teachers or researchers from three different departments of the University of Brasilia: the Faculty of Education (more specifically the Ábaco Group), the Industrial Design Department and the Department of Foreign Languages and Literature.

Conclusions and Future Research

This chapter presented the main elements of the analysis and design phases of MapLango, a mobile app proposed as part of design and development research for a MELL intervention. The aim was to show how system architecture could be designed after a phase of analysis that identified the research problem, the learning context, research questions, as well as guiding elements and current needs in the literature review. According to the findings, MapLango architecture was designed in such a way as to promote an “enabler” role of the handheld device, an extensive
involvement of learners in the design of their own learning experience, an innovative approach to language learning based on social interaction, and a systemic vision of language practice.

The requirements identified in the design phase allowed the proposal of a mobile app that could address the research problem, connect pedagogical, technological, and linguistic affordances and play the role of social and participatory media for language learning on the go. At the time of this research, the study cannot affirm the effectiveness of such a proposal. The development phase is still in the process of finalising graphic design and programming. After this phase, according to the chosen methodology, subsequent phases shall consist of the implementation of MapLango in a community of Brazilian learners and a necessary comprehensive evaluation. This design and development research is a longitudinal study that aims to advance and transform knowledge for a better understanding of the contribution of educational digital networks, for theory as much as practice, in mobile language learning.

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Chapter 13: Learning Dashboards and Gamification in MALL: Design Guidelines in Practice

Stephen Tsourounis

University of Toronto, Canada

Carrie Demmans Epp

University of Toronto, Canada

Abstract

In spite of the potential for mobile-assisted language learning tools to enable anytime-anywhere learning, their widespread use has yet to occur (Burston, 2014). This may be partly due to waning learner motivation as a result of the repetitive nature of many MALL tools (Godwin-Jones, 2010). The use of gamification and learning dashboards can provide English language learners (ELL) with feedback about their activities and progress with the hope that this feedback will persuade ELLs to increase their usage of the MALL tools that are available to them. Both learning dashboards and gamification have been shown to support learner self-regulation (Bull & Kay, 2013) and to help maintain motivation (Bull & Kay, 2013; Deci, Koestner, & Ryan, 1999; Demmans Epp & McCalla, 2011; Nicholson, 2012). However, their use within language learning and MALL has been limited. As a result, a study was conducted to determine the types of feedback that ELLs desire and need. This mixed-methods study informed the design of a learning dashboard that incorporates gamification. This dashboard allows ELLs to set their own goals and monitor their progress.

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towards those goals within a particular MALL tool, called VocabNomad (Tsourounis, Demmans Epp, & Baecker, 2014). The study data highlight a design space that can be further explored to meet the needs of ELLs. The set of design recommendations that define this space can also be used to support MALL designers who wish to employ learning dashboards or gamification to better support language learners.

**Keywords:** Learning dashboards, gamification, motivation, self-regulated learning, adaptive learning environments, open learner models, feedback, goal-setting, progress monitoring, persuasive technology

**Introduction**

Mobile-assisted language learning tools are argued to enable anytime-anywhere learning (Edge, Searle, Chiu, Zhao, & Landay, 2011). However, they are not widely used (Burston, 2014). This lack of adoption may be related to reduced learner motivation as the result of MALL’s reliance on repetition-based activities (Godwin-Jones, 2010). We propose using gamification and a type of educational reporting, called a learning dashboard, to give English language learners (ELL) feedback and persuade them to increase their usage of the MALL tools that are available to them (Burston, 2014). Both learning dashboards and gamification have been shown to maintain learner motivation when used appropriately (Bull & Kay, 2013; Deci, Koestner, & Ryan, 1999; Nicholson, 2012). However, few MALL tools employ these techniques. We, therefore, set out to determine what types of feedback are both desired and needed by ELL.

We report on a mixed-methods study where ELLs used an adaptive MALL tool, called VocabNomad. This evaluation informed the design of a gamification feature that allows ELLs to set their own goals and monitor their progress towards those goals through its learning dashboard (Tsourounis,
Demmans Epp, & Baecker, 2014). This study helps define a design space that can be leveraged by MALL system designers to meet the individual needs of ELLs through the use of learning dashboards or gamification. This design space is presented as a collection of recommendations, for which the implementation is illustrated through the design of a learning dashboard that incorporates gamification for self-regulated learning.

We first present a discussion of the feedback mechanisms that can be provided within MALL environments and the approaches through which we can support individual learner goals. A discussion of relevant language-learning theories is presented throughout the discussion of learning dashboards, persuasive technology, and gamification.

Feedback for Mobile Language Learning

To learn a new language, learners must develop habits that enable them to continually improve their language knowledge and skills. These habits include reflecting on their learning and language use, adjusting their practices, and maintaining their motivation. Feedback is one mechanism that enables learners to perform these tasks. This feedback can come from the responses that learners receive when communicating with others in their target language or their noticing that they lack the necessary knowledge for communicating their intended message (Swain, 1995). Feedback can also come from instructors or the technologies that students use. Often, this means the student’s score on a test, but it could be from formative assessment tools, such as learning dashboards.

While feedback is important to learning, additional support tools are needed to maintain learner motivation and to encourage them to continue working. Along with learning dashboards, techniques from persuasive technology can be used to support learner motivation and self-regulation.
This set of techniques includes gamification or the use of game mechanics (Deterding, Dixon, Khaled, & Nacke, 2011) and goal setting. Employing these techniques becomes especially important when the learner lacks intrinsic motivation.

**Learning Dashboards**

Learning dashboards act like mini-report cards and can include any type of media (Bull & Kay, 2013). They typically employ text and graphics but can use sound, vibro-tactile feedback, or animations (Bull & Kay, 2013). As a result, learning dashboards play a similar role to that of portfolios in language assessment; they provide evidence of a learner’s abilities that is based on many artefacts and typically include an overview of learner abilities. Learning dashboards may also allow users to inspect the evidence on which the overview is based and, like portfolios, learning dashboards can be private or shared, provided the learner is given some control over who can see his or her dashboard (Bull, 2004; Demmams Epp & McCalla, 2011).

By giving learners access to this high-level overview and the detailed underlying information, MALL tools allow learners to get feedback about their learning whenever they need or want it. Using learning dashboards to explicitly show learners their knowledge, strengths, and weaknesses can increase their intrinsic motivation for completing learning activities, which could lead to increased knowledge (Bull & Kay, 2007).

**Persuasive Technology**

Persuasive technology is designed to change people’s attitudes and behaviours (Fogg et al., 2007). The ever-present nature of mobile devices enables their use as a persuasive technology because they can layer information into our everyday lives and trigger or encourage us to change. Persuasive technology is most successful when working towards small goals
or helping learners develop new behaviours that are relatively simple (Fogg et al., 2007). It can also be used to change larger behaviours, provided those behaviours are decomposable.

Behaviour change is a lengthy process that takes an average of two months (Lally, Van Jaarsveld, Potts, & Wardle, 2010). To enable this process, persuasive technologies can play a combination of roles (Fogg et al., 2007), with the concierge and coach roles being most relevant to language learning. Concierge-style MALL tools let learners to get help when it is needed. This allows the MALL tool to influence the user’s behaviour through the information that it provides. MALL tools can also act as coaches by tracking learner activities, helping them set and monitor goals, and encouraging them to work towards those goals.

Keeping the roles of concierge and coach in mind, persuasive technology, like goal setting, triggers new behaviours and manages learner motivation by manipulating the learner’s sensations (pleasure or pain), anticipation, or sense of belonging (Fogg et al., 2007). Task difficulty should vary based on many factors including the learner’s time and monetary resources, the cognitive and physical effort involved, and the task’s deviance from social norms. Tasks should, therefore, be selected so that they are achievable and challenging with more difficult tasks being assigned when learner motivation is high.

There are five ways that mobile tools can help facilitate behaviour change. One of them is by facilitating the collection of information either by automating it (Fogg et al., 2007) or by allowing learners to record examples of interesting language usage (Kukulska-Hulme & Bull, 2009). MALL can also facilitate behaviour change by measuring the behaviour or ability that one wants to change, or by providing the learner with personalized
feedback, as is the case in learning dashboards. Encouraging learners to develop and manage their identity also encourages behaviour change; identity management can be achieved through the selection or design of an avatar and username. Developing a sense of community through game use increases engagement and personal performance while reinforcing the learner’s identity and sense of social contribution, which influences their behaviour. A sense of community can be developed through sharing which increases the likelihood that behavioural changes will be maintained, and it fits with the later described concepts of achievers and competitors (see Gamification and Goals). Both of these concepts can be realized using leader boards or by enabling social comparison: similar learners can be found or a group model that aggregates information about a cohort can be made that allows learners to compare themselves to others.

If we want learners to develop new behaviours we must help them identify when this new activity can be integrated into their routines (Fogg et al., 2007). For users of MALL tools, this might be while they are standing in line or riding the train. An alternative strategy is to have the new activity follow a habitual one so that this new activity is integrated into learners’ everyday activities and becomes associated with existing habits, which later trigger the behaviour. Triggering learning activities in this way can also help avoid a nagging sensation.

Using notifications to encourage the learner to perform activities is a possibility, but these require modeling learners and taking their current context into account if we are to avoid annoying learners or interfering with their other activities (Vertegaal, Shell, Chen, & Mamuji, 2006). This could mean that the application notifies the learner to study when the learner is in the same location where she or he had previously been studying. The
use of these notification-based triggers would then taper off as the learner’s study habits become automated.

**Gamification and Goals**

A learner must be motivated for behaviours to change or learning to happen. While persuasive technology and learning dashboards can help maintain learner motivation, they may not be enough for many learners. This is especially true for those who lack intrinsic motivation. These learners may need other motivators, such as rewards, to help keep them on task. Gamification or enhancing a system by designing it in a way that affords gameful experiences (Huotari & Hamari, 2012), can provide meaning and motivate learners who lack intrinsic motivation through its use of narratives and external reward mechanisms.

Gameful experiences often follow the six-stage process illustrated in Figure 13.1. Learners start at desire, are incentivized or receive a recommendation from their learning dashboard, perform a task or challenge, receive feedback, achieve something, and eventually reach mastery. Learners may not proceed through these steps in a linear fashion; they may repeat sub-cycles before achieving mastery for a specific skill or knowledge component (Zichermann & Linder, 2013). The cycle from incentivization to achievement is a form of persuasion that encourages continued use. This cycle is similar to how learning dashboards give learners feedback and an incentive to continue working. The boundary between achievement and feedback (the purple stages) or desire and incentive (the blue stages) may be blurry in some systems since the blue stages relate to motivation and the purple stages depend on learners receiving feedback.

How learners progress through these stages partly depends on how they are motivated, which can be described by their fit with each of the four
basic gamification personae (see Figure 13.2): competitors, achievers, socializers, and explorers (Ryan, Rigby, & Przybylski, 2006).

Figure 13.1  The Gamification Cycle: The Stages That Learners Undergo When Working with an Adaptive System That Uses Gamification

- Competitors are driven by the need to win. Encouraging competition through features such as leader boards can motivate them (Chatfield, 2010; Fogg et al., 2007; Bull & Kay, 2007) but it may not motivate all learners (Demmans Epp & McCalla, 2011).

- Achievers are driven to succeed either on their own or in cooperation with others. They do not need to be the best but still want to experience success. These learners can be motivated through cooperative activities (Fogg et al., 2007; Chatfield, 2010).

- Socializers are interested in interacting with others. Enabling discussions, encouraging relationship formation, or providing learners with information about how their
performance compares to that of similar learners can motivate them (Fogg et al., 2007).

- Explorers are interested in interacting with the world (virtual or real). This can be encouraged through role-play.

Goals stretch, push, and enable us to accomplish tasks that we might otherwise avoid (Fogg et al., 2007; Frederick, Loewenstein, & O’Donoghue, 2002). Encouraging learners to set goals based on the feedback they receive through the learning dashboard can increase their intrinsic motivation by making the tasks personally meaningful (Nicholson, 2012; Mekler, Brühlmann, Opwis, & Tuch, 2013). Goal setting can also focus learner attention, and the goal-setting process could increase the learner’s sense of competence and autonomy, which predict their willingness to continue learning (Ryan et al., 2006).

However, learners may need encouragement setting goals that will help them develop other skills. In a language-learning context, it might be worth encouraging achievers to set interaction-based goals so that they exhibit behaviours that are consistent with socializers. It then becomes important to reward the effort invested in achieving these goals as learners work towards them since this can improve motivation and encourages continued effort (Chatfield, 2010). These rewards can come in the form of points, virtual trophies, kind messages, or acknowledgement of time and effort invested. However, rewarding effort too soon can result in decreased effort (Festinger, 1961; Kohn, 1999). So, care should be taken in the case of rewards.
A Study of MALL Tool Usage by English Language Learners

To determine what kind of feedback learners want in a MALL tool, ELLs used one, called VocabNomad, for three weeks and participated in an interview following its use.

**MALL Tool: VocabNomad**

VocabNomad is an adaptive communication support tool that also supports vocabulary acquisition (Demmans Epp, Tsourounis, Djordjevic, & Baecker, 2013); it is meant to meet the call for the development of mobile language learning tools that are fundamentally different from those provided by the majority of computer-assisted language learning programs or pencil and paper activities (Ballance, 2013; Burston, 2014). VocabNomad acts as a concierge while it aims to support the fast mapping process (Carey, 2010) by providing contextualized examples of language use and allowing learners to record examples of language usage that they encounter.

VocabNomad has web and mobile interfaces, where every user
interaction through both interfaces is logged. Each of these actions is, then, dynamically reasoned over to infer a user’s vocabulary knowledge. Following this dynamic modelling process, the system recommends new learning materials by showing the user vocabulary (i.e., words or phrases) that is related (i.e., near-synonyms) to the vocabulary that the system has inferred are known by the learner (Figure 13.3). The recommended vocabulary can come from any combination of three sources:

- **Expert-generated collections**: a base set of these is initially loaded within the application and additional collections are made available for learners to import.
- **User-generated collections**: learners can create and share vocabulary items.
- **Algorithm-generated collections**: these collections of vocabulary items are generated by applying information retrieval algorithms to Internet-based corpora.

The learning and support materials within VocabNomad have several parts. Vocabulary items are accompanied by an image that represents their meaning and a sentence demonstrating their use (Figure 13.3). Learners can obtain the vocabulary entry’s definition and hear a text-to-speech-generated model of the pronunciation for a word, sentence, or definition (Figure 13.3).

Learners can record themselves or others saying the word, they can edit any of the information that is part of a vocabulary item associated with their account, and they can search through existing entries. To request new support materials learners can search for a word or topic that is not already contained in their vocabulary collection. These materials come from the
same combination of sources as those provided by the recommendation system and may be automatically generated to meet the learner’s emergent needs. This enables anytime-anywhere learning (Liu, 2009) and is a key advantage of using mobile devices to support learning (Burston, 2014; Kukulska-Hulme, Sharples, Milrad, Arnedillo-Sánchez, & Vavoula, 2010).

![Image of mobile application screens]

Figure 13.3 A list of Vocabulary (Left); The Detailed View for Boat (Center); And the Synonym Recommendation Following the Inference That the Learner Knows the Word Car (Right)

**Procedure**

During the first meeting, participants were given a copy of the application on a smartphone that was later returned. During this meeting they answered demographic questions and were given a tutorial, login credentials, and a user manual. Participants were told to use the application as they saw fit. Participants returned approximately three weeks later to take part in a semi-structured interview that focused on their language-learning experiences, second language communication experiences, technology use, use of VocabNomad, and feedback preferences. The interviews were transcribed and the transcripts reviewed to identify the strategies and technologies that participants had used as well as how they had used VocabNomad. The communication and language learning feedback preferences of participants were also identified.
**Participants**

Eight ELLs participated (see Table 13.1). Five (P1, P3, P5, P7, P8) were exchange students from Brazil who were enrolled in an academic English training program. Three (P2, P4, P6) were visiting post-graduate students from China. Participant mean age was 23.1 years \((SD = 2.0)\).

<table>
<thead>
<tr>
<th>ELL</th>
<th>Age</th>
<th>Sex</th>
<th>Mother Tongue</th>
<th>Language Spoken at Home</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>22</td>
<td>F</td>
<td>Portuguese</td>
<td>English</td>
</tr>
<tr>
<td>P2</td>
<td>27</td>
<td>F</td>
<td>Mandarin</td>
<td>Mandarin</td>
</tr>
<tr>
<td>P3</td>
<td>23</td>
<td>M</td>
<td>Portuguese</td>
<td>Portuguese</td>
</tr>
<tr>
<td>P4</td>
<td>24</td>
<td>F</td>
<td>Mandarin</td>
<td>Mandarin</td>
</tr>
<tr>
<td>P5</td>
<td>21</td>
<td>M</td>
<td>Portuguese</td>
<td>Portuguese</td>
</tr>
<tr>
<td>P6</td>
<td>24</td>
<td>F</td>
<td>Mandarin</td>
<td>Mandarin</td>
</tr>
<tr>
<td>P7</td>
<td>21</td>
<td>F</td>
<td>Portuguese</td>
<td>Portuguese</td>
</tr>
<tr>
<td>P8</td>
<td>23</td>
<td>M</td>
<td>Portuguese</td>
<td>Portuguese</td>
</tr>
</tbody>
</table>

**Results**

All participants used VocabNomad to support their vocabulary acquisition by studying vocabulary entries, listening to vocabulary items and their associated sentences or definitions, using the sentences to model appropriate word usage, or using the search function to learn how to spell words. Through analyzing interview and log data, we identified areas that can be further explored to meet the needs and desires of individual ELLs.

**Integrate the new activity into the learner’s existing routine**

All participants used the application in private settings and some (P2, P4, P6, and P8) used it in public settings that included gyms, buses, pubs, research labs, and grocery stores. When VocabNomad was used in public, it was primarily used to support vocabulary acquisition. However,
participants P3, P6, and P4 used VocabNomad to support their communication. This support enabled P4 to get help finding a particular type of squash at the grocery store.

**Enable learners to transition between roles**

VocabNomad accommodated both experiential and achievement-based roles. Exploration was enabled through the vocabulary list, with the ability to filter by topic or search for specific content. P1, P4, P5, P6, and P8 explored vocabulary on the web client and all participants explored vocabulary through the mobile application (viewing an average of 101 vocabulary entries per session and 2819 vocabulary entries in total). All participants, except P1, reacted positively to discovering vocabulary using the topic filters. P8 liked that “you can search for words based on the topic” and P4 filtered by topic to find vegetables at the supermarket. VocabNomad facilitated the transition to the achievement role by displaying the near synonyms of vocabulary that the system had inferred were known by learners. Learners were exposed to about 12 near-synonyms during each session, which enabled the transition to an experiential-role by encouraging learners to expand their vocabulary knowledge.

**Enable community building**

VocabNomad enables community by allowing learners to share vocabulary collections. This feature was used by P4 and P8 to obtain additional learning materials and some participants said that they tried to share vocabulary with their friends, which indicates that learners want to be able to share content with specific community members and not just the community as a whole.

**Use multiple modalities**

The ability to access materials through several modalities (images,
audio, and text) was positively perceived. Participants liked the pairing of images with vocabulary. P2 and P8 said that it helped to connect the idea of the word with the picture of something that was familiar to them. P5 reported that he paid more attention to words that had pictures.

**Make the system configurable**

Giving participants multiple paths to success allowed them to exercise choice and employ learning strategies that were associated with positive emotions. Participants liked searching through vocabulary and choosing when to listen to how words were pronounced (P1, P5, P7, and P8) because it allowed them to control when they used different macro-skills. They could listen to the text-to-speech (TTS), record their voice, or play their recording whenever they wanted. P1, P5, P6, and P8 went a step further by comparing their recordings to the pronunciation provided by the TTS. P8 said “when you hear the pronunciation, and you can hear your voice and compare. It was the best part.” The use of these features varied based on personal preference with some participants favouring listening over speaking and vice versa. The type of search used by participants also varied based on their preferences. Five participants (P1, P3, P4, P7, and P8) favoured searching using their mother tongue. Whereas, P6 preferred to search using English, and P2 and P5 used first and second language searches equally.

Providing additional learning materials was useful for supporting the varied types of learners and their interests. Most participants found that the content within the application was limited and they frequently used the just-in-time content recommendation to find other vocabulary, even though the new content was slow to load. VocabNomad’s on-device editing also allowed learners to generate their own content. P3, P4, P6, P7, and P8 liked adding topics to new and existing vocabulary. P4, P6, P7, and P8 added
new topics that were not already in the system. P3 and P6 demonstrated their knowledge by associating words with topics that they had previously been exposed to through VocabNomad.

**Communicate learner progress using positive and corrective feedback**

Participants would like to receive both positive and corrective feedback. They would also like to choose the aspect of their language usage for which they will receive corrective feedback. ELL reported that most of their conversational partners do not give them enough constructive criticism. Participants (P1, P4, P5, P6, and P8) also expressed that receiving pronunciation and speaking feedback would help them learn English. Moreover, they wanted to improve their speaking skills by making native, English-speaking friends even though language barriers made this difficult. Some participants wanted to get feedback on spelling (P1 and P7) and grammar (P5 and P7). However, many expressed that they could learn spelling or grammar on their own.

**Design Recommendations**

The literature and study resulted in nine design recommendations for integrating gamification within MALL tools that include learning dashboards. The relationships between these recommendations, the literature, the study, and various concepts or theories are detailed in Table 13.2, which follows the definition and explanation of each design recommendation.

[DR1] **Make the system configurable and allow the learner to exercise choice**

Allow learners to choose the types of media (e.g., audio, video, images, or text) that meet their needs and current context (Nicholson, 2012). Allow learners to edit materials or record language usage and give them input into the goals they are working towards (Bull & Kay, 2007),
even when those goals are suggested by teachers or the system. Learners should be encouraged to set long and short-term goals (Chatfield, 2010) and they should be allowed to select the aspects of their language learning for which they would like to receive corrective feedback. Giving these options to learners helps ensure engagement and provides them with the different paths that may be needed to internalize content and demonstrate mastery.

[ DR2 ] **Encourage the development of learner identity**

Give learners a sense of identity within the system by allowing them to embed themselves within a narrative or represent themselves as they choose to. Both methods can frame a task as meaningful and motivate learner performance (Mekler et al., 2013). When one feels controlled in how one pursues or accomplishes an activity, one’s sense of autonomy diminishes and subsequent motivation wanes (Ryan et al., 2006).

[ DR3 ] **Communicate information through multiple modalities**

Bull (2004) found that students wanted either a graphical or mixed graphical and textual learning dashboard and that only a small number of students would be happy with purely text-based feedback. Participants also reported liking the images that were associated with the vocabulary items in VocabNomad and would record and listen to audio.

[ DR4 ] **Enable monitoring**

Tracking when actions are performed enables monitoring, which empowers learners to reflect on their learning activities and track their progress towards their goals. The system or a teacher can then use information about the goals and choices that the learner has made to point him or her towards potentially beneficial activities (Chatfield, 2010).

[ DR5 ] **Give a sense of progress**

Encourage learner effort by breaking larger goals into smaller ones that
can be accomplished quickly and provide personalized feedback that relates to those goals. This builds anticipation (Fogg et al., 2007) and balances task difficulty with learner motivation (Demmans Epp & McCalla, 2011): activities should increase in difficulty so that learners experience success while being challenged. Learner effort should be periodically rewarded (Chatfield, 2010) when learners are struggling with an activity because this can lead to the development of a preference for those activities (Festinger, 1961) and motivate learners to challenge themselves.

[DR6] Integrate the new behaviour into existing ones

Integrating new behaviours or activities into the learner’s existing processes by having the new activity follow a habitual behaviour allows that new activity to become associated with the existing behaviour. This association helps turn new behaviours into habits.

[DR7] Prompt the desired activity

Prompting could be done using alarms, smartphone notifications, emails, or user interface changes to indicate something should be done.

[DR8] Enable community building where appropriate

Take advantage of the cooperative and competitive personae (Fogg et al., 2007) by incorporating learning dashboards into the MALL tool or by allowing learners to share resources, share their learning dashboards, or help one another.

[DR9] Enable learners to transition between personae

While learners may be primarily interested in achievement-based activities, they should be able to explore learning materials since this may be wanted or needed in some situations. There may also be benefits to encouraging learners to transition between roles so that they can develop other language knowledge and skills.
PART II: Practical Applications

Table 13.2  The relationship between The Design Recommendations, Literature, Study, and Theoretical Constructs. ○ Indicates A Weak Relationship, ⊕ A Moderate One, And ● A Strong Relationship

<table>
<thead>
<tr>
<th>Category</th>
<th>DR1</th>
<th>DR2</th>
<th>DR3</th>
<th>DR4</th>
<th>DR5</th>
<th>DR6</th>
<th>DR7</th>
<th>DR8</th>
<th>DR9</th>
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<tr>
<td>Literature</td>
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<tr>
<td>Gamification Personae/Roles</td>
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<td>Competitors</td>
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<td>Socializers</td>
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<td>Achievers</td>
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<td>Prevents narrow learner experience</td>
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<td>Various modes</td>
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<td>Persuasive Computing</td>
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<td>Habit forming</td>
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<td>Goals</td>
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<tr>
<td>Feedback</td>
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<td>●</td>
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</tbody>
</table>

**Common Pitfalls**

When adding gamification to learning systems it is important to avoid some of the common pitfalls. The first is the assignment of an arbitrary or meaningless goal. Along with this pitfall comes the risk of providing rewards for simple tasks or providing rewards too soon or for too long since this negatively affects intrinsic motivation and can lead to new behaviours being abandoned when the reward is removed (Festinger, 1961). The exclusive reliance on either positive or corrective feedback can also negatively affect
learner motivation (Kohn, 1999). Learners need to receive both types of feedback to remain motivated. The interpretability of learning dashboard information is also paramount. Many system developers have tried to make the visuals look cool rather than ensured that learners can understand the information that learning dashboards are meant to communicate.

With respect to habit formation, some of the largest pitfalls include making tasks too difficult too soon, the failure to challenge learners, the failure to integrate target tasks into existing habits, and a failure to address the larger behaviour change aspect of learning by only focusing on gamification.

**Application of Guidelines and Design of Gamification Feature**

A learning dashboard that incorporated gamification was added to VocabNomad. Based on learner responses, the learning dashboard played the persuasive role of the coach. It was designed to encourage learners to work towards the goals that they set for themselves, and it enabled them to track what they were learning and how they were interacting with the system. The gamification feature emphasized the incentive, feedback, and achievement stages of the gamification cycle (Figure 13.1). The three other stages (desire, challenge, and mastery) are discussed in the potential improvements section.

**Incentive: Recommendations and Goals**

The learning dashboard allows a learner to create or remove goals: a goal is a topic of vocabulary that the ELL decides to learn (Figure 13.4). To maintain learner focus without overwhelming them, each learner is limited to having four active goals at a time. Participating ELLs wanted feedback on their use of particular macro skills (i.e., reading, writing, listening, or speaking), so the application allows learners to select which
macro-skills they are interested in improving. This adds meaning and value to the system [DR1]. For each goal, images from some of the associated vocabulary [DR3], the topic’s definition, and related topics are shown (Figure 13.4). This enables the exploration and discovery of related vocabulary that may be of interest to learners [DR9]. If the learner selects a goal that seems too large (i.e., the topic contains more than 20 unfamiliar vocabulary items), the system suggests a smaller, more manageable goal that will help the learner progress towards the larger long-term goal (Figure 13.4 c) [DR5 & DR9].

![Images of mobile applications](image.png)

**Figure 13.4 Learners Can Add (a) or Remove (b) a Goal and See If It Is Locked (c) or Completed (d)**

**Feedback: Learning Dashboard**

Vocabulary entries (Figure 13.5) display the word, its image [DR3], and the word’s current level. The level indicates how much the vocabulary entry has been studied [DR5] (see Achievement: Rewards). All text uses text-to-speech when touched so that learners can practice their listening when they wish to [DR1]. When a learner creates an audio recording, the new recording is added to the learner’s list of recordings. This was designed to encourage the learner to compare current and prior pronunciation attempts [DR5 & DR7], which can also persuade the learner to practice his or her
listening skills [DR7 & DR9]. The “edit” button uses the same image as the “writing” macro-skill to show that this is how learners can further their writing goals. If a section contains no text (i.e., a sentence or definition for a vocabulary entry does not exist), learners can add text directly [DR7] (Figure 13.5a).

![Images of screens showing VocabNomad features]

**Figure 13.5 Vocabulary Information (a & b), Macro-skill Overview (c), and Goal Progress (d)**

VocabNomad tracks ELL actions within the application to give learners feedback on their progress [DR4]. The overview page (Figure 13.5c) shows a pie chart representing how much time the learner has spent practicing a particular macro-skill in order to enable self-monitoring.

As learners study the vocabulary entries that are associated with their goal, VocabNomad uses a progress bar to build a sense of anticipation for the completion of that goal [DR5]. This progress bar appears at the top of the screen with an image that represents the macro-skill that is being used (Figure 13.6). The progress bar will be seen to fill when:

- the learner listens to a recording or the text-to-speech (listening)
- the learner records something (speaking)
• the learner types something with each key increasing the learner’s progress (writing)

• the learner reads anything (reading)

For reading, the progress bar is incremented depending on how important reading is to the learner. If a learner wants to improve all four macro-skills, the bar will initially fill to 25%. If the learner only wants to improve reading, writing, and speaking, the progress bar will initially fill to 33% [DR1]. Having the progress bar fill as these events are happening provides immediate feedback, motivates the learner, and encourages their effort for studying a vocabulary entry that is associated with their goal [DR5].

![Figure 13.6 Vocabulary Can Be Studied by Reading (a), Speaking (b), Listening (c), or Writing (d)](image)

**Achievement: Rewards**

When the progress bar fills all the way, a message appears over the screen to show the learner that the word was levelled up (Figure 13.7) [DR5]. To enable self-regulation and allow the learner to monitor how they are studying the word [DR4], the number of experience points earned for using each macro-skill are displayed. When all of the words associated with
a goal have been levelled up, another message notifies the learner that a goal has been achieved and a trophy has been earned (Figure 13.7) [DR5]. This message includes a button to “view” the completed goal (Figure 13.7) and suggests new goals (Figure 13.4) [DR1 & DR9]. This is where achievements feed into the incentive/recommendation stage of the gamification cycle (Figure 13.1).

![Images of mobile screens showing goal completion, trophy, and achievement views.]

Figure 13.7  Levelling up Vocabulary (a); Completing a Goal (b); Completed Goals (c)

Completed goals are stored in a “Memory” tab. This tab displays each completed goal, some of the images of words that accompany that goal [DR3], the goal’s level [DR5], and its expiry date. Goals expire when the system infers that the learner has forgotten the associated vocabulary [DR5]. Goals are removed from the memory tab if the spaced-repetition algorithm (Wozniak, 1990) has inferred that a learner has forgotten the topic. The system will then suggest that the learner re-add the goal [DR7].

**Potential Improvements**

The design of the learning dashboard assumes that the learner is already highly motivated. However, desire could be heightened by encouraging the development of the learner’s identity [DR2]. To selectively override people’s bias towards short-term goals at the expense of long-term...
goals (Frederick et al., 2002), the application could embed tasks within a narrative context so that learners perceive the tasks as significantly more valuable and personally more important (Mekler et al., 2013).

Since challenging learners enhances their perceived competence and intrinsic motivation (Ryan et al., 2006) an adaptive test based on learner interactions within the system could be added to assess content knowledge [DR4]. The results of this testing could then inform the challenge, mastery, and achievement stages of the gamification cycle where the difficulty of activities could be adjusted based on learner abilities and motivation. The test data could also be integrated into the spaced-repetition algorithm and increase system confidence in its inferences of learner knowledge (see Achievement: Rewards). Incorporating feedback that is corrective and motivational can also challenge learners [DR5]. For example, the system could increment the progress bar depending on how well something was pronounced or if the typed words were spelled correctly. As users learn, their skills and demands increase, which could cause boredom if they are not sufficiently challenged. By adding a social aspect to the application [DR8, DR9], learners’ skills and demands can grow with each other, and they can challenge each other to avoid boredom (e.g., by competing against each other or exploring content together).

Conclusion

Integrating persuasive techniques into the design of MALL tools can trigger new behaviours that support language learning. Moreover, integrating MALL use into the learner’s daily routine can turn regular activities into triggers, which helps the learner to form habits.

People must be motivated for learning to happen. This means that MALL designers need to carefully consider how the tool will affect learner
motivation and actions. Learning dashboards provide learners with personalized feedback and allow learners to track their knowledge, strengths, weaknesses, and abilities. This supports learner reflection, monitoring, and self-regulation, which can increase a learner’s intrinsic motivation. Gamification can also increase learner engagement by providing an external reward mechanism for students who lack intrinsic motivation. MALL tools that accommodate the four basic gamification personae (i.e., competitors, achievers, socializers, and explorers) can give learners a sense of autonomy and allow them to perform tasks that are personally motivating.

ELL use of an adaptive MALL tool, called VocabNomad, confirmed the need for providing additional motivational support. This study also served to confirm and refine many of the design considerations that need to be made when incorporating gamification and learning dashboards into MALL tools. The resulting design recommendations were incorporated into VocabNomad’s gamification-based learning dashboard.

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Chapter 14: Design and User Evaluation of a Mobile App to Teach Chinese Characters

Fernando Rosell-Aguilar

The Open University, UK

Kan Qian

The Open University, UK

Abstract

This chapter presents both the pedagogical design principles and the challenges faced during the development of a mobile app, Chinese Characters First Steps, to support recognising, learning and practising writing Chinese characters at beginners’ level, including the difficult balance between pedagogy and technical affordances. We also present the results of a research study which collected quantitative data from over 130 users of the app as well as qualitative data from interviews with four users. The results offer a profile of language learning app users and very positive attitudes towards learning with apps. They also reveal users’ reasons for learning Chinese, patterns of learning, expectations of the app, and evaluation of the different features for their own personal learning. Finally, the paper concludes that the chosen design principles for the app were appropriate for its purpose.

Keywords: MALL, Chinese characters, mobile applications, app development, evaluation, writing
Introduction: The App Revolution

When the first generation iPhone was introduced in 2007, few could have predicted the impact it would have on education. As Godwin-Jones (2011) points out, the iPhone was a game-changer not only in terms of its functionalities, but because other competitors followed and created similar devices. Since then, and with the addition of the iPad – introduced in 2010 – and similar devices, there has been a proliferation in the popularity and ownership of smartphones and tablets that can carry out a large variety of educational activities within a single device. Although the devices are clearly necessary for this to happen, the other pillar of this revolution in mobile learning is the availability of the apps developed to be used with them.

As soon as these apps were released, educators began to see the potential for teaching using such devices, including ubiquitous learning opportunities, ease of use, collaboration, content generation, and productivity enhancement (Murphy, 2011). However, does this potential become reality? Moreover, what are the implications for language learning in general and for more complex languages such as Chinese?

Literature Review

This section will present the challenges of learning Chinese, current theory on the use of mobile apps for language learning, and the evidence found so far in research studies about their efficacy for teaching and learning Chinese.

Challenges of Learning Chinese

It is well established in the research of teaching Chinese as a foreign language (CFL) that, due to its unique features, it presents the following key challenges to language teachers and learners: 1) tones; 2) character recognition and writing; 3) lack of obvious correspondence between the
character script and the sound (Hu, 2010; Liang & van Heuven, 2007; Wang & Kirkpatrick, 2012). Tones and characters are two of the biggest hurdles at beginners’ level (Liang & van Heuven, 2007; Jongman et al., 2006; Hu, 2010; Xiao, 2010). Not only are there too many similar sounding words in Chinese (Lü, C, 2010), but also many words sound exactly the same (with the same syllables and same tones) but mean different things and have different character representations. Learning characters is crucial in meaning identification. However, characters are perceived as difficult because of their sheer number (Hu, 2010) and complexity of strokes (on average a character consists of about 12 strokes). Many beginners, face-to-face or learning at distance, feel that they are learning two systems at the same time-pinyin (phonetic transcription of the characters) and characters. In this process, they need to do four mappings (see Table 14.1 with an example for the word for “west”).

<table>
<thead>
<tr>
<th>Mapping</th>
<th>Pinyin spelling</th>
<th>Pronunciation</th>
<th>Character script</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Pinyin spelling with pronunciation</td>
<td>xí</td>
<td>“x” is pronounced a bit like “ch” in the English word “machine”; “i” is pronounced like “ea” in “tea”.</td>
<td></td>
</tr>
<tr>
<td>(2)</td>
<td>Pinyin spelling with character script</td>
<td>xí</td>
<td></td>
<td>西</td>
</tr>
<tr>
<td>(3)</td>
<td>Pinyin, character with pronunciation</td>
<td>xǐ</td>
<td>“x” is pronounced a bit like “ch” in the English word “machine”; “i” is pronounced like “ea” in “tea”.</td>
<td>西</td>
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<td>(4)</td>
<td>The above three with English</td>
<td>xǐ</td>
<td>“x” is pronounced a bit like “ch” in the English word “machine”; “i” is pronounced like “ea” in “tea”.</td>
<td>西</td>
</tr>
</tbody>
</table>
Although there has been extensive research looking into character learning strategies (Ke, 1998; Lu, 2009; Yin, 2003) as well as issues concerning tone production and recognition (Liang & van Heuven, 2007; Jongman et al., 2006; Hu, 2010), not many researches have looked into the effective use of new technologies to support and engage learners in doing the four mappings as illustrated in Table 14.1.

**Apps for Language Learning**

**Potential and Challenges**

Many authors have highlighted the potential of smartphone and tablet devices as well as mobile apps for language learning, based on the theoretical principles and evidence from the field of mobile-assisted language learning (Burston, 2014; Godwin-Jones, 2011; Golonka et al., 2012; Kim & Kwon, 2012; Kim, 2013; Lafford, 2011; Lys, 2013; Shinagawa, 2012; Sweeney & Moore, 2012; Yang & Xie, 2013). This potential derives from features such as larger screen size, responsive touch screen, enhanced text-entry, high-quality audio and video playback, picture, video and audio recording and editing, voice recognition, enlarged storage, faster connectivity, GPS, accelerometers and Bluetooth connections (Godwin-Jones, 2011), all within one device.

Criticisms of the design of language learning apps include too many translations, lack of sound or pictures, poor navigation and user-interface design, and little use of the unique properties of smartphones such as the motion sensor, location detector, and, in particular, connectivity with other users (Godwin-Jones, 2011; Sweeney & Moore, 2012; Burston, 2014). Burston (2014) found that language learning activities on mobile apps have mostly replicated what had been done before with other technologies and limited to basic flashcards, multiple choice, blank filling, drag and drop and vocabulary and grammar drills and games. He concluded that
“pedagogically, nothing new has been done with smartphones that has not already been done with earlier mobile devices” (Burston, 2014, p. 108).

In their review of language learning mobile apps, Kim and Kwon (2012) highlighted that most apps focus on cognitive processes (recognition, recall and comprehension) and receptive language skills rather than socio-cognitive activities, with little collaborative learning; they also found the activities not as well developed as they could be and mostly teacher-directed, with focus largely on vocabulary.

Evidence of App Use for Chinese Language Learning

Although some educators and students are quick to adopt new technologies into their teaching and learning, it is necessary to evaluate the real potential of the tools.

As Golonka et al. (2014) correctly point out, “in spite of an abundance of publications available on the topic of technology use in FL learning and teaching, evidence of efficacy is limited” (p. 70). Studies on the use of mobile apps for Chinese language learning are scarce. Shinagawa (2012) described some of the benefits that mobile apps can bring to learning non-western characters. These include the iPhone’s own Chinese handwriting recognition function, dictionaries, and quizzes. Among the attempts to find evidence of Chinese learning with apps, Wong et al. (2010) carried out a research study in Singapore, providing their students with smartphones to photoblog Chinese idioms and subsequently base collaborative activities around them. They encountered varied levels of participation (partly due to parental negativity towards the use of smartphones by schoolchildren) as well as technical problems. Despite this, their students reported more engagement with Chinese idioms—although post-study performance was not tested. Yang and Xie (2013) also researched learning Chinese idioms, using iPads with heritage learners
studying at a university in the USA. The participants had very positive impressions of the learning experience. A post-test after the activity showed that almost all students could recall the idioms practised, however, after two weeks, the recall had fallen to 40%.

As discussed in above, character recognition and writing present a challenge for learners of Chinese as a foreign language. Technology can facilitate their learning or provide methods to help overcome the need to handwrite them (Lai & Gu, 2011), but very few studies have looked into whether and how apps can support character recognition and writing. Huo (2013) found that stroke order is still relevant when learning Chinese with the use of technology, and claimed that stroke order helped memorise characters. Based on the research she carried out with learners of Chinese at a US university, Chung (2013) claimed that practising Chinese characters with an iPad had led to the students learning basic stroke order, familiarising themselves with structural components of the characters, and gaining knowledge of the history and culture behind the words. Her students liked the fun, game-like features of using the iPad and this encouraged them to continue with the activities. Some of her students commented on the ease and convenience of using a mobile device for learning, for example whilst commuting, allowing them to make the most of their time outside the classroom. Chung concluded that using the iPad facilitated the integration of learning Chinese into the students’ daily lives.

Design Principles and Development of the App

Beginners’ Chinese was introduced to the curriculum at The Open University (OU), a UK-based distance learning university, in November 2009. As distance learners, our students face additional challenges to those mentioned above, such as lack of physical and visual presence of tutor and
fellow students (Hurd, 2005); lack of immediate personal feedback, and limited face-to-face speaking and interaction opportunities (Kan & McCormick, 2014; Stickler & Shi, 2013). Due to these challenges, the beginners’ Chinese course team searched for innovative tools to support their students in meeting the challenges of learning tones and characters. However, in 2011, there was limited number of apps designed for Chinese character learning. Amongst those in the market at the time, most of them had less than 50 randomly selected characters. The team was not able to identify an app that was designed to learn characters in a progressive and personalised manner. To address this and other shortcomings of the apps at the time, such as over-emphasising the fun element (showing the rain drops with the character for rain) whilst neglecting integrating different aspects of learning characters: pronouncing, listening, writing and recognising characters, the team worked with the app developers at our university to create a new app “Chinese Characters First Steps”. Although the app content is of use to students taking the OU course, its use is not compulsory. This is because the university does not assume that students will have access to (or own) a smartphone or tablet that can run the app. This section presents the principles behind the app design and the stages of production that the app went through.

**Design Principles**

Sweeney and Moore (2012) stated that the critical success factors in the design of apps for language learning are pedagogy and technology. The principles behind our app design included:

- Bite-size learning and mobility

It was agreed that small learning bites would work best due to small
screen size and devices often being used on the move, as they can also maximise the number of learning situations in which the resource can be used (Kovalchick & Dawson, 2003). In addition, the mobile learning experience has been described as “highly fragmented” (Trifonova & Ronchetti, 2003) since its early days, and best design should take this into account by providing activities that can be completed in a short amount of time to make use of “dead time”. Hence, each listening and learning activity in the app consists of only ten matching questions.

- **Progressive learning**

There are altogether 20 lessons with 400 + characters in the app, and each lesson consists of an average 20 characters. All the characters are covered in the OU beginners’ Chinese course, which are the most commonly used characters at beginners’ level. The 20 lessons build upon each other in the same chronological order as in our course materials so the characters learnt in previous lessons are used to build new words in later lessons.

- **Integrating writing, listening, reading, and vocabulary building**

Each lesson consists of four sections: 1) Writing-about 20 characters that learners can learn to draw with their fingers using the correct stroke order indicated on the screen, they can also hear how to pronounce them; 2) Listening test-learners hear ten randomly chosen words or phrases, then select the correct answer from the choices displayed; 3) Reading test-learners see ten randomly chosen words or phrases in characters, then select the correct answer from the choices displayed; and 4) word search-most lessons have two word search puzzles. Each puzzle consists of 16 characters that can form about eight words/phrases (see Figure 14.1, below, for...
screen shots).

- Gaming feature – an element of fun

Each listening and reading test is timed at 60 seconds as a default, which can be reset to 40 or 20 seconds. The learner can see the clock count down, making it feel like playing a game. For word search puzzles, learners use their fingers to draw a line horizontally or vertically over the characters that form the correct word/phrase. If it matches the word/phrase in the list, a pink line appears, otherwise, the line disappears.

- Personalised learning

Learners can set the level that suits them (easy, normal or hard). The default is Easy with stroke order indicator and 60 seconds per test. If users choose a harder level, the time available shortens and the stroke order indicator disappears. As users complete each character, data is kept within the device memory to allow the users to see how many times they have practised it.
Development of the Chinese Characters First Steps App

Although not much research had been done at the time on the potential of using mobile devices in language learning, the project team felt that the affordances of smartphones and tablets with touch screen were ideally suited to a language like Chinese. For the first time, it was possible to bring native speaker pronunciation, stroke-by-stroke character writing, pinyin, English definitions and instructions in one interactive mobile experience, instead of the traditional way of having a textbook, dictionary, audio CD player and a notebook to write characters. It was felt that this integrated solution might better support and engage learners in making the four mappings discussed earlier.

The development of the app (iOS version)\(^1\) went through three development phases:

1) Phase I: Version 1 (February 2010-September 2010): the app contained only the first 20 characters in the course materials and it had three parts: stroke-by-stroke character writing, listening test and reading test. This version went live on the App Store in September 2010 as free download.

2) Phase II: Version 2.0-Version 2.1 (November 2010-July 2011): a further 400 characters were built with 20 lessons (lesson 1 free, lessons 2-20 after an upgrade via in-app purchase); and a “word search” tool was added. This version went live on the App Store in July 2011.

3) Phase III: Version 2.2-Version 2.3 (June-August 2014): upgraded to meet iOS8 system requirements and fix problems with upgrade button; the “Listen” button added to each character in the Writing section; and the first five lessons free (lessons 6-20 after upgrade via in-app

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\(^1\) Android version was developed after Phase II. This study is on iOS devices only, hence the Android development is not included.
purchase). This version went live on the App Store in August 2014.

The app has generated 30,766 downloads between January 2011 and May 2014. In that time, 3,290 users have purchased the upgraded version with 20 lessons. In October 2014, the app won the Ed2.0 Work competition-European Union-funded, education, Transversal KA3 ICT Network project (Lifelong Learning programme) Reference: 519057-LLP-2011-UK-KA3-KA3NW.

Research Questions

The research study reported here aimed to a) understand the learner experience of using the Chinese Characters First Steps app and b) evaluate the principles used for the design of the app.

The researchers had gathered some first impressions from users of the app by looking at the reviews and ratings left on the UK and US App Stores. On the US App Store, 12 ratings were received, with an average of 3.5 stars (five 5-star, two 4-star, two 3-star, one 2-star and two 1-star ratings). A further 12 ratings were posted on the UK store. There, the app received an average of 4 stars (seven 5-star, two 4-star and three 1-star ratings). The positive reviews praised the appropriate level for beginners, variety of skills practised and the user interface. Low scores and negative reviews were received from users who had encountered technical problems with sound, tracing or payment (these reviews had been left prior to the bug fixes released with versions 2.2 and 2.3 of the app). Whilst this was of interest, a much more detailed account of the user experience was needed.

Most studies into the use of apps for language learners have been carried out with the researchers’ own students as participants (e.g., Wong et al., 2010; Yang & Xie, 2013). Teachers know their students and base their teaching strategy on that knowledge. When the design is aimed at
massive online consumption, that knowledge is non-existent. Investment and time is being spent on developing language learning apps, but developers, businesses and educators cannot design well without some knowledge of who users are and what they want. This research project aims to understand who the end-users of language learning apps are, using data both from students registered on the OU Beginners’ Chinese course and from other users external to the institution who had downloaded the app.

The research questions were:

1. What is the profile of the app user?
2. What is their motivation for using the app?
3. How do they use the app?
4. What are their expectations and impressions of using the app?
5. Do they think that using the app has improved their Chinese language learning?

Methods and Participants

Methods

To obtain feedback from app users, a prompt was added to the app as a pop-up, which appeared after users utilised the app more than five times. In addition, an email was sent to a UK-based Chinese language-teaching mailing list asking teachers to encourage their students to take the survey. Furthermore, a message with the survey link was posted on the course forum asking students registered on the OU beginners’ Chinese course to take the survey, and finally a tweet with the survey link was sent from the course Twitter feed encouraging followers to take the survey.

When users chose to take the survey, a link took them to the site where
it was hosted. The survey (using SurveyMonkey) consisted of 25 questions, of which 24 were multiple-choice and one was an open comment question (see Appendix A for full survey).

The survey ran between June 2012 and March 2014. A total of 137 responses were collected. All respondents finished the survey. The only question which did not receive full responses was the open question, which was answered by 69 participants. The data gathered were analysed using SPSS 21 to provide descriptive statistics. A second data analysis was carried out using a question which asked participants whether they were registered on a course in Chinese as a variable to ascertain whether there were any noticeable differences between formal and informal learners. Many of the responses in terms of use and impressions of quality were very similar. Where appropriate, the results section will highlight the responses where there were marked differences between the respondents.

To further explore how learners utilised the app, four users of the app were interviewed in June 2013. The users were registered on the OU Beginners’ Chinese course and had indicated that they had been using the app in response to another research study on mobile language learning (one of the authors of this paper participated in the study). The interviews were carried out using a semi-structured schedule (see appendix 2 for sample questions) via Skype or telephone, with each interview lasting between 30 and 50 minutes. The interviews were recorded and transcribed. Using a thematic analysis of the interview transcriptions, the data were examined to identify salient features about the pedagogical design principles of the app and whether they facilitated the learning experience.

**Participants**

The profile of the survey respondents is as follows: 79 (58.5%) were male and 56 (41.5%) female. With regards to age, the largest group of
participants were aged between 30 and 39 (Figure 14.2). The largest proportion of respondents live in the UK (34.3%), followed by other European countries (21.6%), North America (USA, Canada) (15.7%), China (11.2%), Australia and New Zealand (8.2%), other Asian countries (3.0%), Central and South America (2.2%), and Africa (0.7%). A further 3.0% indicated they live elsewhere. Only 17.2% of the respondents were registered on the OU beginners’ Chinese course, the remaining 82.8% were not.

![Age of Participants](image)

Figure 14.2 Age of Participants

Results and Discussion

In this section, the results from the data collected will be presented and discussed in relation to the research questions.

**What Is the Profile of the App User?**

A high proportion of the survey respondents were male (58.5%). This is in line with UK undergraduate population studying Chinese and consistent
with the student profile of our university Chinese course (Kan & McCormick, 2014) as well as conventional UK universities (HESA, 2011), where more men study Chinese in comparison with European languages. With regards to age, most participants were older than the traditional university-age students who had taken part in previously reported research; however, the age distribution percentages were very similar to those of the students taking the course at our institution, who are also older adult learners.

Whereas most students taking the course live in the UK (as expected from a UK institution), we found marked differences between those app users who were registered on a course and those who were not. As expected, most respondents who are registered on a formal course live in the UK because the OU is a UK-based university and therefore the app is more widely promoted in the UK than throughout the rest of the world. Informal learners were much more highly represented in the US, Canada and China. This is not surprising as it would be unlikely for respondents who live in those countries to register with a UK university, whereas beginner Chinese learners who live elsewhere, China in particular, would be likely to want to support their learning with additional resources such as a mobile app.

The majority of respondents (89.7%) described their current level of Chinese language as beginner (35.0% as “absolute beginner” and 54.7% as “beginner”) which is the audience the app is targeted at. A further 8.8% selected “intermediate” and two people selected a higher level, one (0.7%) “upper intermediate” and another one “advanced”.

**What Is Their Motivation for Using the App?**

The survey asked participants why they were learning Chinese. The question allowed more than one answer and 69.3% responded that they were learning the language because of personal interest, as is common with many
language learners (Coleman, 2009). In addition, 46.7% did it because it was an intellectual challenge, and a further 33.6% indicated that it was relevant to their profession. Such a high proportion was expected given that China is a nation that has recently experienced enormous economic growth and now attracts a higher volume of business than previously. Heritage learners (9.5%) stated that they had family ties with China, and 8.8% were learning Chinese because it was relevant to their current studies. These are usually highly motivated learners who actively seek additional resources such as mobile apps to support their learning.

All respondents indicated that they used the app for learning rather than teaching. A total of 25.9% of respondents were formal learners registered on a Chinese course (either from the OU that the app supports or elsewhere), so the app was mostly used to learn Chinese informally: either as the main source of learning (as was the case for nearly 17% of the participants) or as support to other informal sources of learning (likely to be books or other online resources such as websites, podcasts and / or other apps). This confirms Khaddage and Lattemann’s finding (2013) that a vast majority of students who owned smartphones use apps as additional learning resources. Among the users who were not registered on a Chinese course, the proportion of respondents who claimed that they were trying to learn informally was much higher (80.5%) than among those who were registered on a course (37.5%). Similarly, the difference between those who considered the app their main source of learning was much higher (24.4%) among those not registered than the respondents who were registered on a course (3.7%).

As all the four interview participants were registered students of the OU Beginners’ Chinese course, they used the app as a revision tool to revise, reinforce and test the characters learned on the course. One participant
(Interviewee A) used the app mostly for recognising characters, saying it helped “to reinforce […] to revise the characters”. Another participant (Interviewee C) used the app in conjunction with the course materials. He said that he tried “to learn all the words and do everything in line with the study” (see 6.3 for how they use the app).

**How Do They Use the App?**

Of the iOS devices that the app runs on, 70.8% used an iPhone, 32.1% an iPad, 11.7% an iPod touch and 5.1% selected “other”. Some used more than one device.

The survey asked the participants the number of lessons in the app they had completed at the time they took the survey. Just under three quarters of the respondents had used the app for more than one lesson, meaning they must have purchased the upgraded version with 20 lessons (including the 62% who knew they had upgraded and some of those who were unsure about whether they had upgraded or not). This is a high percentage, but must be taken with caution as it makes sense that users who had upgraded would make more use of the app and perhaps be more willing to take part in a survey about it.

With regards to how long at a time users normally spend utilising the app, most respondents (72.8%) used the app for 15 minutes or less. Some 2.2% selected “less than 5 minutes”, 9.6% “about 5 minutes”, 36.0% “between 6 and 10 minutes”, 25.0% “around 15 minutes”, 17.6% “between 16 and 30 minutes” and 9.6% “over 30 minutes”. This is consistent with the design principles for our app.

The interview data shows that participants responded well to the bite-size approach to delivering content and the possibility of using the app during “dead time”. One interviewee (Interviewee A) commented that the app was “useful for filling in time”, whereas another (Interviewee B)
mentioned she made sure she took her iPod with her during commute time so that she could use the app to learn characters. A further participant (Interviewee C) found that the advantage of having the app available was “the speed that you can get access” to fill in 10 or 15 minutes of spare time, which otherwise may be wasted.

The interview data also shows that overall participants worked progressively lesson by lesson but at the same time took advantage of the app design to work on any section or character they wished to focus at a time. The design feature of being flexible and personalised within the framework of progressive learning was welcomed by all four participants. As Interviewee C commented that he “might just pick one [character], one of the ones I’ve done” sometimes, but overall he went lesson by lesson because “I want to keep doing it properly”. This is further supported by Interviewee B: “I think I just see what I fancy on the day and what I have been struggling with. If there is something that I know we have learnt but I can’t remember I will go back to that.” This further supports the findings in the literature on flexible design for distance language learning (Bates, 2005; Garrido, 2005). Garrido (2005) points out that in designing distance course “there had to be a high degree of flexibility built into the course to meet wide-ranging expectations” (2005, 180); whilst at the same time “distance learners need a teaching and learning framework that engenders a high level of motivation to help them stay on track” (2005, 184).

What Are Their Expectations and Impressions of Using the App?

To elicit data on user impressions of the app, the survey asked participants about their expectations and how these were met. There was a wide range of expectations about the app. Based on the features of the app, four categories were offered as choices 1-4. In addition, a further two choices (5 and 6) were added involving an unrealistic expectation to
become fluent in Chinese and having no expectations respectively. Respondents could tick all that applied. The results show that most respondents hoped to learn to write some characters, followed by learning to recognise some characters (see Table 14.2).

<table>
<thead>
<tr>
<th>“What expectations of the app did you have when you downloaded it?”</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would learn to write some Chinese characters</td>
<td>74.4%</td>
</tr>
<tr>
<td>I would learn to identify some Chinese sounds</td>
<td>46.3%</td>
</tr>
<tr>
<td>I would learn to recognise some Chinese characters</td>
<td>67.9%</td>
</tr>
<tr>
<td>I would learn to say a few Chinese words</td>
<td>41.8%</td>
</tr>
<tr>
<td>I would be fluent in Chinese</td>
<td>6.7%</td>
</tr>
<tr>
<td>I had no expectations</td>
<td>9.7%</td>
</tr>
</tbody>
</table>

It is interesting that a much lower percentage of respondents expected to learn to identify sounds (choice 2) or say words (choice 4). This could be linked to the app name and description, both of which refer to characters rather than sounds or pronunciation, or there may be an assumption that using apps for learning Chinese is more apt for reading and writing rather than aural skills. It was interesting to see that a very small number of respondents indicated that they expected to become fluent in Chinese by using an app with 20 lessons. On the one hand, this is clearly an unrealistic expectation—certainly in the case of this particular app, on the other hand, however, it suggests that some people may believe that studying a language with an app on their personal device can lead to fluency, which is something that would not have occurred five years ago.

The next question asked participants whether the app had met their expectations (see Table 14.3). These results vary for those respondents who were registered on a Chinese course and those who were not. These
differences between the two groups suggest that those not registered on a course had more realistic initial expectations of the app, as 53.8% found the app as they expected it to be. This seems logical for users who, as informal learners, are likely to utilise several apps and perhaps have more realistic expectations of what an app can do, which is consistent with the claim that learners often engage in meaningful language learning activities by using several apps (Lafford, 2011). Of the three respondents who selected “worse than expected”, one had selected “I would be fluent in Chinese” as his/her expectation.

<table>
<thead>
<tr>
<th>Table 14.3 Responses to the Question “Has the App Met Your Expectations?”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better than expected</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>Better than expected</td>
</tr>
<tr>
<td>As expected</td>
</tr>
<tr>
<td>Worse than expected</td>
</tr>
</tbody>
</table>

It is pleasing that 97.7% of respondents indicated that the app had either met or exceeded their expectations, as it is evidence that the app is fit for purpose. Again, this supports findings from previous studies in the literature that users have positive attitudes towards using language learning apps (Kim, 2013; Khaddage & Lattemann, 2013).

In the open comment question, participants were asked what else they would like from the app. Some 69 respondents answered the question. The most popular request was for more characters/content, with 25 responses. This was predictable. Among these, six specified they wanted content that was more challenging, including full sentences, a further six specified they wanted more content on tones, and three wanted more pronunciation practice. Four respondents requested more free content. Some 16
respondents suggested new features: the most popular request (from six different respondents) was the ability to test themselves on writing characters without having a model answer in front of them. Other features suggested included the ability to interact with other learners and an interface in a language other than English (two respondents each), a dictionary (two), being able to personalise the interface, and writing tests. Finally, four respondents would like detailed feedback on the quizzes. It is interesting that some of the suggestions for additional features, such as the ability to interact with others and detailed feedback, are consistent with features that had been highlighted in the literature as desirable from language learning apps. Some of the above suggestions have been addressed in the latest version of the app.

All four participants in the interview said they liked the app. Interviewee C said “I really like that app […] It’s the favourite one that I’ve found”. Depending on their own individual learning needs, they liked different functions of the app: some liked the stroke-by-stroke writing of characters most whilst others like the reading test/listening test or word search most. They also made some good suggestions for improvement such as adding audio button to each character in the Writing section so that the user can listen to the character before they practise the writing, which was implemented into the latest version of the app.

**Do They Think That Using the App Has Improved Their Learning?**

Participants were asked to rate the overall quality of the app (see Table 14.4). With over 90% of participants rating the app as either “good” or “very good”, it was clear that they had very positive feelings about learning with it.
Table 14.4  Responses to the Question: “Please Rate the Overall Quality of the
Chinese Characters First Steps App”

<table>
<thead>
<tr>
<th></th>
<th>Overall quality</th>
<th>Writing characters</th>
<th>Reading characters</th>
<th>Recognising words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very good</td>
<td>51.1%</td>
<td>42.5%</td>
<td>54.1%</td>
<td>50.4%</td>
</tr>
<tr>
<td>Good</td>
<td>39.3%</td>
<td>29.9%</td>
<td>33.8%</td>
<td>35.6%</td>
</tr>
<tr>
<td>OK</td>
<td>6.7%</td>
<td>23.1%</td>
<td>11.3%</td>
<td>11.9%</td>
</tr>
<tr>
<td>Not so good</td>
<td>3.0%</td>
<td>4.5%</td>
<td>0.8%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Terrible</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Not all features were rated equally: whereas the quality of the app for learning to recognise Chinese characters and read Chinese words received very high ratings (over 86% rated it “good” or “very good” for recognising characters and nearly 88% gave similar ratings for reading Chinese words - formed by several characters), the quality of learning to write Chinese characters received a generally positive but lower satisfaction rate (72.4% rated it “good” or “very good”), possibly due to i) the frustration in drawing some complex characters on a small screen (as suggested by the interview data); and ii) the inherent difficulty of learning to write Chinese characters as opposed to just recognising them.

With respect to learning to write Chinese characters using the app, and whether this skill was transferable outside the app, participants were asked whether they thought that practising writing characters on screen helped them to write on paper as well. In total, 48.9% selected “a lot”, 31.9% “a little”, and 8.9% “not much”. Nobody selected “not at all” and 10.4% had not tried to write the characters on paper after practising with the app. This suggests that participants believe that repeated writing of characters, whether using one’s fingers on a screen or with pens on paper, facilitates the production of characters.
Finally, the participants were asked whether using the app had improved their knowledge of Chinese. No gradation of improvement was offered as options other than “yes”, which 96.3% selected, or “no”, selected by 3.7%. The perceived benefits of learning characters with the app are further supported by the interview data, where all the four participants who had used the app found the app a useful learning and revision tool. Interviewee A reported that the app enabled him “to try and learn more of the characters more thoroughly”. For Interviewee B, she found the practice of stroke order useful “because I never remember which order the strokes go in. And also I like the reading practice because characters are difficult to remember.” Interviewee D mentioned that using the app is “just a different way of reviewing characters and sounds”. As stated earlier, over 80% of participants felt that practising writing characters on the app helped them, to some extent, to write characters on paper as well. The above findings are consistent with the literature that learners reported that learning with mobile devices helped the recognition and writing of Chinese characters (Huo, 2013; Chung 2013).

Conclusion, Limitations and Further Research

Conclusion

The results from this study have found that the app we created has been used in the way it was designed for and led to very positive impressions of learning with it. The app helps character recognition and writing as it combines the stroke-by-stroke writing of characters, sound, pinyin and English translation on one screen to reinforce the learning; it allows users to use the app when they have a small amount of time or when they are on the move; and by giving them the freedom as well as the structure to suit their own learning needs, they are more likely to engage with the learning.
The study has also provided one of the first profiles of users of apps for language learning and their usage habits. It is very positive that such a varied pool of users utilise the app, as it confirms the appeal of apps for language learning regardless of gender or age. This research is necessary in the field of language learning apps to understand the way learners engage with them. The feedback and data collected from users for this study will be useful to inform the design of further developments.

Sufficient evidence in the data suggests that the design principles used in the development of the app have been useful to learners. During the development of the app, one of the key challenges was to bridge the gap between the language teachers’ limited technical knowledge and the app developers’ limited knowledge of both pedagogy and the Chinese language. It was crucial to communicate clearly and frequently on the pedagogy and learning design. The language experts needed to be ready to embrace new ideas but at the same time strike the right balance between technical affordances and pedagogy, for example by not spending an unnecessary amount of time trying to achieve some technical novelty at the expense of the learning outcomes. Both sides had to be prepared to change the specification of the app as development went on because some ideas did not work out as expected, whilst other ideas came up during the development process. For example, the word search activity was not in the initial design of the app, but was borne during the process as we tried to combine the principle of creating an element of fun with progressive learning, which turned out to be a feature very much welcomed by users. Finally, whereas the academics were accustomed to taking longer periods of time to prepare resources, app developers worked at a fast pace. Because of this, it became important to respond quickly to queries and suggestions and adapt to their availability to work on the app design. These are valuable
lessons to future designers of language learning apps, regardless of whether they are commercial or educational content providers.

**Limitations**

The study asked participants to indicate what their impressions of learning with the app were. Whilst this is helpful to understand how users feel about using the app as a learning tool, it does not provide any evidence of actual learning. In principle, the data from participants who were taking the course could have been correlated with their performance on the course assessment. A number of obstacles impeded this. Firstly, some were using other sources of learning in addition to the app, so the issue of whether the learning was due to app use or not would have been unclear. Secondly, the confidentiality of users might be compromised, as it would be necessary to correlate the survey responses with their attainment. Thirdly, being distance learners, there would be no way of ascertaining that the person who took the survey was the same person taking the assessment. Finally, it was important to keep the survey confidential to avoid any perception of bias or participants thinking that taking part or “good” or “bad” responses may influence their grades. In addition, assessment scores would not have provided evidence of learning, as it is assumed that a large proportion of their learning is due to completing the course and not just based on the app.

It was also impossible to gather analytics from the app itself on number of attempts or levels achieved and link it to the data from the survey. This is something that can be easily integrated into app design now but was not available at the time of the app development.

**Further Research**

Work continues to improve the app: we have recently produced an Android version and updated the iOS version (released on the iTunes Store in August 2014) to meet new OS system requirements and to include usage
analytics. The data gathered from the analytics, user feedback and suggestions collected for this study will inform the design of further developments. We will continue to undertake research based on later versions of the app.

We believe that further research is necessary in the field of apps for language learning, and apps for Chinese language learning in particular. More information is required to understand the way learners engage with apps for language learning, in particular when a proportion of these use apps as their only source of learning resources. Such research would benefit from screen recordings and eye-tracking technology as well as observation of behaviours and/or learning analytics of app activity (such as number of attempts or levels achieved, as discussed above). Although the participants in this survey reported very positive impressions of learning, evidence of actual learning is needed. This could involve further research using control groups and pre- and post-learning activity tests.

Acknowledgements

We would like to thank Paul Hogan, Kevin Quick and Jo Fallows for their work on the development of the original version of the app, and Jay Bailey, Katja Bülow and Alessandro Taffetani for their work on the subsequent versions.

Appendix 1: Online Survey Questions

*Chinese Characters First Steps* App Survey

This survey aims to find out more about the people who download The Open University “Chinese Characters First Steps” app and how they use it. Your answers will be completely anonymous. You will not be identifiable and we will not ask you for any contact information. It should take less than
five minutes to complete.

By completing this survey, you give permission for the data collected to be used in an anonymous form in any written reports, presentations and published papers relating to this study for research purposes.

1. Why are you learning Chinese? (Tick all that apply)
   - Personal interest
   - Intellectual challenge
   - I have family ties with China
   - Relevant to my profession
   - Relevant to my current studies

2. How would you describe your overall level in Chinese at the moment?
   - Absolute beginner
   - Beginner
   - Intermediate
   - Upper intermediate
   - Advanced
   - Near native
   - Native

3. Are you currently registered or have you ever taken the L197 Beginners’ Chinese course from The Open University?
   - Yes
   - No

4. Are you currently registered on a Chinese course (not at the OU)?
   - Yes (go to question 6)
   - No

5. Are you trying to learn Chinese “informally” (i.e., by yourself without signing up to a course)?
   - Yes
PART II: Practical Applications

- No

6. On which of the following devices do you use the *Chinese Characters First Steps* app? (Tick all that apply)
   - An iPod touch
   - An iPhone
   - An iPad
   - Other

7. Do you use the *Chinese Characters First Steps* App for…?
   - Learning (I want to learn Chinese)
   - Teaching (I teach students or family members) [go to question 15]

8. Do you regard the *Chinese Characters First Steps* app as…?
   - Additional to other learning I do
   - Main source of learning

9. Have you upgraded your app to unlock all the content?
   - Yes (go to question 11)
   - No
   - Don’t know

10. Why haven’t you upgraded your app to unlock all the content?
    - Too expensive
    - Not worth it
    - I want to know more about the content before I pay for it
    - I never pay for apps
    - I wasn’t sure how much I’d have to pay if I tried to upgrade
    - I tried but had technical problems doing so
    - I was not aware that I could upgrade the app

11. How many of the lessons in the app have you attempted?
    - 1
    - 2-5
12. How many of the lessons in the app have you completed?
   - 1
   - 2-5
   - 6-10
   - 11-15
   - 16-20

13. How long do you normally spend using the app at a time?
   - Less than 5 minutes
   - About 5 minutes
   - Between 6 and 10 minutes
   - Around 15 minutes
   - Between 16 and 30 minutes
   - Over 30 minutes

14. What expectations of the app did you have when you downloaded it? (Tick all that apply)
   - I would learn to write some Chinese characters
   - I would learn to identify some Chinese sounds
   - I would learn to recognise some Chinese characters
   - I would learn to say a few Chinese words
   - I would be fluent in Chinese
   - I had no expectations

15. Has the app met your expectations?
   - Better than expected
   - As expected
   - Worse than expected
16. Please rate the overall quality of the *Chinese Characters First Steps* app.
   - Very good
   - Good
   - OK
   - Not so good
   - Terrible

17. Do you think that practising writing the characters on screen helps to learn to write them on paper as well?
   - A lot
   - A little
   - Not much
   - Not at all
   - I haven’t tried

18. Please rate the quality of the *Chinese Characters First Steps* app for learning to write Chinese characters
   - Very good
   - Good
   - OK
   - Not so good
   - Terrible

19. Please rate the quality of the Chinese Characters First Steps app for learning to read Chinese characters
   - Very good
   - Good
   - OK
   - Not so good
   - Terrible

20. Please rate the quality of the *Chinese Characters First Steps* app for
learning to recognise Chinese words

- Very good
- Good
- OK
- Not so good
- Terrible

21. Has using the *Chinese Characters First Steps* app improved your knowledge of Chinese?
   - Yes
   - No

22. What else would you like to see available in the app?

23. How old are you?
   - Under 25
   - 25-29
   - 30-39
   - 40-49
   - 50-59
   - 60-64
   - Over 65

24. Are you…?
   - Male
   - Female

25. Where do you live?
   - UK
   - Other European Union country
   - Other European country (non-EU)
   - North America (US, Canada)
   - Central / South America
• Africa
• Middle East
• China
• Japan
• Another Asian country
• Australia / New Zealand
• Other

Your participation will help us to improve our understanding of app design and what users want. Many thanks for taking part.

Appendix 2: Sample Semi-structured Interview Questions

General questions about using mobile devices for language learning
1. What kind of mobile devices do you use for language learning?
2. Do you switch between devices? What kind of language activities do you use the iPhone for, for example?
3. Because of the mobile devices you have now, do you find yourself spending more or less time on language learning?

Questions about the “Chinese Character First Steps” app
1. Why do you use this app?
2. Which section of the app do you find most useful (i.e., Writing, Reading Test, Listening Test and Word search)?
3. Where and when do you use the app?
4. There are 20 lessons on the app. Do you use them in the order presented or randomly?
5. Blue-sky thinking-any features you would like to see in the app which are currently not there?

References


and social meaning making in a Chinese idiom mobile learning environment. 

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PART III:
Research from Case Studies
Chapter 15: From Conception to Implementation and Beyond: A Case Study of a Large-scale iPad Adoption in a Multilingual Society

Christina Gitsaki

Zayed University, United Arab Emirates

Abstract

While studies in mobile-assisted language learning have provided mixed results about the effectiveness of mobile devices in the second language classroom, the use of iPads in second language acquisition is an area relatively unexplored by educational researchers and one that needs systematic investigation given the large-scale adoptions of iPads around the world. This chapter presents an overview of one such project in the Middle East. The project scope and objectives are first outlined followed by evidence from a formal evaluation study designed to monitor and describe the implementation of the project. Lessons learned from the project are summarized in a set of principles suitable for planning and implementing institutional projects such as the one described here.

Keywords: MALL, program evaluation, formative evaluation, English as a second language, iPads in ESL, implementation study

Introduction

Over the past decade and a half the field of mobile-assisted language
learning has seen an unprecedented interest from practitioners and researchers alike. Prior to 2010, the most popular devices in MALL were mobile phones and PDAs (Wu et al., 2012). The advent of mobile tablets (e.g., iPads) in 2010 has resulted in large-scale adoptions of mobile technology in educational institutions mainly driven by the mobility, portability, and ease of use of the devices coupled with the availability of a plethora of apps promising to make learning ubiquitous and fun.

Research in the use of mobile technology in second language learning has yielded mixed results so far (Gitsaki & Robby, 2014; for an extensive literature review see Chapter 1 by Burston). With regards to the use of iPads in the language learning classroom and specifically in English as a second language (ESL), published research is sparse. Where research is available, it usually involves small groups of students and results are not easy to generalize (e.g., Brown, Castellano, Hughes, & Worth, 2012). Need exists for evidence from large-scale studies about the use of mobile tablets like iPads for second language teaching and learning and their effectiveness (see Gitsaki & Robby, 2014; Meurant, 2010; White & Gillard, 2011). This chapter presents evidence from such a large-scale study on the use of the iPad in an ESL program.

**Context**

The study described in this chapter took place in a Gulf Arab country. The following sections describe the context of the study.

**Second Language Education in the UAE**

The United Arab Emirates (UAE) present a unique context for second language education. The UAE, home to over 150 nationalities\(^1\), is a truly

\(^1\) See www.dubaifaqs.com
multicultural society. Native Emiratis comprise about 20% of the total population. The official language of the country is Arabic and it is the main language of instruction in government schools. Given the multinational and plurilingual nature of the UAE society, English is often the common language that expatriates and locals use to interact and communicate. English is taught as a foreign language in public schools. To adequately prepare Emiratis for work and life in such a multilingual and multicultural environment, once Emirati students complete their high school education, they can attend one of three federal higher education institutions, where the medium of instruction is English. Grade 12 high school students take the Common Educational Proficiency Assessment (CEPA) which is written and administered by the Ministry of Higher Education and Scientific Research (MoHESR) and if they score 180 points and above they can enter directly into the undergraduate programs. About 20% of Emirati students (Gjovig & Lange, 2013) enter the federally funded undergraduate programs directly after high school. Students, who fail to score 180 in CEPA, can attend a preparatory course for up to five semesters. This is an intensive English language course that aims to prepare students’ academic English language skills for undergraduate study. To exit the preparatory course and enter the undergraduate program of their choice, students have to take the International English Language Testing System (IELTS) exam and achieve an overall Band 5 as a minimum or retake the CEPA exam and score 180 or above. The IELTS is an international standardized test of academic English proficiency independently administered by IDP Education. Universities around the world use IELTS scores as benchmarks for non-English speaking student entry into their undergraduate programs delivered through the medium of English. In the last decade, the IELTS has gained prominence in high stakes decisions in both government-funded and private higher
education institutions in the UAE (Garinger & Schoepp, 2013).

The iPad Initiative

In May 2012, MoHESR decreed that all students and teachers at the preparatory courses in the three government-funded higher education institutions would be equipped with iPads and instruction would be delivered through the iPad starting with the 2012–2013 Academic Year. The iPad Initiative aimed to promote individualized student learning, increase student motivation and engagement in authentic learning opportunities, and help model 21st century learning by providing opportunities for integrating mobile technology in and out of the classroom (Cochran, Ben Halim, Khalil, & Gilroy, 2012). Teachers involved in the initiative were expected to collaborate with colleagues within and across the three federal institutions, adopt e-books as learning materials and create resources that would be shared across institutions using repositories of learning objects, and introduce progressive classroom pedagogies such as challenge-based learning (Cochran et al., 2012).

The initiative was bold and it was expected to “disrupt traditional notions of teaching and learning and align these with the 21st century young learners” (Cochran et al., 2012, p. 2). By September 2012, over 14,000 iPads were deployed to students and teachers across the three institutions. The project was overseen by an inter-institutional Steering Committee and four working groups in the areas of pedagogy, infrastructure, content development and communication (Cochran et al., 2012). The Steering Committee was responsible for overseeing the efforts of the working groups and how these contributed to the project progress and the overall implementation and success of the initiative. The Pedagogy Working Group was tasked with ensuring that instructional approaches across the three institutions complemented the mobile devices used. Part of their charge was
to select teaching approaches appropriate for mobile teaching and learning and train faculty to use these in class. The Content Team was responsible for selecting e-books and apps that could be used by teachers and students. The Infrastructure Team ensured that institutions were adequately equipped with the necessary technology infrastructure to support the use of the iPads in the classroom. During the summer break prior to the start of the academic year, the team coordinated a number of upgrades to wireless networks, servers, and classroom hardware required to adequately prepare the institutions for mobile learning. Finally, the Communications Group launched a website to facilitate communication about the project within and across institutions. The iPads. ae website was touted as “the one-stop shop for sharing learning tools” (Cochran et al., 2012, p. 5) and included among others, frequently asked questions, information and reviews about apps, links to apps and e-books, project documentation, and press releases.

The long-term plan of the iPad initiative was that the use of the iPads in the classroom would “give new life to curriculum” (Cochran et al., 2012, p. 4). Within 18 months from the start of the project, it was anticipated that textbooks would be “transformed into multi-media portals through which dynamic visual and audio materials will enhance the teaching and learning process” (Cochran et al., 2012, p. 4). Global players such as Pearson and Apple were expected to enter into partnership with the federal institutions to act as learning-support organisations that would help redesign the whole educational process through the provision of authoring tools and Content Delivering Systems (CDS). For example, Pearson would roll out its Learning Management System (OpenClass) in the UAE; Apple would enable iTunesU. Teachers were expected to author curriculum materials in the form of e-learning objects (eLO), which would be stored in a web-accessible repository and openly shared with colleagues across the three institutions. eLOs would not just deliver content but they would also
“integrate gaming principles, which would be transparent to the learning, adhering to best practice in gaming and learning theories” (Cochran et al., 2012, p. 7). Assessment was also expected to be transformed using sophisticated technology and analytical learning tools that would enable institutions to “capture information about student learning in real time” (Cochran et al., 2012, p. 4) and educators to better serve the needs of Emirati students by modifying their classroom experiences based on ongoing information about student learning. It was anticipated that information from analytics data would be aggregated into useful student progress reports enabling the institutions to deliver individualized student learning and increase student attainment. The architects of the iPad Initiative saw the potential of the project to transform every aspect of the educational system in the UAE including the K-12 sector.

At the planning stage of the iPad initiative, several external consultants were invited to provide input and feedback on the implementation plan. Between May and June 2012, Apple Distinguished Educators visited the institutions and provided much needed professional development (PD) sessions to teachers on how to use the iPads in the classroom. There were also a series of smaller institution-based PD events, where teachers would provide short demos of apps that they had found on the AppleStore and thought might be useful for teaching.

The following sections describe an applied research project designed to monitor and evaluate the implementation of the iPad initiative in one of the federal institutions.

The Study

Rationale

Formative evaluation is a useful type of applied research for the ongoing monitoring and development of an educational intervention or program to
enhance quality and effectiveness (Weston, 2004). During all phases of
the implementation of an educational program, applied research is necessary
so that (a) an accurate description is produced of the program context and
setting, as well key components of the program; (b) correlations can be
identified between program processes and outcomes; (c) knowledge can be
obtained about best practices and what aspect of the program is effective;
and (d) program changes can be made to support improvements and
enhance effectiveness (Lipsey, 2007; Schwandt, 2007). Formative
evaluation, therefore, can support important planning, understanding effec-
tiveness, and determining what types of support and modifications can
enhance impact and student learning.

An effective evaluation of the iPad Initiative should describe the details
of the implementation and make explicit the specific use of the iPad in the
teaching and learning context. Reporting on project outcomes needs to be
complemented with information as to “what worked and for whom”, and
include identifying strengths and weaknesses, as well as modifications to
support further improvement as necessary. Clearly, an accurate
interpretation of the results of the iPad adoption and use requires
understanding of the details of the implementation (Chatterji, 2007; Datta,
2007; Isaac & Michael, 1997; King, Morris, & Fitzgibbon, 1987; Lipsey,
2007; Schwandt, 2007).

Carrying out an applied research project on the iPad Initiative poses a
great challenge as there are almost no peer-reviewed studies in the literature
that: (1) report on the use of the iPad for English language acquisition and
skill development; (2) clarify the learning functions and changes in
learning from the level and type of use of the iPad; and/or (3) determine
the effectiveness of the iPad relative to other technologies, models of
educational delivery occurring in the classroom, or supplemental educational
supports occurring outside of class or at home. The few iPad studies available to date only focus on student attitudes and perceptions rather than the acquisition of knowledge and skills (Bansavich & Yoshioka, 2011; Brand, Forder, Hives, Hrivnak, Kenworthy, Keyzer, Kinash, Rees, Stirling, Tom, Watt, 2010; Cavus & Uzunboylu, 2009; Chao & Chen, 2009; Johnson, Smith, Willis, Levine, & Haywood, 2011; Jones, Issroff, & Scanlon, 2007; Liaw, Hatala, & Huang, 2010; McClanahan, Williams, Kennedy, & Tate, 2012; Maurizio, & Petocz, 2011; Meurant, 2010; Murphy, 2011; Murray & Olcese, 2011; Rossing, Miller, Cecil, & Stamper, 2012; Wang, Wiesemes, & Gibbons, 2012; White & Gillard, 2011; Winters, 2007).

In this chapter, we report on an applied research project designed to evaluate the UAE iPad Initiative at one of the federal institutions where it was implemented. At the specific institution there were over 6,200 students and 360 teachers involved in the initiative so conducting a longitudinal study was important in order to support faculty on an ongoing basis, enhance the development of well-organized and structured lessons, promote effective instructional strategies, and ensure the efficient access and use of content-relevant apps and interactive materials aligned with curricular learning objectives (Armstrong, 2011; de Winter, Winterbottom, & Wilson, 2010).

**Methodology**

The study utilised a time-series design and aimed to examine changes during the first 18 months of the project. This formative research aimed to monitor and support the implementation and achievement of the project objectives (Worthen, Sanders, & Fitzpatrick, 1997). The research used mixed methods (qualitative and quantitative data) to help triangulate and
compare results to accurately determine the iPad implementation and its impact on student learning and teacher pedagogy (Bledsoe & Graham, 2005; McConney, Rudd, & Ayres, 2002). Data were collected from faculty and students attending the preparatory course using a teacher survey, focus group discussions with teachers, a student survey, lesson observations, course grades, attendance records, and IELTS results (for a detailed plan of the project see Gitsaki, Robby, Priest, Hamdan, & Ben-Chabane, 2013). This applied research was to a large extent exploratory as it was designed to gain much needed insights and to develop new hypotheses for the impact of the iPad on classroom pedagogy and students’ English language development.

The research primarily used descriptive and inferential procedures. Thus, it described participants, activities, processes, reported on attitudes and perceptions, utilised tables, graphs and chi-square and phi statistics to determine if there are any statistically significant changes in teacher perceptions and ratings for use of the iPad in teaching and for impact of the iPad on student academic skills and English language development.

The project evaluation was inferential and attempted to utilize process data and impact data to determine any meaningful cause and effect relationships. Step-wise regression and ANOVA procedures were used to identify evidence of treatment effect for students (Cook & Campbell, 1979; Isaac & Michael, 1997). With applied research in the form of process/impact studies, it is important to be reminded of the need to utilise rigorous evidence standards with an objective approach that tests the null hypothesis. Assuming causation is difficult with weak designs because of inability to control extraneous variables and to establish a causal link, which requires meeting certain logical and evidence conditions (Sechrest, Perrin, & Bunker, 1990). Part of the methodology of this project was informed by a
logic model (Honeycut & Kegler, 2010) and tried to compare results against standards when a cause-effect relationship was found.

In this chapter, we report findings from three data collections in the first 18 months of the iPad Initiative. Due to the size limitations and the focus of this chapter only data pertaining to the teachers involved in the study is reported and discussed here.

**Teacher Data**

A Teacher Survey was designed to be administered at the end of each of the first three semesters of the iPad implementation to understand how it has been used in classrooms for ESL teaching and to identify any teacher concerns and need for information, training, and support. Survey results were also used to understand changes in teacher attitudes about use of the iPad and their feedback about the impact of the iPad on student skills and language acquisition.

The survey instrument was designed using the Concerns-Based Adoption Model (CBAM) as a framework. CBAM was originally designed in the late 1970s and early 1980s at the University of Texas Research and Development Center. It was developed to support and guide educational change (Hall & Hord, 2001). The CBAM comprises strategies for monitoring an educational innovation, identifying emerging needs, and providing support for the implementation of a project requiring significant change effort such as the iPad Initiative in the UAE. According to the CBAM, change involves developmental growth and it can be promoted with support, training, and communication to address concerns and questions. Educational innovations should be properly planned and supported in personal ways that will reduce trauma to individual experiences and increase the effectiveness of the innovation (Hord, Rutherford, Huling-Austin, & Hall, 1987). In this
study, the use of the CBAM framework was regarded appropriate because it puts focus on the needs of the teachers responsible for implementing the iPad initiative by analysing their concerns as well as their reactions and experiences in using the iPad as a medium of instruction. According to the CBAM framework, teacher concerns are defined as: motivations, perceptions, feelings, thoughts, and attitudes about an innovation (Hord et al., 1987). The framework suggests that teacher concerns are initially high at the personal level; then at some stage concerns are primarily on the task level; subsequently as the innovation matures, concerns shift to the impact level (see Table 15.1).

<table>
<thead>
<tr>
<th>Focus</th>
<th>Stages of concern</th>
<th>Expression of concern</th>
<th>Management strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELF</td>
<td>0 Awareness</td>
<td>I am not concerned about it.</td>
<td>Involve teachers in discussions &amp; decisions.</td>
</tr>
<tr>
<td></td>
<td>1 Informational</td>
<td>I would like to know more about the iPad.</td>
<td>Provide clear and accurate information.</td>
</tr>
<tr>
<td></td>
<td>2 Personal</td>
<td>How will using the iPad affect me?</td>
<td>Address personal concerns directly.</td>
</tr>
<tr>
<td>TASK</td>
<td>3 Management</td>
<td>I spend all my time preparing.</td>
<td>Answer &quot;how to&quot; questions and provide support.</td>
</tr>
<tr>
<td></td>
<td>4 Consequence</td>
<td>How is my use affecting students?</td>
<td>Share knowledge and provide positive feedback.</td>
</tr>
<tr>
<td>IMPACT</td>
<td>5 Collaboration</td>
<td>Concerned about relating what I am doing with others.</td>
<td>Promote collaborations and schedule opportunities.</td>
</tr>
<tr>
<td></td>
<td>6 Refocusing</td>
<td>I have ideas about what may work better.</td>
<td>Respect, encourage, and support teacher interest.</td>
</tr>
</tbody>
</table>

Table 15.1 CBAM: Stages of Concern

The Teacher Survey was administered online and it was confidential and anonymous. The first time the survey was administered was in
November 2012, and there were 232 respondents out of 273 English teachers. The follow-up survey was administered in June 2013 to 273 teachers and yielded 220 responses. The third and final administration of the survey was in January 2014 (18 months into the project). There were 180 responses out of a total of 269 teachers. In all three administrations, there was a very low margin of error (less than 2.8%) at the 95% confidence level. Therefore, all three survey results “moderate to strongly” represent the views of all teachers involved in the project. Following each survey administration, a number of focus group discussions were held with teachers. Each group discussion lasted about 60-90 minutes depending on the size of the group. In December 2012, there were a total of 132 teachers that participated in different focus groups. In June 2013, 109 teachers took part in the focus group discussions. Finally, in January 2014, there were 114 teachers who participated in the discussions.

Results and Discussion

The results of the analyses of the data collected from the teachers involved in the initiative are discussed below in light of the project expectations as these were outlined in the iPad Initiative framework and briefly described above.

Teacher Concerns

The use of the CBAM framework in the teacher survey allowed us to measure initial concerns about the initiative and subsequently monitor whether these concerns had reduced. It was expected that overtime, as the iPad initiative would mature, teachers’ concerns would gradually reduce, especially at the personal, informational, and task level. As we can see in Figure 15.1 below, teachers initially had high information, personal and
task concerns about the use of the iPad in the classroom. Teachers felt they needed more information about how to use the iPad for teaching English, how to engage students with the iPad, and what the institutional expectations were with regards to the use of iPad for teaching. After 18 months, teachers were still in need for more information in those domains. This indicates that, initially, the institution needed to provide more adequate information and clear guidelines as to the use of the iPad for teaching and learning. Moreover, the support provided to the teachers throughout the initial phases of project needed to be improved as the results indicate that teachers’ need for greater direction for use of the iPad for the intended purposes did not reduce overtime and in some cases it increased (see data for June 2013 in Figure 15.1).

![Teacher Survey: Information, Personal & Task Concerns](image)

**Figure 15.1 Teacher Survey: Information, Personal & Task Concerns**

High concerns were also expressed about the time that teachers spent dealing with technical problems in the classroom (see Figure 15.2 below) indicating a pressing need for the institution to provide more technical
support not only in terms of infrastructure but also in terms of technicians able to solve technical issues as these occurred in the classroom. During the focus group discussions at the start of the project, teachers reported a number of technical issues with access accounts, setting up iPads, uploading apps, file sharing and storage, support with AppleTV, functionality and connectivity problems. These issues persisted throughout the first 18 months of the project with teachers reporting similar issues at the other two data collection points. Teachers expressed their need for more technical support with a dedicated Information Technology (IT) – iPad person to help with day-to-day technical issues in the classroom and further support the use of Blackboard on iPads, writing and saving materials, and administering secure tests. While the institution had a dedicated IT department, according to the teachers, the majority of the support personnel were not familiar with the iPad environment at least at the start of the initiative. As a result, teachers who used the iPads on a daily basis had more knowledge on how to resolve issues. However, teachers felt that sorting out technical issues during class took away valuable time from teaching the curriculum.

One area of concern that showed significant drop overtime was about “having enough time to organize oneself for teaching with the iPad” (see Figure 15.2 below). Initially almost three quarters of the teachers were concerned about it, but in subsequent measures, that number dropped to half. Similarly, concerns about “managing all that the iPad initiative requires” improved significantly over the 18 months of the project. This indicates that overtime and through practice, teachers got better at managing their time in delivering their lessons with iPads and felt more confident about using the iPad for teaching. Still, concerns about how the use of the iPad
impacts student learning remained high throughout the 18 months of the project.

![Figure 15.2 Teacher Survey: Personal, Task & Impact Concerns]

*Statistically significant difference

High concerns were also expressed in the area of sharing and collaboration (see Figure 15.3 below). While the iPad Initiative made provisions for collaboration and sharing within and across the three institutions, in the first 18 months of the project there was no central repository for teachers to store and share their course resources. The iPad. ae website, while very useful at the start of the initiative, was abandoned after the first year of the project. Teachers were reporting that they were still in need of system-wide sharing of ideas, projects, resources, and ways to create and present lessons and materials; time to discuss approaches with colleagues with new apps and learning about effective practices; time to collaborate and try things and work out creative methods to solve persistent problems.
Chapter 15: From Conception to Implementation and Beyond...

Classroom Pedagogy and Student Learning

With regards to the impact of the iPad on teaching practice and student learning, we can see a significant improvement in teachers’ perceptions as to how the iPad helped them improve their teaching (see Figures 15.4 and 15.5). Initially about half or less of the teachers reported changes to their pedagogy as a result of using the iPads. Further into the project, two thirds of teachers and above saw an improvement of their teaching on account of using the iPad. In the focus group discussions, at the start of the project, the portability and mobility of the iPad were often mentioned by teachers as one of the advantages of teaching with iPads as learning tools, teaching materials, and student work were all in one place and easily accessible at any point. As the project progressed, more and more teachers were able to report that their teaching had improved as a result of using the iPad. This shows the professional growth that teachers underwent over the 18-month period. However, there is still much to be done in the area of classroom
pedagogy. At the start of the project, teachers reported that in order for them to use the iPad effectively they needed more time to plan their lessons, learn how to use the different apps, prepare instructional material, and experiment with different pedagogical approaches in order to find out how to better integrate the iPad in the English language classroom. While they had confidence in how to operate the different apps, they felt they needed on-going professional development by experts who could show them not only how to use the iPad for teaching but also how to use the iPads for teaching ESL and how to develop effective lesson materials and resources. After three semesters into the project, teachers were still reporting that they needed more hands-on workshops to share ideas that have been tried in the classroom; professional development sessions on how to best use specific apps in classroom activities; time for instruction on how to incorporate the iPad into the learning process; time to try new strategies and apps and to talk with other teachers.

![Figure 15.4 Teacher Survey: Impact on Teaching](1)

* Statistically significant difference
In terms of student learning, we can see teachers having very moderate perceptions as to the positive impact of the iPad on student motivation and language development (see Figures 15.6 and 15.7). It is also interesting to note that over time the number of teachers who reported student learning improvement as a result of the iPad decreased steadily. This shows that even after having used the iPad as the medium of instruction for 18 months, many teachers were still not convinced that it was the best tool for language teaching and learning. The only skill for which teachers confidently reported a positive improvement as a result of using the iPad was vocabulary (see Figure 15.7). It could be that the type of apps that were available to them, the game-like properties of vocabulary learning activities, and the practice drill type of vocabulary exercises were a good match for the affordances of the iPad.
Use of the iPad in English language learning has improved my students’…

Use of the iPad in English language learning has improved my students’…

**Figure 15.6 Teacher Survey: Perceived Impact on Students’ Learning**

* Statistically significant difference

**Figure 15.7 Teacher Survey: Perceived Impact on Students’ Language Learning**

* Statistically significant difference

**Teaching Resources**

Concerning teaching resources, the iPad Initiative anticipated that by the end of the first 18 months, students and teachers would have access to
multi-modal fully interactive digital resources that would transform the curriculum and the learning process. Instead, for the first year of the project, the English language teaching resources were digitized pdf copies of paper textbooks with very limited, if any, interactivity. Furthermore, a major challenge to teachers was a strictly paperless policy, which limited teachers to using only materials that could be accessed via the iPad. Despite the initial project plans, there were no analytics tools attached to any of the teaching and learning resources and despite the fact that courses were delivered through Blackboard, there was no regular reporting of progress and achievement based on analytics derived from student use of the resources either at the institutional or at the classroom level to enable individualized teaching and learning. While, teachers reported that they were able to find a number of helpful apps for English learning to use with their students (e.g., reading, grammar, speaking, vocabulary building, authentic sources, visual/game centered activities, videos, internet resources, etc.), due to budgetary constraints most of the apps were accessed in their free versions which offered limited features and interactivity. Teachers reported that there were fewer ambitious interactive tasks undertaken in class because of lack of access to apps specifically designed for ESL. A year into the project teachers reported that they needed more access to the following: content specific apps and apps appropriate for the students’ proficiency level and language learning skills (reading grammar, writing, listening, speaking), as well as apps specific to student needs; better interactive resources and e-books, a dictionary app, and iPad-ready materials to support the use of the iPad for teaching and learning; apps with good grammar content; apps with exercises and tests for student feedback; high quality paid apps and apps to enable students to view websites which have flash content.
Assessment

While classroom pedagogies and teaching resources seemed to change, assessment remained the same in terms of content. The assessment delivery method changed from paper or computer to iPad, but this came with a myriad of technical and security issues that had to be resolved overtime. Even after 18 months, some of the technical issues were persisting causing assessment to be done on paper from time to time.

Another issue was the discrepancy between the skills students were learning and practicing as part of the course and the skills they were assessed at the end of the course. For example, as part of the English course students had to prepare projects and presentations that comprised multi-modal and largely non-linear interactive texts and visuals. At the end of the course, students’ writing skills were tested in the IELTS by writing a traditional argumentative essay using pen and paper. This indicates that current practices for evaluating the impact of technology in language education need to be reconsidered, as they may not measure the full extent of the impact. Standardized test scores, such as the IELTS bands, say little about how technology impacts student learning and how to improve technology’s effectiveness. In a technology-rich education environment, formative evaluation can show us what technology applications work, under what conditions, and with which students. We need to find new ways to identify and measure the skills and knowledge that students gain while using mobile devices such as the iPad.

Conclusion

This chapter provided a review of an iPad adoption in the field of ESL. The planning process and implementation of the project were outlined and evidence from teacher data were used to provide an account of the enablers
and barriers in the successful implementation of the iPad project. Based on
the lessons learned from this longitudinal project, the following is a list of
principles in undertaking similar large-scale institution-wide projects:

- **Planning**: Allow enough time for planning the imple-
  mentation of the project. While long-term goals are
  important, clear and well-defined short-term goals and
  objectives are critical in the successful implementation
  of the project.

- **Goals**: Project goals should be developed in a collaborative
  manner with stakeholders so they are appropriate for the
  setting, culture, and student needs, as well as feasibly
  considering the available resources and human capital of
  an organisation.

- **Pilot**: Conducting a pilot study prior to the full-on rollout
  of the project will help prepare for any issues that may
  have not been originally anticipated.

- **Teaching Resources**: Access to proper teaching resources
  and apps that should be evaluated and selected ahead of
  time or if selected during the project with input from the
  project participants, they should be properly evaluated
  using rubrics created by the team. Such a process is
  critical to the success of the project. Technology by itself
  will not do much to help students learn. Access to
  resources specifically designed to meet the students’
  curricular needs is paramount to ensuring academic
  attainment. If the proper resources are not available for
  the device chosen, then teachers and students should have
at their disposal other tools and resources outside of the device.

- **Professional Development**: Initial, on-going and just-in-time professional development should be available to the teachers and it should address the specific needs of the teachers.

- **Technical Support & Infrastructure**: Without the proper infrastructure and continuous technical support, any efforts by teachers and students to utilise technology in the language learning classroom will be hampered. If issues persist and remain unresolved, then technology becomes unreliable and teachers will eventually abandon it.

- **Project Evaluation**: Along with the planning of the project, there should be a plan for monitoring the implementation and evaluating the outcomes. The evaluation must receive support within the organization, as the evaluation is critically important for facilitating program development, maximizing effectiveness, and ensuring that there is accountability and accurate data to drive evidence-based planning and decision-making. The evaluation process should be formative, i.e., not just to measure the success of the project but to also help decide what type of on-going supports are needed for the implementation and to further support the teachers and students involved in the project. Doing so helps to develop the program and to enhance the quality and effectiveness of the initiative. The use of multiple measures (process and impact variables) are critical as part of producing an accurate description of the
project implementation and to be able to correlate level of use and type of use with changes in objective and external assessment measures for determining effectiveness for improving student outcomes (e.g., motivation, engagement, attitudes, learning abilities, and English language acquisition).

While this is not an exhaustive list of MALL project design and implementation principles, they are a good start. A systematic and rigorous planning, implementation, monitoring, and evaluation process are critical to the effective implementation, integration, development, and best use of the iPad for second language acquisition. Formative evaluation with rigorous quasi-experimental design is important for yielding reliable evidence that can provide much needed information in the field of MALL as to what works, for what students, and under what circumstances. It is this kind of information that can help advance the literature and field of MALL and lead to further innovations in the field of ESL.

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Chapter 16: Mobile Technologies in Pre-service Language Teacher Training

Elżbieta Gajek

University of Warsaw, Poland

Abstract

The article presents a mobile technologies (MT) component in a pre-service language teacher academic course at University of Warsaw. The need for learner training and teacher training in this domain is investigated against a sociocultural background in Poland. Student teachers’ opinions on MALL differ in their perspectives as language learners and as future teachers. They favour the use of MT as learners but they are more critical of MT as teachers. They identified the advantages of MT from the learners’ perspective and disadvantages from the teachers’ perspective. The interviews reveal their observations and critical events they noticed while they used MT with their learners’. The results provide insights in the factors influencing teacher-training activities for the use of MT in language learning and teaching and the gap between learning and teaching outcomes. Although the students should belong to the “digital natives” generation because they are 23-24 years old, they neither possess the expected competencies nor do they want to verify their pre-existent opinions on what language learning should look like.

Keywords: mobile technologies, mobile learning, informal learning, formal learning, teacher training
Introduction

Both in-service and pre-service teachers need support on how to incorporate mobile technologies (MT) in teaching. Teacher training embraces technical aspects, pedagogical strategies of MT implementation in teaching, and affective factors to help trainees overcome pre-existent opinions. Based on the students’ understanding of what education is and the role of digital technology in it, when involved in academic education student teachers redefine their competencies and attitudes towards technology.

Teacher Training for the Use of MT in Language Teaching

The need for teacher training in CALL has been well established and researched since the beginning of the use of computers in language learning. Ahmad et al. (1985, p. 8) discuss the language teachers’ need to learn computer programming to prepare their own CALL software for their classes. If they do not want to do it, they would either buy off-the-shelf packages or apply authoring packages. Ahmad and colleagues (1985, p. 9) state that “[i]n order to make productive and creative use of CALL, the teacher must come to grips with the computer, and must understand the ways in which it can relate to language teaching, and to a particular class”. This general statement, 30 years later, also relates to the use of mobile technologies. Higgins emphasizes the affective aspect of pre-service teacher training for CALL:

Perhaps the most important product of pre-service training will be not great skill in handling the machines but simple demystification of computers, removing the element of fear. The skill will come with practice, but people who have never had a chance to experiment with computers in a protected
environment are often afraid to take the first step later (1988, p. 60).

With the next change in technology, which is the advent of online distance learning, teacher competencies were widely discussed, too. According to Salmon (2000, p. 40) an e-moderator needs to be confident, constructive, developmental, facilitating, knowledge sharing and creative. She describes a detailed characteristic for each of the five qualities including understanding of the online process, technical skills, online communication skills, content expertise, and personal characteristics (Salmon, 2000). Online distance learning opened new areas for collaboration (Harasim, 1990). At that time the research focused on teacher training for online learning environments (Ernest, Heiser, & Murphy, 2013; Guichon, 2009; Hampel & Stickler, 2005; Wang, Chen, & Levy, 2010), and the design and evaluation of the best ways of training online language teachers (Comas-Quinn, 2011, Ernest et al., 2012, Stickler et al., 2010). The use of multimodal audio-graphic online environments has also received specific attention (Hampel & Stickler, 2012). When the iPod was launched in 2007 and then smartphone in 2008, followed by the tablet (the iPad) in 2010, many pioneer language teachers started using them for teaching. Now, there appears to be a need of support for both in-service and pre-service teachers on how to incorporate MT in teaching.

TESOL Technology Standards for Language Teachers (Healey et al., 2011) set four goals, which may serve as signposts in preparing future teachers of languages for the use of MT in class:

Goal 1. Language teachers acquire and maintain foundational knowledge and skills in technology for professional purposes (p. 73).

Goal 2. Language teachers integrate pedagogical knowledge and skills with technology to enhance language teaching and learning (p. 91).
Goal 3. Language teachers apply technology in record keeping, feedback, and assessment (p. 105).

Goal 4. Language teachers use technology to improve communication, collaboration, and efficiency (p. 119).

Learner Training for the Use of MT for Learning

Warschauer and Healey (1998) and Bax (2013) claimed that technology facilitates effective language learning when it is normalised, which means practically invisible so that users are not focused on the tasks not technology. Now, it is possible to argue that technology is transparent, as it does not require special qualifications for being used, but it is still not invisible. All users, from a 16-month-old toddler to a senior, easily acquire basic operations; however, learners need to be encouraged to use MT for learning. Prensky’s (2001) idea of “digital natives”, which assumes that learners of a young age are computer literate and possess all competencies and skills to be able to learn effectively with and through technology that is available for them, has faded. Just as children have to be shown how to use any toy they get, language learners need induction. This leads to more focus on learner training for the use of technology including MT in language learning. Even digital natives are not able to use online tools proficiently and to their best advantage for the purpose of learning (Jeffrey et al., 2011, Thorne, 2003). Some research has pointed out the negative impact of technology on student learning (Conole, 2008, Ushioda, 2005). Technologies “can only be effective if they are in the hands of students who know what to do with them” (Figura & Jarvis 2007, p. 457) and that effective use of technologies requires learners to possess certain skills, strategies and attitudes (Hubbard, 2004). To benefit from MT learners need training focused on both selection of digital artifacts effective in their
learning context and MT-based learning strategies.

Sociocultural Background

Attitudes to MT are sociocultural phenomena. They depend on such factors as willingness to apply the latest technical achievements in one’s life as a result of interest in them.

Eurobarometer 314 (2010) shows the level of interest in new scientific discoveries and technological developments in various countries.

Figure 16.1  Interest and Confidence in New Scientific Developments and Technological Discoveries (Science and technology report; Eurobarometer 340, p. 10)

This chart illustrates grounds for the application of MT in the learning and teaching of languages. In the countries to the left of this chart the
atmosphere is more favourable (in Cyprus 92% of the population is interested) than in the countries to the right (in Bulgaria 58% of the population is interested).

The level of interest influences the number of mobile devices and readiness to use them for language learning (LL). There are also other factors such as economic, social, availability of infrastructure and connectivity, which have an impact on activities in class and outside it as well as on the LL strategies based on MT. Some users, who get a new mobile device, start searching for its potential for language learning and teaching; however, their willingness to explore it varies depending on the abovementioned factors.

In Poland, only 17% of the population is very interested and 48% is moderately interested in dealing with new scientific discoveries and technological developments in everyday life. The attitude is reflected in the research on teachers of languages. On the one hand, it is the grounds for decisions of whether to possess a device or not. Gajek asked 676 respondents (0.95% of the total number of language teachers in Poland) in 2013 about their use of hardware. They declared access to the following devices: computers (71.7%), laptops (86.5%), notebooks (21%), mobile devices (33.2%), and interactive whiteboards (57.9%). On average, every respondent had access to 2.3 devices. Respondents declared that they were able to support students in the use of MT in their own learning. The result was 1.53 (mean) calculated from the range negative 3 (I do not know how to do it) up to positive 3 (I know very well how to do it). 62% of the teachers marked answers 2 or 3, which means they are confident in this activity. Teachers declared they knew how to use MT in class, with a mean of 1.5 (range from -3 to 3 as above). 60.5% marked answers 2 and 3. The results show that two-thirds of the investigated teachers know the educational
potential of MT. They use dictionaries, non-commercial applications and games. They also know what complementary material is offered by the main publishers for the textbooks.

Among 50 students at Jagiellonian University in Cracow in 2014, 81% of students possessed a mobile device (Czerska-Andrzejewska, 2015). At the University of Warsaw, 78% of students (111 people) investigated at the beginning of 2014 possessed a mobile device (Gajek, 2015). Mykowska, Kostrzewa, and Orda (2014, p. 207) observed resistance to the use of MT for vocational purposes by trainers and trainees. Both groups did not want to use smartphones because it was difficult for them:

Some trainers appear not [to] believe that mobile technologies can be of a real use and of a great help in the teaching process. They do not see the point in using new technologies or they seem to be too resistive of spending some time in changing their old habits (Mykowska et al., 2014, p.207).

Thus, the sociocultural factors indicate the need to work on attitudes with pre-service teachers of languages in Poland. The chart above implies that in different countries people spent various amounts of time using their mobile devices. This is valid not only in European countries. In Canada, Palalas indicates that (N = 189)

Twenty-one percent of respondents reported spending more than three hours a day on their devices. Eighteen percent devoted between two and three hours to mobile tools, 22 percent, one to two hours, and a quarter of students, 30 to 60 minutes. Those that spent under 30 minutes using their devices formed the smallest group (14%) (2012, pp. 127-128).

What is more, Palalas’s students stated they used their mobile phones
while “travelling/commuting (82% of respondents) and walking to a destination (76%) because they primarily used their mobile devices. In addition, they tended to make use of their mobile device around the house (64%), during leisure time (62%), shopping (46%) and when working out (29%)” (Palalas, 2012, p.127).

Stockwell (2010) states that Japanese students (N = 50) work on language tasks at home and at the university.

### Table 16.1 Places Where Students Used MT for Language Activities (Stockwell, 2010, p.132)

<table>
<thead>
<tr>
<th>Location</th>
<th>PC</th>
<th>Mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>In transit</td>
<td>0.0%</td>
<td>15.4%</td>
</tr>
<tr>
<td>University</td>
<td>44.1%</td>
<td>25.5%</td>
</tr>
<tr>
<td>Home</td>
<td>52.5%</td>
<td>43.9%</td>
</tr>
<tr>
<td>Restaurant/Café</td>
<td>2.3%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Other</td>
<td>1.1%</td>
<td>4.9%</td>
</tr>
</tbody>
</table>

### Pedagogical Background

The programme of MT implementation into pre-service teacher education was based on the Vygotskian social constructivist approach (Wertsch, 1985). At the tertiary level, it provides grounds for students to build their own resources contrary to the usual acquisition of external knowledge, to develop their own strategies of scientific thinking, and to justify their opinions, as well as to develop critical thinking (Hessen, 1977).

Klus-Stańska (2010) enumerates constructivist-based concepts seen from the practical perspective:

- Start with student activity
- Stimulate cognitive conflict to encourage independent problem solving
PART III: Research from Case Studies

• Know your students’ schemata
• Teaching is more to identify what students think rather than guiding them to guess what the teacher thinks
• Learning is not acquisition of other people’s concepts, but it is negotiation of meaning and its relation to reality
• Students better remember cognitive procedures; how they get to the results rather than the results
• A substantial part of learning is subconscious, beyond the teacher’s and student’s control
• Mistakes and errors are natural in learning
• Planning learning and teaching is designing didactic opportunities without precise defining partial effects (pp. 313-314).

The aim was to embrace students’ informal experience as independent learners and incorporate them into an academic course.

Computational Thinking

MT users, as with earlier computer users, constantly need to develop computational thinking, which enables them to effectively solve problems with the use of computers. Whatever the design of the digital interface is, humans need to adapt their operational strategies as well as their cognitive strategies to be able to use the tools for their purposes. A human needs to be able to define a problem in a way that can be dealt with and managed with MT. This requires a certain level of understanding of what can be done with ICT and how can it be done. It also requires a reasonable estimation of MT limits. Dede (1995) notices the influence of medium-related objects on their users:

The telephone creates conversationalists; the book develops imaginers who can conjure a rich mental image from sparse symbols on a printed page.
Much of television programming induces passive observers. Today’s “couch potatoes”, vicariously living in the fantasy world of television, could become tomorrow’s “couch funguses”, immersed as protagonists in 3-D soap operas while the real world deteriorates. The most significant influence on the evolution of distance education will not be the technical development of more powerful devices, but the professional development of wise designers, educators, and learners. (para. 4)

ICT creates gamers, blog exhibitionists, forum debaters, and haters, among other identities. MT may create either addicts or learners on the go.

First of all, the users need to adapt to the physical and screen characteristics of the device as “there is a major tug of war between size and portability, and between size and legibility, as well as screen’s ability to display enough texts to meet the current needs of the writer” (Sussex 2012, p. 230). The responsiveness for shaping and change in formal institutional settings, such as school and university, is greater than in the later stages of life (Gardner, 2006). Thus, the paper focuses on the role of MT in pre-service language teacher training and learner training, as the student teachers are still learners of various languages.

Methodology

The aim of the study was to induce student teachers to use MT in their learning of languages and in their teaching practice, to identify their motivation or lack of it to use MT, and to identify their student and teacher perspectives.

Subjects

One hundred and eleven students in the MA programme participated in
the study. All of them were qualified teachers at the BA level, and pre-service teachers of two out of five languages: English, French, German, Spanish, and Russian.

Procedure

At the introductory stage, the students were presented with an overview of the domain: devices, exemplary applications, approaches, from the perspective of a language learner and teacher based on Kukulska-Hulme and Traxler (2005) and Demouy and Kukulska-Hulme (2010). They were introduced to teachers’ dilemmas, practical solutions and ethical issues in the Polish context (Gajek, 2013). The content covered the four goals of the TESOL standards. They learned about the operational systems iOS, Android and Windows Phone, which differentiate learning software available for each system. Then, they have to know such basics as downloadable applications and web apps. To fulfill the TESOL Standards they were given information about selected resources such as app platforms and websites available on mobile and standard devices, e.g., monolingual and multilingual dictionaries, audiobooks from Librivox, and mobile flashcards such as ANKI. For Content and Language Integrated Learning (CLIL)-wolfram; alpha and National Geographic apps and many applications for children. They were also presented with demo versions of Macmillan pronunciation and ivona speech-to-text converter. They practiced Socrative facilities for class management, giving feedback and record keeping. They became familiar with learning management apps, e.g., Quizlet and memrise. They were shown how to produce personalized visual materials by adding notes to photos taken outside school during individual or group trips. Built-in speech recognition systems and voice recording systems were presented for documenting and monitoring the oral production of their students. Even the
controversial Google Translate was critically introduced. On top of it, they learned about selected games or game-like activities available through MT in foreign languages. They were asked to share in groups their personal experience with the use of MT or in the case of lack of it, and reflect upon the reasons.

Following Vygotsky’s constructivist approach (know your students’ schemata), it was assumed that the majority of students possess mobile devices and have some basic operational skill. They were encouraged to reflect on their own use of MT for learning and the reasons supporting or hindering their activities. The students were put in a situation in which they had to develop innovative techniques of the use of MT in learning and teaching languages. This evokes a cognitive conflict, as their previously formed mental structures on what learning a language looked like conflicted the new knowledge. In other words, as they could not rely on their own experience of being taught a foreign language with MT, they had to solve the cognitive conflict by assimilating new materials, approaches and contexts of learning and teaching with MT. They were guided by the teacher to identify features of MT useful in language education; make them meaningful, put them into practice, reflect on them and critically evaluate their values with special emphasis on the adaptation of didactic techniques. This helped them to develop computational thinking as they, eventually, were able to create language-learning tasks adjusted to the specific functionalities of MT.

As future teachers, they needed to plan a task for language learners with the use of mobile devices in order to conceptualize a combination of their pedagogical knowledge with MT. As for collaboration, they might transfer concepts worked out in the lessons for the use of social networking in teaching with MT.

To summarize, they learned how to utilize MT as a tool for (1) access
to language resources, (2) creating own learning materials, (3) managing and monitoring their own learning, (4) managing teaching and integrating pedagogical knowledge with technology, and (5) communicating, collaborating and sharing. However, the main message emphasized in this course was the following: when they got to school in two years’ time or later, the technology may have changed radically, but MT needed to be considered as useful in language education. The ways MT would be implemented depends on many factors, including but not limited to organizational, financial, social, pedagogical, and technical ones.

Students were asked to fill in a questionnaire in order to identify their opinions on the use of MT as learners and their motivation to use MT as teachers. They identified advantages and disadvantages of the use of MT in learning languages. They also estimated and justified the probability of the use of MT in their teaching practice in the future at school.

Finally, they were asked to use MT in their own teaching practice, reflect on the procedures and results, and present them in class. During the presentations, they answered specific questions posed by the teacher or colleagues. They were interviewed on the details of the critical events they had happened to observe.

Results

Seventy-eight percent of the respondents have their own mobile devices. Sixty-four percent of them think that MT can be used in class from time to time, and fifty-eight percent agree that they can be used to encourage learners to work independently.

The students identified the following advantages of the use of MT in language learning (Gajek, 2015):

**Attraction and fun**: Students indicated that MT are user-friendly and
introduce novelty and fun into regular class activities, which enhances motivation and interest. Learners like playing with their phones and tablets, so they willingly use MT for language learning.

**Autonomy and individualization:** Learning with MT becomes more individual, personalized, and self-directed, as it is possible to learn without a teacher. Students who used MT for their own learning observed great effectiveness as the apps impose learning strategies and revisions, e.g., in *Quizlet* and *memrise*. They also noticed a higher level of concentration in learning. Immediate feedback facilitates learning. They emphasized the role of MT for phonetic tasks and developing listening comprehension. They wrote that MT are very good for motivated individuals who like useful entertainment.

**Easy access to content:** There is a great choice of foreign language apps, both native apps (which once downloaded do not require access to the internet) and web apps (which require constant access to the internet); hence, students perceived MT as providing access to cognitive tools that help develop interests, which motivates language learning. MT provide easy access to reference materials such as dictionaries and websites with cultural content. They mentioned the importance of situated, “on the go” learning, any time, and any place.

**Interactivity and audiovisual materials:** Students mentioned new ways of interactions, e.g., through *Socrative*, which engages all students. Audiovisual materials attract learners’ attention.

**Environment-friendly tool:** MT save paper.

In addition, the students pointed out a number of disadvantages of the use of MT in language learning and teaching in the following categories:

**Costs:** Mobile devices are still expensive. Schools do not equip learners with such technology. Thus, there is a risk of discrimination based on
economic status, which enhances digital divide. The cost for the school infrastructure is also high.

Technology: Unreliability of technology discourages students from its constant use. They are afraid of the dehumanization of teaching.

Learner factors: There are risks of addiction to MT, as many learners use them constantly. A teacher has to reduce, not increase, such risks. Learners are not as good at technology as is commonly assumed. They focus on the technology rather than on the language. They do not perceive learning with MT as serious, proper learning. MT are of little use for learners who like group work, competition and comparison with others. Handwriting skills may also be negatively affected.

Teacher factors: Teachers do not know how to use MT in teaching. They are not aware of what their learners are interested in and need. The teacher has to learn how to use hardware and software for pedagogical purposes. Teachers have to learn how to use mobile hardware and software for professional purposes. The teacher is at risk of loss of authority if he or she is not competent in the use of MT.

Students were asked to estimate the probability of their use of MT in their teaching practice. They were grouped into five categories as they presented a variety of voices, from the enthusiastic advocacy of the use of MT to resistance against them. 13. 51% of the respondents – the enthusiasts – declared a very high probability (100% -81% ) of the use of MT in their own teaching in the future. One third of the respondents (33. 33% ) – the supporters – declared a high probability (80% -61% ) of the use of MT. Nearly one third of them (29. 73% ) – the undecided – declared a medium probability (60% -41% ) of the use of MT. 10. 81% – moderate opponents – declared a low probability (40% -21% ) of the use MT. 12. 61% of the respondents – the determined opponents – declared a very low probability
(20% -0%) of the use of MT in the future as teachers of languages.

To justify their opinion the enthusiasts indicated their own positive experience in using MT. They pointed out the need of the school as an institution to keep up with the technological changes and students’ interests, as well as the teacher’s obligation to use any tools and materials available to enhance students’ learning. They opted for tablets for educational use rather than smartphones because of the screen size.

The supporters used MT in their private teaching practice or in private language schools where they worked if the learners had their own mobile devices. However, they were aware of the organizational impediments such as lack of mobile devices, and their high price. They declared the use of MT to vary teaching techniques, to encourage self-directed learning, and for enhancing cooperation in intercultural projects. Through the use of MT they expected to avoid the obsolescence of school in the learners’ eyes. They were aware of the growing impact of MT on everyday activities and they wanted to build their language teaching activities on the fact that learners use MT more and more frequently. However, they did not want to remove traditional methods, but to adapt them to the needs of the students and new conditions.

The undecided expected headmasters’ or parents’ opposition to the use of MT in schools. They opted for balance in methods. They declared they would use them in favourable conditions such as equal convenient access for all, and with support from school authorities and parents. Although they preferred traditional methods, they believed that in the future they would have to use MT. However, they declared they needed to develop their competencies in this domain because lack of them would hinder their professional development in the future. They were also sensitive to health risks, mental distractions, addictions and discrimination of learners with
lower economic status.

The *moderate opponents* favoured traditional materials, tools, and methods because they liked attractive, colourful textbooks. They were not used to learning with MT. They did not have or use MT by themselves. However, they declared they would use them from time to time on the condition that school would provide mobile devices to all learners to avoid discrimination. The teacher is not autonomous enough to use such innovations, as he or she has to obey standard requirements. However, they expected that in the future, MT in language class might be normal. They did not declare the need to develop learning and teaching skills to use MT efficiently in teaching.

The *determined opponents* were fond of printed materials and direct interactions between the teacher and students so they did not see any place for MT in teaching. For them, the use of MT in class was a waste of time. They were sad about the disappearance of traditional methods of teaching. They claimed that they had learned languages without mobile devices and computers so the others could also learn in this way. They perceived lessons with technology as chaotic. One person stated that her learners rejected her suggestions for the use of MT. Determined opponents thought that traditional methods are sufficient for them as future teachers. They observed that learners spend a lot of time with MT in their hands, thus the school has to encourage them to read printed books and to practice handwriting. To them, learners who use MT get lazy and do not put enough effort into learning. However, they will recommend MT to learners for individual work. Some students in this group wanted neither to be teachers nor to develop their technical competence.

At the next stage of the task completion, the students presented critical events they observed in their use of MT with learners and were interviewed
about their observations. Some students noticed that young learners (8-10 years old) with very short concentration spans could work longer on language activities with tablets. Young teenagers at the natural stage of negativism, including a negative attitude to all traditional language tasks, got involved in learning with the use of mobile games. They learnt vocabulary fast either to get to a higher level in the game or to finish it and get another application. One student observed that two teenage girls, informed about the intention to use of MT for language learning, shared information about an application they had tried to use in English. They were very motivated to learn the language that helped them to fully exploit the app. They also displayed confidence and respect for what the teacher offered, which helped to build a rapport supportive to language learning.

Another teacher, having realized that his student was a football fan, started the iTunes application *Kick the Ball*, and then built all his teaching tasks around it and other football fan pages. He not only noticed increased motivation in the learner, but also fast progress in the student’s linguistic competencies. Some of them working with young adult learners who had been bored with any typical traditional language tasks got involved in learning when the teacher introduced activities for their mobile device. An interesting suggestion was made by one female student who mentioned web packages for creating applications and prepared her own app for learning English in *Scratch*¹, bringing back the old discussion about whether language teachers should learn computer programming or not.

Having completed the task, some of them commented that they had been not aware of the potential of MT in teaching and learning languages, but they started perceiving their potential and employed them if they could.

¹ Software for coding
They identified areas of further teacher development and the need for following the changes in technology. The majority of them realized that, as teachers, they needed to be able to give examples of sound mobile resources and advise learners on how to use MT for independent learning.

Findings

Students rightly emphasized the need for balance in using digital tools and materials and paper textbooks, and searched for conditions supportive of the use of MT in language learning. As learners, they were focused on learning processes. Some of them either used or started to use MT; they had hands-on, positive learning experiences. They realized that their learning strategies were shaped by the applications. Others were not aware of the potential of MT, but felt encouraged by the course content to use them. In describing advantages of MT in language learning, they mentioned attractiveness, multisensory stimuli, variety of learning techniques, easy access to authentic materials, fun and learning by playing, encouraging autonomy and self-directed learning, learning on the go, and motivating learning strategies embedded in the applications. Thus, the learners’ perspective was positive.

As teachers, they were more critical. They emphasized sociocultural aspects rather than aspects strictly related to learning. Financial problems were the first mentioned. They would use MT if the school provided all learners with MT devices, otherwise children without access to MT might feel discriminated against. They required supportive conditions, which they perceived unlikely to happen: if the use of MT were required by the curriculum in the future, if they did not have other choices. They cared about traditional printed materials and were worried about the diminishing importance of handwriting as a skill. They expected headmasters, parents,
learners and older teachers’ resistance to the use of MT in schools. The respondents also mentioned teacher autonomy, as teachers know effective methods of teaching and should not be forced to use technology. They would only rarely use MT to add variety to lessons, and to encourage learners who have mobile devices to use them independently out of class. The resistance to technology hinders the need for developing digital competence and professional skills related to how to use MT.

However, as young teachers at the try-out stage of their professional development, they were able to introduce MT in their own teaching and identify effective use of MT and evaluate the learning outcomes, based on the task content as a start-up. In this way they developed their computational thinking.

Discussion

The results show that the technology is neither invisible nor normalised among pre-service teachers of languages in Poland. What is more, Prensky’s concept of the digital native does not apply to the generation when it comes to MT, since the students neither possess their own mobile devices nor have sufficient competences or even positive attitudes about the use of MT in their private and professional lives. The attitudes can be shaped to some extent by educational processes. To some extent, their attitudes also reflect, the opinions pre-existent in their society. The percentage of enthusiasts among the students is slightly lower than the people interested in the scientific discoveries and the use of technology in Polish society. The total number of supporters and the undecided exceeds the number of those moderately interested in scientific discoveries and the use of technology in the Polish society. The percentage of opponents is lower in the students’ sample than among the society, which is probably the generational effect.
The results also support Higgins’s (1988) idea that when working with pre-service teachers on the use of technology in teaching, the emphasis should be put on creating a learning environment in which the trainees can overcome fear and make initial steps to encourage further professional development, even though the technology may change. Surprisingly, the issue of language teachers’ programming skills revives with the growing computer literacy and computational thinking among the youth—at least in some of them. In the future, creating one’s own mobile learning applications may be as easy as using word, film or audio editors is now.

Conclusion

To conclude, pre-service teachers of languages are open to and positive about MT as learners. However, they are conservative, demanding and idealistic as teachers. They want to keep school as it is—how they experienced it as learners, with traditional materials, tools and processes, and traditional resistance to technology by parents and headmasters. They do not want to introduce innovations, not to mention a digital revolution. Thus, in the attempts to transfer successful teacher-training schemes to other circumstances, sociocultural factors need to be considered first.

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Global.


Chapter 17: M-learning for Literacy in Low Resource Environments — A Case Study in Liberia

Simon James

University of Bristol, UK

Abstract

Recovering from 14 years of civil conflict, the education sector in Liberia still needs significant improvement to meet the learning needs of school children and youth learners. Although substantial resources are being focused to address low literacy rates as well as education quality and access in general, the lack of learning materials available is a significant impediment. However, the proliferation of mobile phones provides opportunities to utilize mobile learning to deliver additional resources. The USAID Advancing Youth Project carried out an m-learning study to assess whether using SMS text messages could improve the literacy skills of learners enrolled in an Alternative Basic Education program and to gauge learner and facilitator response to learning through phones. A baseline assessment was conducted through in-person literacy testing and subsequently an endline assessment, consisting of phone-based interviews and literacy tests, was conducted following the closure of schools due to the Ebola crisis. Learner reaction to m-learning was overwhelmingly positive despite the extremely limited experience learners had using phones for text messages prior to the study. Learners were willing to copy the messages and write their answers in their copybooks, but lacked confidence in replying to text messages. The
class facilitators asserted that reading and writing skills had improved due to m-learning, although there was little observable improvement for the treatment group compared to the control group in the literacy assessment.

**Keywords:** SMS, youth, BYOD, mobile phones, literacy, low resource environments, phone literacy, Liberia, developing country, FrontlineSMS

**Introduction**

This chapter discusses the United States Agency for International Development (USAID) Advancing Youth Project in Liberia, which provides Alternative Basic Education (ABE) to youth aged 13-35 years. In addition to in-class instruction, the project is using mobile phones to provide supplementary literacy learning opportunities, sending Short Message Service (SMS) text messages to learners with content that supports the in-class literacy lessons. The chapter provides an overview of the USAID Advancing Youth Project within the context of Liberia’s current post-conflict status before looking at the utilization of mobile phones for literacy learning. It then describes the methodology used, the baseline and endline assessments (which had to be adapted due to the Ebola crisis) and the results of the study, before making recommendations for future use of m-learning.

**USAID Liberia’s Advancing Youth Project**

**Liberia’s Education Sector**

Liberia has now been at peace for over a decade, but 14 years of civil conflict, combined with pre-existing structural inequalities, has left the country facing a variety of serious challenges, such as an estimated 64% of the population living below the poverty line (WFP, 2015). There has been
significant progress across all sectors, including improved educational indicators; for example, between 1980 and 2013 mean years of schooling increased by 2.4 years and expected years of schooling increased by 4.1 years (UNDP, 2014). However, nearly a third of all students who are enrolled in school drop out in the first grade (LISGIS, 2013) and Liberia is still ranked 175 out of 187 countries on the Human Development Index with just 3.9 mean years of schooling and 8.5 expected years of schooling (UNDP, 2014).

The education system suffers from poor infrastructure, poorly trained teachers (QED, 2009) and inadequate management. Low schoolbook rates mean that students share materials (MoE, 2014) and the facilities are frequently inadequate, with children “often required to provide their own uniforms, books, pencils, paper, and even desks” (US DOS, 2011, p. 18).

In addition, although English is the national language of Liberia and used throughout the education system, the majority of learners speak one of the 16 indigenous languages (only 17% of the learners in the USAID Advancing Youth Project reported speaking English at home, according to (USAID Advancing Youth Project survey, unpublished). The use of what is effectively a foreign language as the medium of learning, combined with the lack of materials available in schools and in homes, provide significant impediments to learners of all ages who want to improve their reading and writing skills.

Within this context, there are poor educational outcomes for too many students. For example, the oral reading fluency is 22 words per minute for 3rd grade Liberian pupils, which contrasts with the USA where pupils who read less than 80 words per minute in grade 3 “would be considered at risk”
(Crouch & Korda, 2008, p. 2).

**USAID Advancing Youth Project Overview**

With the low levels of children’s literacy is it unsurprising that youth literacy is also low. Liberia is estimated to have a youth (15-24 years) literacy rate of below 50% compared to 70% for sub-Saharan Africa as a whole (CIA, 2014; UNESCO UIS, 2015).

Recognizing that disenchanted youth can be highly destabilizing to fragile countries, funding for youth-related issues, including education, training, and access to employment, is increasingly being prioritized. Stakeholders also hope to reap more immediate private and social returns compared to investing in education for children (Aker et al., 2010). In Liberia, USAID is working to improve the non-formal education system for youth who did not attend school due to the conflict or due to economic or social reasons through the USAID Advancing Youth Project, a 5-year project implemented by Education Development Center and the YMCA of Liberia.

Together with the MoE, and in collaboration with other educational stakeholders, a Technical Working Group developed and reviewed an Alternative Basic Education (ABE) curriculum. The curriculum consists of three levels, each scheduled to take one academic year, beginning at zero literacy and continuing through to grade 6 equivalency (MoE, 2011). Four core areas of literacy, numeracy, life skills and work readiness are covered, with the academic year consisting of 108 highly structured lessons in each of the areas. “Facilitators” (MoE teachers who provide the ABE instruction) receive manuals which provide detailed guidance on the various activities contained within each lesson.

**Justification for M-learning—Access to Relevant Materials**

There are many challenges to operating such a program, including
facilitator training, ensuring adequate lighting of classrooms, motivating learners to maintain regular attendance, and many more. However, the biggest challenge to beginning learners is the dearth of learning resources. Although the project provides learners with a Learner Workbook for each subject, as well as some supplementary materials, there are very few additional materials available at schools or at home. As such, learners generally have limited opportunities to practice reading. In a report for the UK’s Department for International Development, it was observed that poor literacy levels in developing countries are “strongly related to resource availability and use, including access to learning materials, [as well as] a match between school tasks and every day experiences” (Nag et al., 2014, p. 21). It is within this context that the m-learning study was implemented with the aim of providing supplementary material to promote opportunities for additional reading and writing practice in a format that would be interesting to learners.

Mobile Phones to Support Literacy Learning in Developing Countries

Education Technology-Why Mobile Phones

Within the industrialized world, the “use of technology in educational context would appear to have become such a commonplace occurrence that, for many people it has entered the realm of the common-sense” (Selwyn, 2011, p. 1). Computer labs have been common in schools for the past four decades and, with the advent of highly portable devices such as tablet computers, learners of all ages are engaged in learning, both in- and out-of-school. For example, companies such as Memrise (memrise.com) provide opportunities to learn languages in small segments with regular tests and reminders whilst allowing opportunities for social contact and collaborative
learning (Kukulska-Hulme & Shield, 2008). Within the developing world, however, there are huge challenges to establishing such Information Communication Technology (ICT) infrastructure, including resource constraints and infrastructure problems (see MoE, 2014), as well as a lack of electricity (The Whitehouse, 2013).

The mobile phone is the one technology that has undergone explosive growth across the developing world, effectively leapfrogging landline telephones due to cheaper infrastructure requirements (Aker & Mbiti, 2010). In Liberia, the conflict added further impetus to this adoption of mobile phones, since by 2003 the fixed-line infrastructure was wholly destroyed or looted (Best et al., 2010). Currently, at least 65% of Liberian households own a mobile phone (while 14% have a television, and 59% own a radio) (LISGIS, 2013).

Wagner et al. (2014, pp. 123-124) refer to “the premise that the lack of textbooks, and reading materials in general, leads to low-literacy environments that fail to support useful literacy practices” as a basis for promoting mobile learning. For West and Ei Chew (2014), the nascent literacy of beginning readers can easily deteriorate in the absence of appropriate content but reading on mobile devices can provide a solution.

With regard to the type of mobile phones available, although mobile-broadband penetration in Africa has increased from 2% in 2010 to 19% in 2014 (ITU, 2014), the majority of learners enrolled in youth literacy courses are using basic phones, without access to data packages. In order to reach the largest population possible, there is a requirement to use the most common technology available on each handset. The technology which works across all models is SMS, a system which due to this ubiquity has appropriately been called the “technology par excellence” (Traxler, 2012)
for ICT for development; hence, SMS has been the technology employed in the reported literacy project.

**SMS Literacy Projects**

There have been various projects that utilize text messages to support language learning in low resource environments, as well as in industrialized countries. Examples of these interventions include projects in Pakistan, Niger and Papua New Guinea as well as countries such as Japan, Australia and the US.

**Project Alphabétisation de Base par Cellulaire (ABC) —Niger**

The ABC Project was two-year randomized control trial undertaken within an adult literacy project implemented by Catholic Relief Services across 140 villages in Niger. The study taught participants how to use mobile phones, provided groups of learners with a phone and facilitated groups’ access to market information via SMS. The participants in the treatment villages learned more quickly, with writing and math test scores that were 9 to 20 percent higher than learners in non-ABC villages (Aker & Ksoll, 2011).

**Mobile-Based Post-Literacy Programme (eTaleem)—Pakistan**

In Pakistan, female learners with low literacy skills were supported through a UNESCO project, which did not require the women to meet regularly face-to-face. The project provided phones and sent 6-8 text messages per day which were relevant to the women’s daily lives, including health—related issues such as “Drinking boiled water saves us from following diseases: diarrhea, vomiting, pain in stomach, cholera, hepatitis, typhoid fever etc.”. The project reported positive results including higher literacy, improved perceptions of being connected and positive impacts on female family members (Hanemann, 2014).
SMS Story—Papua New Guinea

In Papua New Guinea, Voluntary Services Overseas implemented a SMS study to establish whether it could improve children’s reading (Kabeebu, 2013). 100 text messages stories and 100 text message lessons were sent out over two terms to teachers, together with a cartoon poster explaining the process. The control schools did not receive the text messages or the poster. The study found that pupils in the treatment groups significantly outperformed those in the control group in decodable words, sight word fluency, invented words and oral reading fluency.

SMS Projects in Industrialized Countries

SMS has also been used successfully in industrialized countries to support language learning. Students in a Japanese university learned English through receiving five words per week together with short mini-lessons. The students receiving the SMS lessons improved nearly twice as much as students receiving their lessons on paper (Thornton & Houser, 2005). In Australia, students learning Italian received SMS messages containing new words, definitions and example context sentences (Levy & Kennedy, 2005). Learners were not required to send texts back but to write words down in copybooks. Other organizations such as CellEd (celled.org) combine the use of SMS and voice to provide language learning opportunities for learners in the United States.

SMS Projects Overview

M-learning projects that utilize SMS have, therefore, been implemented in a variety of differing environments, including both low and high resource countries. As smartphone ownership and access to the internet continue to increase, it is likely that the use of SMS will decrease. However, within developing countries, there will be a significant number of
users who do not have access to higher-end phones for the near future and therefore SMS is a relevant medium through which to provide literacy learning.

M-learning for Literacy within the USAID Advancing Youth Project-Research Methodology

Mobile Phones as a Tool for Authentic and Social Learning

The use of authentic tasks and simulations that approximate real-life situations are central to learning (Westbrook et al., 2013) and language learning (as noted by Palalas and Hoven in Chapter 2 in this volume). Authentic learning is relevant to both in-school and informal learning, and learning “should be organized around authentic problems and projects that are frequently encountered in non-school settings” (Bransford et al., 2000, p. 77). Bransford et al. (2000) noted that as per Dewey’s vision, “school should be less about preparation for life and more like life itself” (p. 77). For language learning, Henry Sweet, regarded as one of the first linguists, advocated the use of authentic texts, which “do justice to every feature of the language” (Sweet, 1899, as cited in Gilmore, 2007, p. 97). This approach continues in modern methodology such as the “Read Right Now!” Literacy program, which has both authentic reading and writing at its core (EDC, n. d.).

Building on these concepts, Kearney et al. (2012) propose a pedagogical framework that highlights three central features of mobile learning: authenticity, collaboration and personalization. The use of text messages provides “authentic activities” within an “authentic context that reflect[s] the way the knowledge will be used in real life” (Herrington & Kervin, 2007, p. 221) whilst collaborating with classmates helps learners
build “knowledge and skills through practice within a supportive community” (Sharplese et al., 2005, p. 3). Therefore both the “low-cost pedagogical tool” (Hanemann, 2014, p. 25) of the mobile phone, through which relevant materials are provided, as well as collaborating with classmates, afford enhanced learning opportunities.

**Study Design**

The m-learning literacy study consisted of sending text messages supporting the in-class curriculum to Level 3 learners (approximately grade 4-6 equivalency) in 10 ABE treatment sites. FrontlineSMS (frontlinesms.com), a SMS management tool, was used to send the messages. Two text messages were sent relating to each lesson, the first reinforcing topics covered in the lesson and the second asking a related question. The Italian language project above concentrated primarily on vocabulary learning; however, Levy and Kennedy (2005) found that vocabulary messages were less popular than messages which focused on grammar. To address this issue, the m-learning messages were designed to encourage the development of different skills, including: reading (asking learners to re-read materials in the Learner Workbook); writing (asking learners to write additional answers in their copybooks); grammar (reinforcing issues introduced in the in-class lessons such as verb tenses); and research & general knowledge (asking learners to gather additional information from other sources or providing relevant information not contained in the Learner Workbooks).

Learners were asked to write the content of all text messages into their copybooks in order to practice both their reading and writing, using “writing . . . [as] a vehicle for improving reading” (Graham & Herbet, 2010, p. 6). Learners were asked to send text messages back with answers to the questions posed. Learners who responded received a reply text
message with the answer to the question, providing a system of ongoing formative assessment and feedback embedded directly into the authentic, real-life learning experience of receiving, reading, drafting and sending the messages (Herrington & Kervin, 2007). A shortcode reverse charge system was established so there was no cost to the learners.

To reduce costs and ensure that the use of m-learning would be sustainable and suitable for larger scale expansion, no phones were provided to learners; instead, the study utilized a BYOD (Bring Your Own Device) methodology. Learners without phones were asked to share with their classmates who owned or had access to phones.

**Learner Technical Knowledge and Revised Training Plan**

The m-learning study was initially piloted at three ABE sites in Montserrado County in order to test the software and gauge learner and facilitator reaction. The initial training was designed to teach the learners simply to reply to messages sent through Frontline SMS. However, it became immediately apparent that learners were not familiar with using their phones for sending and receiving text messages.

Therefore, the training had to be significantly adapted to address this “digital divide” (Hanemann, 2014) between our perceptions of learner ICT skill levels and the actual level. It was necessary to start with extremely basic training, including how to type letters and numbers, accessing the SMS in-box and sent-box, before practicing writing, sending and deleting messages. This low level of phone literacy was found across all sites, requiring the additional training to be carried out everywhere.

**Phone Ownership**

Three hundred and fifty-five learners were initially enrolled in the 16 sites; 237 in treatment sites and 118 in control sites. In addition, there were 29 facilitators at the treatment sites. Phone ownership was almost
universal amongst the facilitators at 98% and, as might be expected by their lower economic status, phone ownership was much lower amongst learners at 42% (M-39% / F-44%).

**Text Messages**

Each learner (and facilitator) received a minimum of 122 text messages during the course of the study. The figure varied depending on whether the learners replied to text messages, hence generating reply messages. A total of 17,164 texts were sent to the learners and facilitators. However, a total of merely 639 messages were received from the learners.

**Assessments**

Vavoula and Sharples (2009) argue that “[i]ncreasingly, mobile evaluation designs include mixed methods. These are useful not only for validating data, but also for capturing different perspectives of the learning experience” (p. 57). The initial intention was to employ such an mixed methods approach including: i) a quasi-experimental design with baseline and endline literacy assessments of learners’ literacy at 10 treatment sites (which received the text messages and the in-class instruction) and six control sites (which received in-class instruction only); ii) ongoing formative assessments via the text messages sent by the learners; and iii) qualitative interviews and focus group discussions.

The Out-of-School Literacy Assessment (OLA)¹ instrument was used during the baseline to assess learner literacy levels in the treatment and control sites. Of the enrolled learners, a total of 264 participated in the baseline assessment, including 183 at the treatment sites and 81 at the control sites.

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¹ The Out-of-School Literacy Assessment (OLA) is available at http://eola.edc.org/about/ola-background/.
PART III; Research from Case Studies

The endline assessment was planned for the end of the academic year but the Ebola crisis struck, causing the closure of all of Liberia’s schools and the imposition of travel restrictions. It was hence impossible to conduct any further in-person literacy assessments. This necessitated alternative methods of assessment which did not require staff to interact directly with learners. Since materials could not be transported to learners, it was necessary for the assessment to be conducted using materials that learners had available. The only materials that all learners had access to were the Learner Workbooks, so an assessment was developed using materials from within the Workbooks. The revised assessment utilized as many of the subtests of OLA as possible, consisting of Word Reading, Oral Reading/Comprehension, Real Life Reading, Silent Reading/Comprehension, as well as additional subtests on Grammar and Spelling. Reading passages were selected to be as consistent as possible with the in-person literacy assessment, with the maximum readability score of 6.5 on the Flesch-Kincaid test.\footnote{The Flesch-Kincaid test is available at (http://www.readabilityformulas.com/flesch-grade-level-readability-formula.php).}

This revised literacy assessment was conducted via phone. A total of 117 assessments were conducted, 81 from treatment sites and 36 from control sites. Additionally, 64 phone interviews were conducted with learners and 16 interviews with facilitators, in order to understand how m-learning was perceived.

There was some difficulty in getting in contact with learners, particularly those without phones who had to be reached through their facilitators or classmates. Although this difficulty was caused directly by the Ebola crisis, it demonstrates Sharples’ point that the very usefulness of mobile devices, that of allowing learning to take place at any time and in different
locations, can also cause difficulties in terms of tracking progress and measuring outcomes (Sharples, as cited in Vavoula et al., 2009).

**M-learning Results**

**Survey Results**

Despite the fact that the learners were unfamiliar with using text messages, m-learning was enthusiastically embraced by learners. With regard to the general perception of mobile learning, 16 of the 64 learners (25%) who were interviewed found that it was very helpful to their learning to receive and read messages and 43 out of the 64 learners (67%) judged that m-learning was helpful. There was little difference between the genders when positive answers (Very Helpful/Helpful) were combined, a trend which was largely borne out throughout the study.

Learners commented that “constant reading and writing … has helped me stick to my book” (F, 36, Nimba county) and “I read more than before due to constant practicing from text messages” (F, 28, Nimba). Highlighting the advantage of the portability of mobile devices, one learner said “I can now study from those texts in the absence of my copybooks or textbook” (F, 41, Montserrado). Even learners without phones reported that m-learning could be helpful; “I can read and write better by looking at my friend’s phone” (F, 34, Grand Bassa).

With regard to learner perceptions of whether the sending of text messages was helpful for their learning, there were similar results, with 22% of learners finding sending text messages to be very helpful to their learning and 74% of learners reporting that sending text messages was helpful.

The existing low skill level of learners was exemplified through some of the answers; m-learning was “very helpful-because I now know the use of the keys on the keypad in sending texts” (M, 26, Montserrado) and it was
“helpful—however replying to text messages have been challenging” (M, 32, Nimba).

Encouraging learners to write text messages and the answers into their copybooks to practice writing was an integral part of the study and 83% of learners said that they wrote the text messages into their copybooks. Learners commented that “this has helped me to practice on my own” (M, 17, Nimba) and “it really made my handwriting look good these days as compared to before” (M, 26, Montserrado). The main reason given for the learners who did not write messages into their copybooks was lack of phones, though one said “I was really not able to write the text in my book because I had no time” (M, 36, Grand Bassa).

With regard to some learners not having phones, those who did were asked to share with their classmates. 84% of learners said that they had worked with classmates to lend them the phone or copybook, or discuss the questions: “I read with friends in class; asked for help in pronouncing some of the hard words. We shared our phones to copy texts in class to identify which of the lessons the text comes from. We also shared our notebooks and we discussed in class” (F, 36, Montserrado).

Sixteen per cent of learners said that they did not work with colleagues during the study which implies that further training is required for both facilitators and learners. Nevertheless, some learners did report that they still gained partial exposure to m-learning: “No, but I used to listen to their discussion about text they are receiving” (M, 54, Grand Bassa).

Within the industrialized world, the connection between literacy and ICT literacy is becoming increasingly important. It is now “difficult to function adequately, either at work or in general life, without some basic knowledge of the use” of ICT (Hanemann, 2014, p.189). A similar pattern is likely to develop in countries such as Liberia as all forms of ICT become more ubiquitous. Mobile money, which is new in Liberia but
rapidly being adopted across the developing world, is one such use of technology which requires adequate levels of literacy together with the ability to use phones. 17% of learners had previously used mobile money: “It was great to send and receive money-easy to use” (F, 29, Grand Bassa). Another learner said m-learning was very helpful “because when I receive mobile money nobody can know because I am able to fill in my own form” (i.e., I can read the screen and type the appropriate responses) (F, 39, Grand Bassa).

**Facilitator Feedback**

The facilitators interviewed were universally positive about the use of m-learning. Reasons were “because it changes their ways of understanding, lets them learn to read on their own, made them discuss together as groups which alleviated shyness from some of them, and it also improved their writing skills” (M, Montserrado). All facilitators attributed improvement in the learners’ reading and writing skills to m-learning: “YES! It makes them to now know how to send and receive text messages and the use of mobile phones regularly and now they are reading better than before”.

With regard to problems with m-learning, lack of knowledge about using text messaging and the need for additional training was highlighted: “visiting their school twice a month to do refresher trainings”. Ideas for improving the system included setting up a system to allow the facilitators to send text messages to learners, thereby improving collaborative learning (Kukulska-Hulme & Shield, 2008). Other suggestions included the provision of “cheaper phones for the learners which they can later pay for so that all of them will be encouraged to participate fully”, extending m-learning to conventional schools and providing encouragement to the facilitators to recognize the additional work required.

However, there were issues because “sometimes [m-learning] detach[s]
the learners’ attention when discussing among themselves in class instead of focusing on the lesson that is on the board” and it “takes up some of the class time for m-learning when learners bring out text issues”. This supports the assertion that mobile learning “can both complement and conflict with” education taking place in classrooms (Sharples et al., 2005, p. 5)

**Literacy Assessment**

The Ebola crisis forced the adoption of a different data collection tool to assess literacy, moving from the in-person OLA test to the phone-based literacy assessment. Since a different tool was used, it is not possible to compare the learning gains between the baseline and endline with any degree of accuracy, but it is possible to make comparisons between the groups.

During the baseline, the control group learners had largely outperformed the treatment learners on the various subtests within the OLA assessment. At the endline, the control group learners continued to outperform the treatment group learners on the majority of the subtests with higher mean scores (as illustrated in Figures 17.1a and 17.1b).

![Figure 17.1a Baseline Results](image-url)
Chapter 17: M-learning for Literacy in Low Resource Environments—A Case Study in Liberia

![Figure 17.1b Endline Results](image)

Within the subtests, there are some which could indicate the positive effect of m-learning. For example on the Word Reading subtest (Figure 17.2), the percentage of learners scoring more than 80% increased in the treatment group and dropped in the control group between the baseline and the endline. At the same time, the percentages of learners scoring more 60% increased from 40% to 51% for the treatment group compared to 50% to 64% for the control group.

![Figure 17.2 Word Reading](image)

Other subtests demonstrate improvements in both the treatment and control groups. For example, for Oral Reading (Figure 17.3), the endline
showed a large increase in learners scoring 80% -100%. While improvement would be expected during the year, this increase may be attributable to the fact that the endline assessment was conducted using a different assessment methodology, including materials that the learners had previously seen.

![Bar Chart: Oral Reading](image)

**Figure 17.3 Oral Reading**

In other subtests such as Reading Comprehension (Figure 17.4), learners in both the treatment and control groups scored less well on the reading comprehension subtest compared to the baseline. Again, this is likely to be a function of the assessment, including the phone methodology and the reading materials and questions rather than a decline in reading ability.

![Bar Chart: Reading Comprehension](image)

**Figure 17.4 Reading Comprehension**

Although these comparisons between baseline and endline results did
not show any clear evidence of learning that could be attributed to m-learning, additional grammar and spelling questions were asked in the endline which were not included in the baseline. The treatment group did significantly better (p < 0.05) on the grammar question, and also performed better on the spelling question, compared to the control group. This could provide evidence to reinforce the observation by Levy and Kennedy (2005) that text messages related to grammar are popular with learners as well as providing effective learning opportunities for relatively difficult topics.

Discussion and Recommendations

It can be seen that there was a positive reaction to the introduction of m-learning to a group of learners who had not previously encountered it. There were a number of themes which stood out from the study. In fact, they point to the importance of adequate access and familiarity with the mobile hardware and software, necessary to fully benefit from mobile learning, be it in language learning or any other mobile-assisted learning context.

Access to Hardware

Selwyn (2011) argues that it is important to view technology in “terms of the limits and structures that it imposes as well as the opportunities that it may offer for individual action and agency” (p. 9). The use of BYOD methodology has advantages in increasing ownership of hardware, reducing costs, potentially reducing time taken to train users amongst other benefits. At the same time, there is also the possibility of disenfranchising those who do not have access to the necessary hardware (whether they do not own a device or whether their family members will not permit its use), who cannot afford to pay for the electricity to charge their device or experience other
access barriers. Although many learners in the study who did not have phones reported positive reactions to mobile learning, those who were negative generally did not have access to phones on which to learn and practice.

**Learner Phone Literacy and Sending Text Messages**

The lack of technical skills in utilizing phones was a surprise to project staff, both Liberian and international, who had anticipated higher levels of phone literacy. This low level of experience required additional training to reiterate basic steps such as how to access message in-boxes. Despite the additional support, the numbers of text messages sent by the learners was very small. The prime reason for not sending messages was lack of confidence in their skills, as well as excuses such as being “too busy” and being “not sure of the number”. It is imperative that projects working in similar environments have an accurate assessment of learner technical skills, with personal hardware as well as with any hardware provided by the project and provide sufficient training and ongoing support.

**Phone Literacy Assessment**

The Ebola crisis forced the project to develop innovative solutions to conduct the endline assessments. The use of phones to remotely implement assessments and collect both qualitative and quantitative data was successful, particularly when viewed under the circumstances that it was implemented. The impossibility of providing new materials meant that existing materials had to be repurposed, entailing combing through Learner Workbooks for appropriate texts. The learners had, therefore, already seen the materials, which would likely have an impact on the assessment. All learners had been provided with the same materials at the beginning of the academic year and hence neither group was disadvantaged compared to the other.
Whilst the phone literacy assessment may not be robust or accurate enough to be used for completion/graduation assessments, it can provide low cost, frequent opportunities to check on progress such as the formative end-of-module assessments. Consequently, it could be used to provide ongoing support to learners and teachers in both adult education classes and in regular classes if phones are provided by the school.

**Conclusion**

The study showed that learners and facilitators were extremely enthusiastic with regard to m-learning. Learners reported using their phones to study at various times of the day, supporting Wagner’s (2014) point that a “key implication of increased use of mobile devices is the amount of additional time and space created for learning” (p. 11). The learners were diligent in writing texts into their copybooks and the majority of them collaborated with classmates, indicating that although having a phone is highly desirable, it is still possible to participate as long as there are other classmates who they can work with. Facilitators were convinced that m-learning had a positive effect on their learners.

Nonetheless, the literacy assessment did not show major improvements in the treatment group compared to the control group. This could have been due to the different assessment methods being used for the baseline and endline. Alternatively, as with other m-learning research, it may be that it was “trivial treatment” (van ‘T Hooft, 2009), where the intervention was too limited to produce measureable results. It could also be because sending text messages to support in-class instruction needs to be more fully integrated into the curriculum with more concentrated support from the facilitator. Whatever the reason, this aligns with the World Bank’s findings that “current research on the impacts of ICTs on student achievement yields
few conclusive statements, pro or con, about the use of ICTs in education” (World Bank, 2013).

The ability to effectively use mobile phones will become increasingly important for all members of society in all countries. Economic activities such as the provision of the most up-to-date market prices and weather information (Steele, 2012), health activities, such as tracking pregnancy dates (e.g., http://www.whattoexpect.com/mobile-app/) and government activities, such as the payment of taxes (Scharwatt, 2014), all require both minimal literacy as well as an understanding of the functioning of phones. Likewise, it is also important for citizens “to be able to actively engage with the language of power” (McCaffery et al., 2007, p. 125) and therefore important that Liberian learners can read and write in English. As such, it is essential for everyone to develop both technological skills and basic literacy skills.

Overall, the enthusiasm of the learners and facilitators, both to improve their reading and writing skill as well as improving their phone literacy, indicate that m-learning “using simple information technology could be a simple and low-cost way to promote adult’s educational outcomes in developing countries” (Aker et al., 2010, p. 18). More work is required to assess the best practices for promoting increased learning gains in an efficient manner.

Acknowledgments

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Chapter 18: Mobile Devices in ESP Learning: Pilot Project

Ivana Simonova
University of Hradec Kralove, Czech Republic

Petra Poulova
University of Hradec Kralove, Czech Republic

Abstract

Reflecting the latest results of technical and technological development, mobile devices have become a standard didactic means in both foreign language and other subjects’ instruction on all levels of education. This study focuses on the use of mobile devices within higher education in Informatics and Management-related study programmes. The research was conducted at the Faculty of Informatics and Management (FIM), University of Hradec Kralove, Czech Republic, monitoring sources of information the respondents use within their university study and the mobile devices they use for mobile-assisted language learning compared to other disciplines. After identifying the respondents’ preferences in learning styles, the ownership and use of various types of mobile devices, the MALL process included learning in online courses through mobile devices, mainly tablets and smartphones, as preferred by Blackboard Mobile Learn™ version 4.0 used at FIM. With the help of the mobile tools provided to students, new vocabulary and grammar structures were acquired, listening/reading comprehension skills developed, tests used (not all test types are available in the mobile version compared to traditional LMS) and discussions held. In
the pilot, completed in June 2014, students shared their experience and opinions concerning the implementation of mobile devices for English for Specific Purposes instruction.

**Keywords:** mobile-assisted language learning, MALL, mobile devices, m-learning, English for Specific Purposes (ESP)

**Introduction**

Reflecting the latest trends in technical and technological development, mobile devices have become standard didactic means in both foreign language and other subjects’ instruction on all levels of education. The use of wireless, mobile, portable and handheld devices is gradually increasing and diversifying across every sector of education in both the developed and developing worlds. Currently, mobile learning has been exploiting handheld computers, mobile/smart phones and other devices that work on the same set of functionalities. The use of handheld computers is obviously relatively immature in terms of both technologies and its pedagogies, but mobile-assisted learning is developing rapidly (Traxler, 2009).

Until now, traditional e-learning (using non-portable devices) has been widely implemented into education in the Czech Republic reflecting that mobile devices were not available to such an extent as in developed countries. Within the last two-three years, the situation changed substantially and mobile learning can be applied on all levels of education, gradually moving from small-scale, short-term trials to larger, more sustained and blended deployment.

This study focuses on the use of mobile devices within higher education in Informatics and Management study programmes. Mobile devices were defined as very small items to accompany users anytime and anywhere,
autonomous from the electrical supply (Roschelle, 2003; Liang et al., 2005). The research was conducted at the Faculty of Informatics and Management (FIM), University of Hradec Kralove (UHK), Czech Republic, monitoring what mobile devices students own and use for private purposes and how they are applied in education, mainly in English for Specific Purposes learning.

**Process of ICT Implementation at the Faculty of Informatics and Management**

The process of ICT implementation into education started in 1997 at FIM and widely spread after 2000, when the LMS WebCT (later merges with Blackboard) started to be used. Since the 2012 to 2013 academic year, “virtual desktops” have been available to students and teachers, mainly for work with software not providing free or open access (e.g., MS SQL Server, Enterprise Architect); since 2013/14, the Blackboard Mobile Learn™ version 4.0 for Apple and Android devices have been piloted (Blackboard Mobile Learn™ version 4.0 supports iOS6+, i.e., iPhone 3GS, iPad 2+, iPad mini, iPod Touch 4+ and Android OS 2.3+). Currently, approximately 250 online courses (called e-subjects) supporting single subjects are available to students, either to assist the teaching/learning process or to be used in the distance form of education. In total, 21 of them have applied MALL principles, namely in English for Specific Purposes (ESP) for IT students, Business English, ESP for Tourism & Management, History and Culture (UK), History and Culture (Australia), and History and Culture (New Zealand). All e-subjects run traditionally within the LMS, and currently they are available on mobile devices in the limited extent as well. In other words, the blended learning model is applied which combines the face-to-face instruction, work in online courses and
individualized approach to them through mobile devices which satisfies learners’ time and place preferences (Pieri & Diamantini, 2009) and bridges formal and informal learning (Abdullah et al., 2013). With the use of mobile devices within the Czech education system being rather new, the following questions were set to be researched:

1. What mobile devices do students own?
2. For what purposes do students use the mobile devices?
3. What are the students’ opinions and experience after the MALL?

These questions resulted from the background of the FRAME (Framework for the Rational Analysis of Mobile Education) model by Koole (2009). Equipped with a mobile device, the learner can choose to consult a web page, access audio or video tutorials, send a query via text message to peers, or contact an expert or tutor for guidance. Koole (2009) asks how such a learner could take full advantage of the mobile experience, and how practitioners could design materials and activities appropriate for mobile access. Additionally, she questions how mobile learning could be effectively implemented in both formal and informal learning (Koole, 2009). The FRAME model offers some insights into these issues as it describes a mode of learning in which learners may move within different real and virtual locations and thereby participate and interact with other people, information, or systems-anywhere, anytime. The interaction with information is mediated through technology. Within this context, the FRAME model is represented by a Venn diagram (Figure 18.1) in which three aspects (circles) intersect. The three circles represent the device (D), learner (L) and social aspects (S). The intersections where two circles overlap contain attributes that belong to both aspects. The attributes of the device usability (DL) and social technology (DS) intersections describe the affordances (i.e., availability, called the ownership in our research) of mobile technology (Norman 1999). The intersection labelled
interaction learning (LS) contains instructional and learning theories with an emphasis on social constructivism. All three aspects overlap at the primary intersection (DLS) in the centre of the Venn diagram. Hypothetically, the primary intersection, a convergence of all three aspects, defines an ideal mobile learning situation. The model can and should be used to design a more effective mobile learning process (Koole, 2009). The FRAME model takes into consideration the technical characteristics of mobile devices as well as social and personal aspects of learning, thus referring to concepts similar to those found in psychological theories, e.g., in the Activity Theory by Kaptelinin and Nardy (2006) and especially pertaining to the work by Vygotsky (1978) on mediation and the zone of proximal development. In this model, the mobile device is an active component with equal footing in learning and social processes. This model also places more emphasis on constructivism; the word “rational” refers to the “belief that reason is the primary source of knowledge and that reality is constructed rather than discovered” (Smith & Ragan, 1999, p. 15).

![Diagram](image)

Figure 18.1 The FRAME Model (Koole, 2009)
Research Design

In the 2013 to 2014 academic year, the pilot round of MALL started, structured into three phases. In the first phase, before the process of MALL started, students’ learning preferences were detected by the Learning Combination Inventory (LCI) by C. A. Johnston, based on her concept of “Unlocking the will to learn” (Johnston, 1996). Johnston emphasizes that the traditional learning process is based on the belief that all learning occurs as part of learner’s intelligence—the greater the intelligence, the more a child can learn (1996). Johnston attracts attention to the verb “can”, as no one says “will” learn (1996, p. 16). To describe the whole process of learning, she uses the metaphor of a combination lock, saying that cognition (processing), conation (performing) and affectation (developing) work as interlocking tumblers; if aligned, they unlock an individual’s understanding of his/her learning combination (Johnston, 1996). The will lies in the centre of the model, and interaction is the key to unlock it. Thus, Johnston (1996) compares human learning behaviour to a patterned fabric, where the cognition, conation and affectation are the threads of various colours and quality. It depends on individual weaver (learner), how he or she combines threads and what the final pattern is.

Johnston (1996) designed the LCI consisting of 28 statements, responses to which are defined on the five-level Likert scale, and three open-answer questions. The LCI differs from other widely used inventories (e.g., by Kolb, Honey and Mumford). It emphasizes not the product of learning, but the process of learning; it focuses on how to unlock and what unlocks the learner’s motivation and ability to learn, i.e., how to achieve student’s optimum intellectual development (Johnston, 1996). This was the main reason why LCI and not any other traditional tool was applied for
detecting respondents’ individual learning styles. The responses to LCI describe the schema (pattern) that drives their will to learn. Respondents are categorized into four groups where sequential, precise, technical and confluent ways of processing information are combined. The sequential processors are defined as the seekers of clear directions, practiced planners, and thoroughly neat workers; the precise processors are identified as the information specialists, info-details researchers, answer specialists, and report writers; the technical processors are specified as the hands-on builders, independent private thinkers and reality seekers; and the confluent processors are described as those who march to a different drum beat, creative imaginers and unique presenters. The reason why learners’ preferences were detected was to discover whether there are any students in the sample group who strongly reject the mobile devices and approaches which are required if mobile devices are implemented in the process of learning.

Consequently, students’ other preferences were detected in three areas:

- What sources of information they use for university study,
- What mobile devices they own, and
- For what purposes they use them.

The state was monitored by the questionnaire (Q1) containing twelve multiple-choice items focused on above listed fields (a, b, c). The number of choices under each item was either not limited, or limited to 5 in two items, where the list of choices was too long. The collected data was processed by the NCSS2007 software by the method of frequency analysis.

In the second phase, from February-May 2014, the pilot process of instruction supported by the Blackboard Mobile Learn™ version 4.0 started.
As mentioned above, it included

- Face-to-face lessons (90 minutes/week, for 13 weeks),
- The work in online courses in LMS (e-subjects accessed through PCs, notebooks, netbooks), and
- The work in mobile devices (particularly tablets and smartphones).

Reflecting the tools available in the Blackboard Mobile Learn™ version 4.0, services in three fields were mostly used: (1) learning-related tools (i.e., Learning Content, Mobile Tests, and Tasks); (2) information tools (Announcements, Roster, Push Notifications, Grades) and (3) communication tools (Blogs, Discussions, and Student Journals).

The following activities were implemented in the MALL process:

- Face-to-face teaching and learning, i.e., learners attended present lessons where communication and immediate feedback-required activities were preferred,
- After-lesson independent work in online courses in LMS Blackboard (i.e., activity running after instruction in learners’ leisure time), and
- After-lesson independent learning through mobile devices, mainly tablets and smartphones, which were recommended for Blackboard Mobile Learn™ version 4.0.

LMS Blackboard is a high-quality environment designed for education purposes, so it provides all tools necessary for an efficient simulation of all phases of the instruction process. From the tools provided in the Blackboard Mobile Learn™ version 4.0, the learning content (in the form of study
materials containing texts, figures, images, and animations) was available to students, and new vocabulary and grammar structures could have been practised (not all types of tests are available in the mobile version compared to the traditional LMS). Listening and reading files in podcast form, and tests on listening and reading comprehension were also available, and discussions were held, both in the written form on mobile devices in discussion forums and on Skype, which was linked with the LMS.

Above all, for practising *vocabulary and grammar*, simple applications were designed by students for their peers, where words, phrases or short sentences appear on the screen; after writing the answer (i.e., translating the item) a notice would appear saying whether the reply was correct, or not, and finally the correct solution is displayed. Both Czech to English and English to Czech versions were available, as well as short texts and animations to explain single grammar items. The development of *listening/reading comprehension* skills was supported by the *English Reader for IT and Management Students*, which is a set of professional texts collected by students from the Internet and other sources with professional vocabulary translated (using the Insert, Comments tool) and recordings in mp3 format. Students can read the text, having professional vocabulary translated if required, and listen to the recording. This is also an output of students’ project work for their peers. Both these activities enable students to show what they have learned from the studied field and to reflect and share their professional experience, which strengthens their motivation to further study.

In the third phase, after the MALL process had been finished (it took one semester, i.e., three months), students’ satisfaction, experience and opinions were detected by the evaluation questionnaire (Q2). Totally, seven criteria were set to monitor and evaluate the process of MALL as a whole, especially focusing on the roles of mobile devices and encouraging students to introduce their own proposals for improvements. In collecting
feedback during the pilot phase, we surveyed students’ attitudinal responses to the mobile technology use, whereas perceptive and cognitive fields were to be monitored after the massive use later. Each criterion was defined in the form of a statement. Students’ feedback was expressed on the six-level scale from 1 (Completely Agree) to 6 (Completely Disagree). In other words, this evaluation questionnaire focused on how the mobile technology was viewed by individual users within the MALL process (Chang & Hsu, 2011; Cheng, Hwang, Wu, & Shadiev, 2010). The main objective of the future research activities will be to learn in what ways the use of mobile devices facilitates the acquisition and development of linguistic knowledge and language skills. Students’ feedback on the following statements was monitored:

1. Compared to learning in online courses, I consider the mobile approach of anywhere, anytime helpful in the process of ESP learning.
2. Compared to learning in online courses, I consider the mobile approach of anywhere, anytime significantly helpful in the process of ESP learning.
3. I worked with recommended operational systems and devices. If you did not, list the devices you used.
4. I did not have any technical problems. If you did, please explain.
5. The Internet access was as displayed in Internet signal maps.
6. Would you appreciate using mobile devices in ESP learning in the future?
7. Would you use mobile devices in learning other subjects in the future? If yes, provide examples, please.
The MALL was piloted in the sample group of 203 students of the Faculty of Informatics and Management, University of Hradec Kralove, who enrolled in IT study programmes (63%), Tourism & Management (27%), or Financial Management (10%). The sample group was composed of 60% male students and 40% female; 60% of students were full-time and 40% were part-time students; 72% of them were 19-24 years old, 13% of students were 25-29 years old, 11% of students were 30-39 years old, and 4% of students were 40+.

Research Results

The following results were collected in three phases of the research. Within the first phase, individual learning preferences were detected by LCI. This step intended to discover whether there were some learners in the research group who rejected or strongly rejected the use of mobile devices and approaches, which required their implementation into learning. Results are displayed in Figure 18.2.

![Research sample: LCI preferences](image)

**Figure 18.2 Individual Learning Preferences in the Research Sample**

As clearly seen, the “accept” fields of all types of processors are wide. This result means that most students are able to accept (i.e., study efficiently to develop the required knowledge) any of the provided types of study materials, which present the identical learning content in various ways
(full texts, short texts structured for the distance education, PowerPoint presentations, animations, video-recordings and others) which are delivered through mobile devices and relating methods of learning. Whereas approximately 10% of confluent processors rejected some formats and methods, this response was not observed with other types of processors. More than 20% of the sequential processors had a preference for some formats and methods, followed by technical (approx. 13%) and precise learners (8%), whereas the confluent processors expressed hardly any preferences (approx. 3%).

Next, data monitoring students’ preferences in sources of information relating to the university education and mobile devices ownership and use were collected by questionnaire Q1. The collected data was considered from the point of ESP and other subjects, from the use of mobile devices for education and private purposes (e.g. entertainment, communication). The following areas were monitored:

- Sources of information respondent’s use for education within university study (both in ESP and other subjects)

Following sources of information were taken into consideration: personal attendance of lectures, “I buy books,” “I borrow books from libraries”, e-subjects in LMS, study materials on FIM web page, Wikipedia, materials available from the Internet for free, Facebook, discussion groups, LinkedIn, Google+, and other sources. As displayed in Figure 18.3, online courses (e-subjects) in LMS are the most frequently used source of information (92% of respondents), followed by personal attendance of lectures (85%), materials from the Internet available for free (77%), materials from the FIM web page (there is a special folder where teachers uploaded the materials before online courses were widely used, and
numerous teachers still use both this folder and online courses). Above all, half of students borrow textbooks (53%) , but only one-third buy textbooks (31%). Following the latest trends in social networking, discussions in the LMS are widely used (72%), as well as Facebook (58%), followed by Wikipedia (42%), Google+ (11%) and LinkedIn (1%).

![Diagram showing information sources for education](image)

**Figure 18.3 Information Sources Used for Education in ESP and Other Subjects**

Sources of information respondents use for ESP show different distribution. E-subjects are obligatory used by all students (100%), as well as the personal attendance of lectures (96%) and work with textbooks (printed, electronic, and scanned). That is why students borrow textbooks from libraries (96%), buy them (35%), download free study materials from the Internet (92%), participate in discussion groups within LMS (81%) and on Facebook (95%). They use Wikipedia (72%), LinkedIn (24%); no materials are available on the FIM web page for ESP.

In summary, these are traditional sources and approaches that have been applied in e-learning for decades. As mentioned above, what reflects the MALL approach is, the e-subjects have been running on mobile devices
for last a few years, as well as social networks (mainly Facebook) are used through mobile devices for sharing experience and study materials, answering questions, and a range of other activities.

- Mobile devices respondents own

The data shows that notebooks are currently the most frequently owned mobile devices (88% of respondents possess them), followed by smartphones (61%), mobile phones (52%), PCs (52%), mp3 players (49%), and DVD players (39%), whereas Hi-fi (27%), tablets (24%), game consoles (13%) and netbooks (10%) were rather rarely owned (Figure 18.4). As expected, students do not have one type of mobile devices only, but simultaneous possession of PCs, notebooks, netbooks, tablets, smartphones was proven. Other types of mobile devices were not used so often, but respondents also mentioned the ownership of TV (67%), and radio (30%).

![Mobile devices respondents own(%)](image)

**Figure 18.4 Mobile Devices Respondents Own**

- Mobile devices respondents use for private and education-related communication
As displayed in Figure 18.5, from six choices (PC, notebook, netbook, tablet, smartphone, mobile phone) respondents marked in descending order which mobile devices they use for communication either on private or education-related matters, and the personal contact was added to this list. The results show notebooks were the most frequently used mobile device (79%), followed by smartphones (59%) and mobile phones (55%); fewer than 45% of respondents declared they used PCs, whereas tablets (13%) and netbooks (8%) were less frequently used. Despite the latest devices available, the personal contact (96%) was strongly preferred.

In education-related communication, results were almost identical with the highest frequency of personal contact (92%), the use of notebooks (79%) and smartphones (56%). Mobile phones were less frequently used (46%) but the frequency with PCs increased (55%). The use of tablets (12%) and netbook (6%) was on similar level.

![MD for private and education-related communication](image)

**Figure 18.5 Mobile Devices Used for Communication**

- Mobile devices respondents’ use for entertainment and education

Unlike the previous criterion, this data shows different devices are used
for entertainment. Traditionally, notebooks are on the top position (81%) followed by smartphones (49%), mobile phones (28%), tablets (16%) and netbooks (7%), but higher frequency of use was detected with TV (54%), mp3 player (29%), radio (18%), DVD player (16%), HI-FI (12%) and game console (10%). In ESP, mostly notebooks (90%) and smartphones (80%), followed by PCs (43%), mobile phones (32%), tablets (18%) and netbooks (6%) are used. What is interesting, not unexpected but logical, is that respondents declared higher frequency of mobile devices use in ESP than in other subjects. The phonetic side of language and quality of sound/recording provided through mobile devices are in correlation.

In other subjects within university study, notebooks were detected (87%) as well as smartphones (43%), PC (42%), mobile phones (18%), tablets (18%) and netbooks (7%). Results are displayed in Figure 18.6.

![Mobile Devices for Education and Entertainment](image_url)

**Figure 18.6 Mobile Devices for Education and Entertainment**

Reflecting on these results, we felt ready to start the MALL process, i.e., to use the mobile devices to assist the ESP instruction. The process of MALL included after-lesson independent work in practising vocabulary,
grammar, listening comprehension, written and oral discussions, as described above.

When the MALL process of instruction had been closed in June 2014, respondents provided their experience and opinions with the mobile device implementation in MALL by the Evaluation Questionnaire (Q2). Single items drew answers to the question of how the use of mobile technology was viewed by individual users (Chang & Hsu, 2011; Cheng et al., 2010) on the 1 (completely agree) to 6 (completely disagree) point-scale. The following results were detected by questionnaire Q2.

As displayed in Table 18.1, most respondents’ feedback was highly positive, though several exceptions appeared (3%). These students were detected as confluent processors from the point of learning styles and preferences (Figure 18.2), so their attitudes were expected to differ.

### Table 18.1 MALL Feedback

<table>
<thead>
<tr>
<th></th>
<th>Statement</th>
<th>Evaluation coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Compared to learning in online courses, I consider the mobile approach</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>“anywhere, anytime” helpful in the process of ESP learning.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Compared to learning in online courses, I consider the mobile approach</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>“anywhere, anytime” significantly helpful in the process of ESP learning.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>I worked with recommended operational system and devices (if you did not,</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>list the operational systems and devices you used).</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>I did not have any technical problems (if you did so, please explain).</td>
<td>1.1</td>
</tr>
<tr>
<td>5</td>
<td>The Internet access was as displayed in Internet signal maps.</td>
<td>1.3</td>
</tr>
<tr>
<td>6</td>
<td>Would you appreciate using mobile devices in ESP learning in the future?</td>
<td>1.14</td>
</tr>
<tr>
<td>7</td>
<td>Would you use mobile devices in learning other subjects in the future?</td>
<td>2.04</td>
</tr>
<tr>
<td></td>
<td>(if yes, provide examples, please); Calculation applications for accounting;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>animations, simulations, modelling for various IT subjects; high quality</td>
<td></td>
</tr>
<tr>
<td></td>
<td>video-recordings for culture-and history-relating subjects (English,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>German, Russian, Spanish) etc.</td>
<td></td>
</tr>
</tbody>
</table>
Discussion

Briefly summarized, the results collected at FIM reflect the MALL implementation in the world. In the Czech Republic, significant items neither on m-learning nor MALL have been published. The reason is that m-learning has not become as common as e-learning has, and thus long-time data still is not available, as the latest types of mobile devices reached the users later than in economically-strong and developed countries of Western Europe, USA, Canada and others. Currently, differences are quickly fading in the field of mobile device availability. However, the lack of scientifically-verified methodology (didactics) on how to implement mobile devices, particularly how to start and apply MALL, into the process of instruction, is still missing.

The only valuable result of m-learning implementation (but not MALL) in the Czech Republic was published in 2011 by Lorenz. In 2010, he ran quantitative research in a group of 274 IT students in a library services study programme at Masaryk University, Brno, Czech Republic, following the Corbeil and Valdes-Corbeil design (2007). He analysed the concept of mobile education within the changing university environment, focusing on the process of learning and the support which libraries can provide. His research focused on three fields which are described below.

First, he answered the research question whether both students and teachers are ready for this process, i.e., whether:

- They have learning and teaching skills to use the potential of m-learning (i.e., students’ efficient use of materials and activities designed and implemented in the process of
instruction by teachers);
• They are equipped with mobile devices;
• They are willing and able to cover financial fees for services used; and
• Both teachers’ and students’ attitudes to such an approach are positive.

We are aware his results (Lorenz, 2011, pp. 12-13), were collected in 2010, but they are comparable to FIM in several criteria. Lorenz discovered that:

• 92% of students and 85% of teachers own a mobile phone, 10% of students and 27% of teachers have a smartphone (in 2010);
• 65% of students and the same number of teachers own notebooks or laptops;
• 61% of students and 46% of teachers have MP3 players;
• 4% of students and none of the teachers have an iPod.

Despite both parties being sufficiently equipped for m-learning implementation, only 65% of students and 42% of teachers proclaimed insufficient readiness for m-learning, i.e., having the learning or teaching skills needed for efficient use. This result contradicts Corbeil and Valdes-Corbeil’s results, where 94% of students and 60% of teachers expressed the readiness for using mobile devices in education (from the sample group of 107 students and 30 teachers) (Corbeil & Valdes-Corbeil, 2007).

In Lorenz’s research, a total of 57% of students and 46% of teachers were willing to pay for services for education purposes, and the same amount
of both parties would appreciate or are going to implement mobile devices into learning and teaching. The most frequently used services include sending short messages (94% of students, 96% of teachers), e-mail messages (57% of students, 65% of teachers), and listening to audio-recordings and saving photos (70% of students and 58% of teachers), while 54% of students and 38% of teachers make records by themselves. Instant messaging service is used by 45% of students and 27% of teachers, podcasts and audio-books are listened to by 18% of students and 12% of teachers, e-readers are used by 23% of teachers and 21% of students, and 32% of students and 23% of teachers regularly access to social networks.

All users, both teachers and learners, consider mobile devices and technologies useful, easy to use, motivating and enjoyable. These criteria have a strong impact on efficient use of mobile devices and the m-learning in general. No restrictions were detected in this field, which would limit this process in MALL.

Lorenz also emphasized the m-learning contribution to the lifelong, massive and democratic access to education and (as a librarian) the role of digital libraries. In the proposal, he applied the TPCK framework (Koehler & Mishra, 2008) reflecting principles of problem, co-operative, active, authentic and situation learning (Lorenz, 2011, p. 6), as well as strategies towards efficient use of mobile devices in lessons (Lorenz, 2011, p. 8). Despite these general introductions, all of them can be applied in MALL. The TPCK model has had a long tradition in Czech pedagogy (general didactics), so its application in mobile-assisted learning and MALL concepts could be rather easy.

Finally, he accepted eleven didactics rules for mobile education design from Herrington et al., (Lorenz, 2011, p. 9):
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1. Real world relevance: Use mobile learning in authentic contexts.
2. Mobile contexts: Use mobile learning in contexts where learners are mobile.
3. Explore: Provide time for exploration of mobile technologies.
5. Whenever: Use mobile learning spontaneously.
7. Whomsoever: Use mobile learning both individually and collaboratively.
8. Affordances: Exploit the affordances of mobile technologies.
10. Mediation: Use mobile learning to mediate knowledge construction.
11. Produce: Use mobile learning to produce and consume knowledge.

As mentioned above, Lorenz’s study was carried out in 2010, which means the data has changed within the four-year period since. This was one of the reasons why our study was important, providing the latest results reflecting the state in the field. Below, selected world studies are mentioned, as they have close relation to our criteria.

Our study proved identical results as Viber and Gronlund (2013), who monitored attitudes towards the use of mobile devices in second and foreign language learning in higher education, considering cross-cultural views. They employed Kearney’s pedagogical framework to mobile learning from a socio-cultural perspective (Kearney, Schuck, Burden, & Aubusson, 2012). The findings showed the positive impact on individualization (83%), collaboration (74%) and authenticity (73%), whereas gender was identified to be a predictor of differences in students’ attitudes to MALL, and concluded technology was a stronger culture-shaping factor than
inherited cultural environment or age.

Additionally, Hsu (2013) investigated the end-users’ perception of MALL through cross-cultural analyses in seven countries and regions and discovered that despite significant differences still existing, all respondents agreed MALL provided potential for EFL learning.

Closely relating to our research topics, a survey conducted by Chen (2013) identified tablets as an ideal tool for interactive, collaborative and ubiquitous environments for independent informal language learning, supported by students’ positive attitudes towards their usability, efficiency and satisfaction for the MALL purposes.

In the field of knowledge, de la Fuente (2014) focused on the aural input and indicated that learners in the MALL group demonstrated significantly higher levels of bottom-up comprehension and top-down overall comprehension than learners in instructor-manipulated language learning.

On the other hand, Golonka et al. (2014) summarized evidence for the effectiveness of technology use in FL learning and teaching, when focusing on studies comparing the use of new technologies (mobile and portable devices, network-based social computing) to traditional methods and material (PC), and stated limited efficacy of mobile technologies. The strongest impact was discovered in computer-assisted pronunciation training, particularly automatic speech recognition.

Above all, relating to digital library services, as mentioned above by Lorenz (2011), open access repositories of language learning resources were also researched, for instance by Zervas and Sampson (2014). They stated there was limited experimental evidence about possible factors influencing and potentially enhancing the reuse of MALL resources stored in open access repositories (Zervas & Sampson, 2014). They proposed the Mobile2Learn Framework, which supports the sharing and reuse of MALL
resources within the context of MALL courses development. Then they conducted a quantitative analysis of the reuse of MALL resources developed with the Mobile2Learn Framework. The results proved that completeness of metadata fields related to educational objectives based on Common European Framework of Reference for Languages (CEFR) could strongly influence the reuse of MALL resources among Mobile2Learn Framework users.

Other studies have demonstrated mobile technologies work as helpful and appropriatetools for language teaching and learning, as seen in Demouy and Kukulska-Hulme (2010). In other studies, significant improvements were detected in listening and reading skills (Kondo, 2012), in vocabulary development (Agca & Ozdem, 2013), in learning idioms (Kargozi & Tafazoli, 2012), in English vocabulary revision (Ma, Chen, Hwang, & Ding, 2012), in using task-based approaches to design a contextualized MALL (Tai, 2012), in pronunciation (Saran, Seferoglu, & Cagiltai, 2009), and so on.

Unfortunately, none of these studies provided any complex didactic recommendations applied either within the process of designing single activities/tools, or in the MALL implementation, as it had been done by Palalas (2012). When exploring the design of a Mobile-Enabled Language Learning (MELL) solution, she defined a set of ten corresponding design principles and eight technological components, which should be integrated into the system (Palalas, 2012). Her proposal contributed examples to solve the problem of inadequate aural skill acquisition with adult ESP students in Canada, similar to the one designed by Lorenz (2011) within the Czech education environment.

Conclusion

Information and communication technologies help education overcome
the gap between time and space. M-learning, based on learners’/teachers’ ownership of mobile devices and mastering skills on how to use them for education purposes, including their willingness to cover related financial requirements for services used, is a natural solution for the net generation of digital natives (Prensky, 2001). This solution is ideal as it puts together favourite learning aims (i.e., mobile devices) and methods of constructivism, connectivism, collaborative active learning and others. All these factors result in strengthening learners’ motivation to learn, as well as enabling to run the process of learning in a way that is natural for them. The efficiency of such a learning process has been a subject of current and future research activities, focused mainly on its didactic potential. Numerous surveys have been published, but didactic ones related to the Czech education and MALL environment are still missing. The hot topics which should be researched and resolved in the near future include: mobile technologies’ affordances in specific learning activities and learning domains, difficult financial circumstances in the field of education in the recent years, and ethical problems relating to the use of mobile devices. The didactic design of mobile devices implementation in MALL (as well as in other subjects to some extent) should also consider the problem of unlimited availability of the teacher, which is a strongly positive feature from learners’ side, but logically a very conflicted feature from the teachers’ view. The ethical question of when it is appropriate to contact the teacher is connected to general behaviour and good manners. Additionally, current learners, being allowed to feel free from young age, sometimes disrupt this subtle border line. At the same time, for at least the last decade, there has been a strong emphasis on teacher-student communication within e-learning with learners being encouraged to contact teachers anytime anywhere. They got used to it rather quickly and as a consequence, recently the boundary
between good and bad manners has been violated to a great extent.

To sum up the circumstances in the Czech Republic, it can be stated the hardware and software have been available to teachers and most learners of all age groups. The offer on the market is as wide as in other countries, and the financial expenses do not exclude the vast majority of learners from the MALL process. If in need, other ways can be always discovered to provide learners and schools with mobile devices (e.g. funded by European projects). Teachers are also interested in using them and in attending courses, mostly held by local institutions for further education for teachers on how to apply mobile devices to lessons in an appropriate way. Under such conditions, mobile-assisted learning can be applied and developed in all subjects in an appropriate manner. Unfortunately, not many large research studies have been published focusing on other subjects in the Czech Republic, though some results are currently available. Mobile devices are exploited in the traditional way, i.e., for searching sources and study materials, running applications for practising the learning content, observing simulations and animations, etc. In Science, where visits to open-air parks and museums are recommended, and so-called Museum Didactics are quickly developing (Bílek, Cyrus, & Slaby, 2008; Bílek, Cyrus, & Slaby, 2009; Krumina, Bílek, & Salickaité-Bunikienė, 2009), mobile devices are often exploited for virtual visits to museums, technological parks, zoos, enterprises and other places where personal attendance could be dangerous (nuclear power station), financially demanding (outer space), or unavailable (micro-world). Reflecting the above mentioned, the vast majority of both students and teachers are ready for efficient use of mobile devices into MALL and other subjects. Didactic recommendations from experienced users from technologically developed countries can help substantially.
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Chapter 19: User Evaluation of Language Learning Mobile Applications: A Case Study with Learners of Spanish

Fernando Rosell-Aguilar
The Open University, UK

Abstract

Studies into the use of mobile applications (apps) for language learning have mostly focused on small samples of learners using a specific app rather than using the apps they have selected for themselves. More data is required to understand the ways learners engage with apps for language learning (through profiles of app users, how apps are used, and user opinions of learning with apps) to create a realistic picture of users in their natural settings. This chapter reviews current research, highlights the potential of mobile apps for language learning, and presents the results of a study into how a group of language learners use mobile apps of their choice. The study is innovative, as it provides the first comparison between app users and app non-users. Data was collected through a questionnaire (n = 85) and interviews (n = 7). The results suggest that there are differences in age and gender between learners who use mobile apps and those who do not. The results also indicate that learners use apps mostly for vocabulary development, translation, and grammar practice. Apps are used often, mostly informally, and for relatively short periods of time. Learners like the ability to practise specific areas, rapid access to information, ease of use, and gamification elements, but have concerns about reliability and other
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factors. All users reported that using apps improved their language skills to different degrees. The chapter discusses the implications of these findings for learner training and app development, reports on limitations, and highlights directions for further research into apps for language learning.

Keywords: MALL, mobile applications, apps, evaluation, user profiles

Introduction: Apps for Language Learning

It has been less than ten years since smartphones were introduced for mass consumption, and in that time they have become almost ubiquitous in many parts of the world. Worldwide, 2.7 billion connections had been made from smartphones by January 2015, and of all webpage views between January 2014 and January 2015, 38% were made from smartphones or tablets (Kemp, 2015). In the USA, for example, 64% of adults own a smartphone, up from 35% in 2011 (Smith, 2015). Among the features that contribute to the appeal of smartphones, as well as tablets, is the ability to install software chosen by the user rather than the manufacturer. This software is specifically designed for mobile operating systems (OS) found in smartphones and tablets and commonly known as apps or mobile apps, available to download from app stores. The most popular ones are the Apple App Store for devices that run the Apple iOS operating system (such as iPhones and iPads), and Google Play and the Amazon App Store for devices that run the Android operating system. A large number of apps are available to download. As of July 2015, Google Play and the Apple App Store offer more than 1.5 million apps each (Statista.com, 2015), although many of these are the same app designed for the different operating systems. The number of downloads for these apps is very high too; the Apple App Store reached 100 billion downloads in June 2015 (Fiegerman,
2015).

Many apps are available for educational purposes, providing new opportunities to engage in learning activities in different spaces, places, and at the users’ own pace. They make use of the features that smartphones and tablets possess, including larger screen size, responsive touch screen, enhanced text-entry, high-quality audio and video playback, recording and editing, voice recognition, enlarged storage, faster connectivity (Godwin-Jones, 2011), portability, sleek design, and intuitive interfaces. One effect of the widespread use of smartphones and tablet devices has been the fall in popularity and ownership of single-use devices, such as mobile phones which only allow calls and texts, traditional wristwatches, or point-and-shoot cameras; even the iPod Classic was discontinued in September 2014 (Johnston, 2014). The reason for this is that many of the capabilities of such devices are now integrated into smartphones, providing these functionalities within a single device.

As early as 2009, there were claims about how apps could serve language learning activity with tools such as translators, dictionaries and voice recorders that could be used to practice pronunciation, as well as the potential to increase students’ awareness of the areas where the target language is spoken (Rosell-Aguilar, 2009). Apps were soon evaluated as potentially beneficial for language learning by a number of authors (Burston, 2014; Godwin-Jones, 2011; Kim & Kwon, 2012; Lafford, 2011; Sweeney & Moore, 2012). These appraisals were based on principles from second language acquisition (SLA) theory and computer-assisted language learning, such as noticing, negotiation of meaning, learning by doing, focus on form and collaborative learning (Skehan, 2003; Doughty & Long, 2003), the provision of tasks that are meaningful and engaging (Oxford, 1990), collaborative, interesting, rewarding, and
challenging (Meskill, 1999), interactive (Skehan, 2003), make use of authentic materials (Little, 1997), and provide opportunities to produce target language (Chapelle, 1998). Other fields that can serve as a framework for the evaluation of apps include the field of mobile-assisted language learning, which advocates the provision of resources that can be used autonomously, taking screen size into consideration in the design of resources, and chunking knowledge as independent learning objects to facilitate processing of information (Ally, 2005). The use of apps for language learning is an example of both didactic mobile learning, defined as “learning from mobile educational material … in a way that responds to the potential and the limitations of mobile devices” (Kukulska-Hulme & Traxler, 2005, p. 26), and discursive mobile learning, based on the interaction among learners that apps can afford. Another advantage of MALL is that it offers “just in time learning” (Traxler, 2007; Pegrum, 2014) “where learners can often take advantage of unexpected free time since they often have their devices with them” (Evans, 2008, p. 492).

An issue that affects learner engagement with apps for learning purposes is Continuous Partial Attention, the process of paying simultaneous attention to a number of sources of incoming information, but at a superficial level (Stone, 2009). The practice of taking the opportunity to learn during short periods of inactivity also has implications for the design of mobile apps, as learners may choose not to engage with materials that require deep concentration or a long time to process. Kenning (2007) speculated that mobile learning could be “a highly fragmented experience liable to be fraught with distractions” (p. 194). Both this and continuous partial attention affect the mobile learning experience, as users can be distracted by notifications from other apps such as Facebook, Twitter, email, or messaging whilst using their mobile devices.
One common assumption regarding the use of technology, including mobile technology, by 21st Century learners is that they are “digital natives” already prepared for the use of devices (Prensky, 2001). Many, however, have questioned this notion, (e.g., Bennett, Maton, & Kervin, 2008). Instead, Pegrum (2014) refers to learners being “tech-comfy”, able to use new technologies for social and entertainment purposes, but in need of training to become “tech-savvy” and use the technologies for professional and academic purposes as well as developing critical skills to evaluate them (Pegrum, 2014, p. 39).

Finally, other factors to take into consideration in the evaluation of apps for language learning are usability of the app (Shield & Kukulska-Hulme, 2006) and gamification, i.e., using game design elements applied to educational contexts (Domínguez et al., 2013).

**Literature Review: Research into Apps for Language Learning**

The use of apps for language learning has been the subject of a number of studies. Most of these have found very positive attitudes towards learning with apps (e.g., Khaddage & Lattemann, 2013; Brown, Castellano, Hughes, & Worth, 2012). A study with 13 university students of German using iPads to engage in listening and speaking activities at advanced level by Lys (2013) concluded that the devices were suitable for engaging with such activities; her students felt that they had the necessary competency to use the devices and were also comfortable using them. Castañeda and Cho (2013) carried out a study with undergraduate students of Spanish who showed significant improvements in verb conjugation ability after using a conjugation app. The participants in their study also reported that the gaming features of the app were the most enjoyable. Kim (2013) also found positive attitudes towards the use of apps. Her study of Korean students
Learning English reported improvements in listening comprehension. Yildiz (2012) reported that using apps with young learners of English as a second language led to positive effects on vocabulary acquisition, phonological awareness and listening comprehension skills. Similarly, other studies have found improvements in literacy, reading and writing with native speakers of English (McClanahan, Williams, Kennedy, & Tate, 2012; Harmon, 2012). In his study of 70 Hungarian learners of German, Kétyi (2013) reported that most students enjoyed using the chosen app (Busuu) and considered it helpful for language learning. The students liked the gamified elements, the use of different media, interaction with other learners, and immediate feedback. Busuu, however, requires a paid subscription for full access to the content, and 92% of participants stated that they would not be willing to pay after the free seven-day trial in which they took part. Other studies have reported on skills specific to certain languages, such as learning Chinese characters (Rosell-Aguilar & Kan, 2015), with very positive results.

As well as positive results and impressions, there have also been criticisms about language learning apps, particularly in terms of design. Many language learning apps are designed for learners at a beginner level. Activity types for vocabulary recall and grammar drilling are relatively easy to design. Since beginners need to build their vocabulary and value exercises that drill grammar items such as conjugation, plural formation, or prepositions, apps are a good fit to practice in such a way. This sort of drilling also lends itself to activity types where only one answer is correct, and therefore such activities are easy to assess as right or wrong, with feedback on performance often limited to a tick or a cross. Advanced language learners, in contrast, require more sophisticated activities, which are consequently harder for automated software to assess and provide
feedback on. Brown et al. (2012) warned that the success of any activity involving mobile devices depends on the task carried out as well as familiarity with the device and software. Kim and Kwon (2012) reviewed a number of language learning mobile apps and concluded that most apps focus on cognitive processes (recognition, recall and comprehension) and receptive language skills rather than socio-cognitive activities, with little collaborative learning. Burston argued that “pedagogically, nothing new has been done with smartphones that has not already been done with earlier mobile devices” (Burston, 2014, p. 108). Other criticisms surrounding the design of language learning apps include poor navigation and user-interface design, the fact that there is too much focus on translation, and little use of the unique properties of smartphones, such as multimedia capabilities and connectivity with other users in particular (Godwin-Jones, 2011; Burston, 2014).

This situation is changing and, as Sweeney and Moore (2012) have noted, “more useful material is gradually being created by publishers” (p. 35). Whilst some app developers continue to offer limited activities that focus on drilling and translation without much meaningful feedback or support, some apps such as Duolingo, Busuu or Babbel offer a much more well-rounded experience, including practising a number of language skills (reading, speaking writing, listening), a wider variety of activities, and use of gamification to keep the user engaged.

Research Questions

Studies into the use of apps for language learning have mostly focused on small groups using a specific app rather than learners using the apps they have selected for themselves. However, learners typically find their own apps through searches, recommendations, or download popularity charts in
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Apps stores, and most app use for language learning is rarely integrated into formal teaching. As such, a research approach that allows the investigation of app use in naturalistic settings is necessary. More information is required to understand the way learners engage with apps for language learning, including providing a profile of the app user, how apps are used, and user opinions of learning with apps. In addition, although smartphones and tablets are mobile devices, there is little evidence that they are being used “on the move”. The research questions this study focused on were:

- Are there any differences between app users and app non-users? This includes factors such as age and gender, devices owned, and operating system of those devices.
- What type of apps do language learners choose and use independently to aid their learning?
- How do learners use apps? How often, for how long, where, and when?
- What are the most and least appreciated features of language learning apps? This question includes features that learners would like to see in apps and the issue of payment for apps.
- Do learners think the use of apps contributes to their language learning?

Participants and Methods

Participants in this study were adult learners of Spanish taking a Higher Education qualification with a distance learning university in the UK. The research received approval from the university’s Human Research Ethics
Committee. At the time of the study, the participants were attending a weeklong residential school in Spain. A questionnaire was distributed among all 165 participants (60.61% female / 39.39% male) in the residential school, who were advised that filling it in and returning it was voluntary. A total of 85 students (51.51%) returned the questionnaire.

A first version of the questionnaire was designed and a pilot study was carried out with a sample set of 91 students in 2014. Based on the responses from that pilot, the questionnaire was revised. The more concise and clearer questionnaire contained 27 questions; twenty multiple-choice questions and seven open questions. Questions included personal data (age, sex), device ownership (which device, Operating System), and use of apps for language learning (which, where, when, how long, what for, opinion, features, impressions) (see Appendix A for full questionnaire). The data from the paper questionnaires was input into SurveyMonkey for statistical analysis.

In addition, seven voluntary interviews were carried out with five female and two male respondents. These interviews were 15 minutes long on average and were audio recorded with the students’ consent. The interview questions asked about device preference, use of apps context, feedback obtained from using apps, app features and paying for apps. Some of these questions were followed up with impromptu questions to seek clarification, depending on previous answers. The interview recordings were transcribed and coded for thematic analysis following principles of participant anonymity and research rigour.

Questionnaire respondents provided information about device ownership. Those respondents who did not reply and those who did not own a smartphone or tablet (n = 8) were removed from the analysis, making the total n = 77. Of these, forty-eight (62.34%) were female and twenty-nine (37.66%) were male. Seventy-one respondents provided their age. The age
spread was twenty-five (35.21%) in the 18-30 range, seventeen (23.94%) between 31 and 40, fourteen (19.72%) between 41-50, nine (12.68%) between 51-60, five (7.04%) between 61-70 and one (1.41%) over 70.

Results

The results are presented here, divided into five sub-sections in response to the five main research questions.

User Profiles: Are There Any Differences between App Users and App Non-Users?

Fifty-eight (78.38%) respondents use language learning apps to support their language learning, compared to sixteen (21.62%) who do not. This is a considerable decrease from the pilot study, where 34.06 of respondents did not use apps. Among the app users, thirty-seven (63.79%) were male and twenty-one (36.21%) female, whereas among app non-users, the gender split was 50% (eight each). Of the sixty-eight participants who provide their age, fifty-three (77.94%) were app users and fifteen (22.06%) were app non-users. The breakdown of age ranges is presented in Table 19.1.

<table>
<thead>
<tr>
<th>Age</th>
<th>App users</th>
<th>App non-users</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-30</td>
<td>19 (35.85%)</td>
<td>4 (26.67%)</td>
</tr>
<tr>
<td>31-40</td>
<td>16 (30.19%)</td>
<td>1 (6.67%)</td>
</tr>
<tr>
<td>41-50</td>
<td>8 (15.09%)</td>
<td>5 (33.33%)</td>
</tr>
<tr>
<td>51-60</td>
<td>6 (11.32%)</td>
<td>3 (20.00%)</td>
</tr>
<tr>
<td>61-70</td>
<td>4 (7.55%)</td>
<td>1 (6.67%)</td>
</tr>
<tr>
<td>70+</td>
<td>0 (0.00%)</td>
<td>1 (6.67%)</td>
</tr>
</tbody>
</table>
A total of fifty-eight (100%) app users and thirteen (81.25%) app non-users provided details about which devices they own (Table 19.2).

<table>
<thead>
<tr>
<th>Device owned</th>
<th>App users</th>
<th>App non-users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smartphone</td>
<td>19 (32.76%)</td>
<td>5 (38.46%)</td>
</tr>
<tr>
<td>Tablet</td>
<td>4 (6.90%)</td>
<td>2 (15.38%)</td>
</tr>
<tr>
<td>Both</td>
<td>35 (60.34%)</td>
<td>6 (46.15%)</td>
</tr>
</tbody>
</table>

Participants’ devices had a variety of Operating Systems, but iOS (Apple’s OS) devices almost doubled those who used Android OS. Only a minority use devices that run the Windows mobile OS.

The respondents who did not use language learning apps listed the following among their reasons for not using them; lack of awareness of apps for language learning (37.50%); preference for other methods (such as videos, podcasts, using a laptop rather than a mobile device), or more “traditional” methods, such as books or spoken exchanges with other people (25.00%); lack of time (12.50%); and screen size (6.25%). The main reason for not utilising apps in language learning given by three respondents (18.75%) was that the app store for Windows Phones lacked adequate content for language learners.

**What Type of Apps Do Language Learners Choose to Use Independently to Aid Their Learning?**

The primary area of language learning for which respondents use apps is vocabulary (82.26%), followed by translation (66.13%), and grammar practice (58.06%). Some 41.94% use them for reading and 38.71% for listening practice. Apps are used least for speaking practice and to facilitate interaction with others (11.29% each). The top five apps used by
questionnaire respondents are *Duolingo* (a full language learning app), mentioned by seventeen respondents (29.3%), *Memrise* (flashcard app) by sixteen respondents (27.6%), *Google Translate* (translation app) by twelve respondents (20.7%) and both *Word Reference* and *Collins Spanish Dictionary* (dictionary apps) by four respondents (6.9%) each. Other apps mentioned included *Busuu* and *Babbel* (full language learning apps—three respondents each); different dictionary apps, and various news, TV and radio apps, which allow language learners access to native sources of Spanish reading and listening practice, were also used.

The use of apps is not restricted to a single app; three quarters of respondents use more than one app to supplement their language learning.

**How Do Learners Use Apps?**

The majority of mobile device users of language apps in this study state that they use apps informally, as and when the opportunity arises (60%), rather than in planned study sessions, although 40% state that they use apps both informally and during planned study sessions. Male and females do not differ significantly in their response to this question, but there is noticeable variation between respondents of different age ranges, with younger age ranges tending to use apps only in informal situations, while older age ranges are more likely to use apps both informally and in planned study sessions. One of the interviewees (Interviewee 4) stated that he tends to plan the use of apps and can devote between 30 minutes to an hour on *Memrise* “if the session is going quite well”.

Some sixty-one participants responded to a question about the frequency of their app use: ten respondents (16.39%) use them several times a day, seventeen (27.87%) use them every day, twenty-two (36.07%) several times a week, five (8.20%) about once a week and seven
(11.48%) less frequently than once a week. There is no particular trend between different ages, but there is distinct variation between male and female respondents in this question, with 52.38% of male respondents using apps at least daily, compared to 36.11% of women. Although female respondents use apps less frequently, they are more likely to use them for a longer period of time; 52.63% of female respondents report they use an app for 15 minutes or longer, in contrast with male respondents among whom only 23.81% use the app for that long. Some 76.19% of male and 47.36% of female respondents use apps for shorter periods of time, ten minutes of fewer (see Figure 19.1).

![Duration](image_url)

**Figure 19.1 Percentage of Time Spent Using Apps by Gender**

This trend is echoed in the interviews with female app users. Interviewee 6 reported that she could spend up to 30 minutes on just one entry of the *Collins Dictionary* app, as it afforded her the opportunity to expand and explore many different phrases from just one word. Interviewee 2 also reported that she often used apps for up to 30-45 minutes, although
she would use game apps or *Memrise* to “kill time” when waiting for the bus. Interviewee 3 reported using *Memrise* for up to 30 minutes at a time, although she would also use apps “whenever I have five minutes”, e.g., on the way to work. Interviewee 7 also used *Duolingo* or similar apps for between 30 minutes to an hour, as she found it “quite fun” and “tends to get quite caught up in it”.

To obtain information about where respondents use language learning apps, the questionnaire offered a number of choices and asked participants to select all that applied. Responses can be seen in Figure 19.2.

![Figure 19.2 Situations Where Language Apps Are Used](image)

During the interview questions related to the location, interviewee 6 states that she could use apps any time in a 24-hour period, particularly as she does not sleep well, but she also used apps during breaks at work. Interviewee 1 used apps to listen to audiobooks via *Audible* on long train journeys and on her way to Spanish tutorials to get her in the right frame of mind. Interviewee 4 commented that he needed to concentrate on the apps, rather than use them while doing other things, such as watching TV.

One of the interview questions asked those who own more than one device (smartphone and tablet) about preferences for which device to use
for language apps. For Interviewee 7, the choice between a tablet and a smartphone depended on where she was in the house, and the purpose for which she was using the device. She stated that her iPad was used for planned study sessions, when she was using apps such as *Duolingo*, which are more visual, or when she was having her lunch. In contrast, she used her iPhone when she just wanted to quickly check something on *WordReference* whilst studying, or to look up verb forms whilst speaking in Spanish. Interviewee 6 also stated that location is a deciding factor in her choice of whether to use a tablet or a smartphone at any given time, and noted the convenience of an iPhone over a tablet, although she found the *Collins Dictionary* app easier to use on an iPad due to screen size. Interviewee 2 also noted the convenience of smartphones when “on the go” due to device size, compared to a “big tablet”. She did not find that screen size affected her decision between a tablet and a smartphone. For interviewee 5, the choice between iPhone and iPad was decided by the type of app he wanted to use at the time. Like the others, he saw dictionary apps on the iPhone as convenient, as he could “take it around with [him] everywhere and when [he thought] of something, [he could] just look at it”, but saw the iPad as more suited to visual apps and games such as *MindSnacks*, as it was “just easier to look at” and also easier for using books due to its bigger screen.

**What Are the Most and Least Appreciated Features of Language Learning Apps?**

Three questions in the questionnaire asked respondents about the app features they liked best, least and further features they would like to find in language learning apps. This issue was also part of the interview questions.

A total of forty-eight respondents replied to the open question about most liked features. The most mentioned feature was the ability to focus on
specific areas, such as translation, grammar practice, or vocabulary (mentioned by twenty-two respondents). Other liked features included ease of use (mentioned by 12 respondents), rapid access to information (8 respondents), game-like elements (4 respondents), access to authentic materials (2 respondents), and portability and feedback (1 respondent each).

The interviewees also mentioned these features. In terms of app design, Interviewee 2 mentioned that she liked apps that were “colourful, easy, straight to the point,” and were “simple and visual,” while for interviewee 3 the app she used the most (Memrise) was simple and had “just what you need”. With regards to the ability to focus on specific areas, one respondent mentioned the ability to practice “over and over.” Interviewee 1 mentioned how she appreciated the ability to focus on troublesome areas in Memrise, and how the app would repeat words that the user was not getting right. Likewise, Interviewee 4 stated that a helpful feature of Memrise is that the user was not allowed to make too much progress until they had mastered a certain number of words. In terms of gamification, several respondents mentioned that apps were “fun” and the competitive nature of some apps, which gave them targets to reach every day, were encouraging. Interviewee 5 stated that “fun” is an important feature for him and that certain games can be “quite addictive,” although the app needed to be effective as a language learning tool as well. Interviewee 7 mentioned that she gets competitive with herself and loved “that buzz of being able to recall” vocabulary. Interviewee 4 drew attention to the “clever little system”, whereby one’s progress on the app he used is measured by the growth of virtual plants. Interviewees 3 and 5 mentioned that apps on mobile devices offered more opportunities for study and negated the need to carry around heavy language books when one wants to “learn on
the go”. This was particularly beneficial for users such as Interviewee 6, who had to stay in hospital for long periods and needed to know she had everything available to continue her studies. She also mentioned that iPads are much easier tools on which to study than a laptop, which is much heavier and awkward for somebody who may have to study in bed. The convenience of being able to undertake short bursts of activity was also mentioned: Interviewee 1 stated she was able to “do two minutes and then put it down” while waiting for something to boil, and Interviewee 6 mentioned that she liked being able to do “a selection of different tasks” during breaks at work.

There was also a variety of responses to the question of what features were liked least in language apps. Forty questionnaire respondents answered this question and the most common response (8 responses) highlighted usability issues about the interface and design of the app: cluttered interface, text size and colours that have poor contrast, too many clicks, and amount and difficulty of typing on a smartphone. Other responses included unreliability of content/content errors (7), lack of grammatical explanations and usage examples (4), software glitches / freezing (4), advertising (2), the decontextualized manner in which content is presented in some apps (2), having to pay for content (2), requirement to be online to use certain apps (2), and poor feedback (1).

The interviewees mentioned some of these issues as well. Concerning content unreliability, Interviewee 4, a user of both Google Translate and Translator, suggested that many translation apps provided different answers and unreliable translations; at the same time, nuances could be lost. He tended to use these types of apps as “a bit of a crutch” and “confirmation,” which he could “access at any given moment” but noted that it was important not to “over-rely” on them and be “selective” in what he uses. Interviewees 1 and 5 stated their dislike of advertisements in mobile
applications, particularly when the apps were so intrusive that they prevented the user from actually utilising the app until the advertisements were closed. However, Interviewee 1 was not bothered by them when they did not impede the use of the app. Although adverts did bother Interviewee 5, he did not consider this enough to justify paying for an app solely to disable them. Interviewee 6 also found them “distracting and annoying” and she named advertisements among her least favourite features of apps; she is willing to pay to eliminate adverts.

Other issues that did not appear in the questionnaire responses but were mentioned during the interviews are:

- Lack of content for advanced users Interviewee 5 suggested that apps tend to be tailored more for those at beginner level or who want to learn holiday phrases. Interviewee 1 made a related point, that drop-down or multiple-choice questions offered by some apps were too easy; she believed they would be more challenging if users had to come up with the answer themselves.

- Inability to customise according to level or need: Interviewee 1 stated that although she had used Busuu in the past, she no longer used it, as one has to complete beginner-level sections before moving onto more advanced areas, which is too time-consuming. Interviewee 3 also mentioned certain missing features in Memrise, such as the ability to test oneself on gender of nouns, rather than just the noun itself.

- Lack of synchronicity between apps: although not mentioned by any respondents in the questionnaires, an
interesting point raised by interviewee 6 is the lack of synchronicity between language learning applications, of the type, which exists between diet tracking and fitness apps, for example. She described language-learning apps as “disjointed” and would like to be able to highlight a new word in a dictionary app, and then incorporate any new words into a flashcard app to aid vocabulary learning.

- Predominance of Latin American Spanish: this was not mentioned by any of the questionnaire respondents, but two interviewees mention that they dislike the predominance of Latin American Spanish varieties in the apps available, as they would prefer to focus on Peninsular Spanish. Interviewee 5 mentioned only using *Duolingo* for German, not Spanish, due to its focus on Latin American Spanish.

Questionnaire respondents and interviewees were also asked about features they would like to see in apps. Answers to this question were, in many cases, extensions to the question of what was disliked most about apps. This might be due to the location of the question in the questionnaire, a design fault that should be rectified in further replications of the study. Responses include mainly design and pedagogical issues. In terms of design, participants mention better structure and mapping of content, better quality sound and spoken translation capabilities, the ability to access content offline, and the ability to speak to somebody “in real time” and facilitate exchange with native speakers. From a pedagogical point of view, participants include having one app that allows them to practise all four skills of reading, speaking, listening and writing, more grammatical
content, more tests, quizzes and interactive material, more usage examples of both grammar and vocabulary, more colloquial and idiomatic examples, and better quality feedback.

Survey respondents were asked specifically about the type of feedback they receive from apps, to which 42.11% replied that feedback is either “very good” or “good”. For 22.81%, feedback is either “OK” or “not very good”. Although no respondent stated that feedback is “terrible”, 35.09% of respondents claimed that they do not receive feedback from the apps they use – possibly due to the types of apps that some respondents use. Interviewee 5 provided an example of useful feedback that he used to receive from using LiveMocha – native speakers of the language would correct him by listening to audio recordings he made in Spanish and pointing out mistakes in pronunciation. Interviewee 7 added that apps such as WordReference offer a way to check herself on areas such as verb conjugations.

A final issue included in this section is that of app prices and payment for upgrades, full content and/or removing advertising. The questionnaire asked whether respondents pay for language learning apps and why, giving a list of the six most common reasons from the pilot study. In response to the question about whether they pay for apps, 60.34% of questionnaire respondents selected that they never pay for apps and only download free apps. A further 29.31% pay “sometimes”, 3.45% pay “most of the time”, and 6.90% pay only after trying a “lite” version (if available). There was no discernible relationship between age range and willingness to pay for apps. However, responses suggested that male app users were more likely to pay for apps than females. No female respondent stated that she paid for language apps “most of the time”, and 25.00% stated that they paid for apps “sometimes”. Male respondents were more likely to pay for apps “most of the time” (9.52%) or “sometimes” (38.10%). The full
breakdown of responses appears in Figure 19.3.

![Figure 19.3 Responses by Male and Female App Users to the Question of Whether They Pay for Apps](image)

Concerning the participants’ reasons for paying for apps or not, roughly the same proportion of men and women said that all language learning apps should be free (42.86% and 43.48%, respectively). Males seemed more likely to feel that apps represent good value for money (50.00%, compared to 21.74% of women), but 34.78% of women also responded that they think prices of apps are quite reasonable, compared to 28.57% of men. When comparing responses by age range, 57.14% of 31-40 year olds and 60.00% of 41-50 year olds said that apps should be free to use, compared to 25% of 18-30 year olds. 18-30 year olds were also slightly more likely to regard apps as good value for money (43.75%, compared to 28.57% of 31-40 year olds and 40.00% of 41-50 year olds). Although no respondent above the age of 50 regarded apps as “good value for money” or thought that developers should be rewarded, 66.67% of 61-70 year olds stated that prices were reasonable.
The interviewees were also divided on whether they were happy to pay for a language learning mobile app. Interviewee 2 argued that free apps are always as good as paid ones, and disliked the inability to try an app before committing to purchase it. She has never paid for extra content, and will always check the small print for any additional in-app purchases. Interviewee 2 stated that one could usually find what they want for free. Interviewee 4 also stated that he tries not to pay for apps if he can help it. The other interviewees were more willing to consider paying for apps, but with certain caveats. Interviewee 1 stated that she will always try a “lite” version first, but would not “think twice” about paying for a good app. Interviewees 5 and 6 both stated that they would also pay for apps and have done so. The reputation of the app provider is also a factor for interviewee 7, who said that she would need to be convinced the app was “100% correct” before parting with her money.

**Do Learners Think the Use of Apps Contributes to Their Language Learning?**

In response to the question “Do you think using language learning apps has improved your knowledge of Spanish?”, a large proportion of respondents stated that they felt that apps had improved their Spanish either “a lot” (32.79%) or at least “somewhat” (39.34%). Just over a quarter of respondents chose “a little” (27.87%) but nobody selected “not at all”.

During the interviews, interviewee 4 stated that he would use apps as a reference now and again when he did not have his hardback dictionary on hand, but his usage of apps was “not every day” and “not for everything”. Although he had used Memrise and described it as a good system with “a lot of repetition”, Interviewee 4 stated that he found it difficult to keep on top of new words in the app, and has discovered instead that repeatedly writing
out words to learn new vocabulary works better for him. He also believes that apps may have had a negative effect on his language learning, as he has been criticised for over-reliance on the sometimes too-literal translations provided online. In contrast, Interviewee 2 described herself as an “audio-visual learner” and finds that apps are more suited to her learning style. She finds reading much more difficult and books with ”loads and loads of words” are not appealing. For Interviewee 7, apps such as Memrise offer a fun alternative to traditional methods of vocabulary learning.

Interviewee 5 stated that the convenience of being able to look up words/access information quicker has probably meant he has learnt more and the convenience aspect has also improved his Spanish. Interviewee 6, who is suffering from a serious health condition, also stated that having everything handy on one device makes it much easier for her to continue her studies while she is in the hospital, where she once may have struggled.

In the final question, questionnaire respondents were asked to share any final thoughts about learning languages with apps. Respondents brought up issues about reliability of apps in terms of software as well as content accuracy, mobility, convenience and ease of use. Several respondents mentioned that they found apps very useful to provide variety and a different experience from more traditional materials, as well as motivation to keep trying. The most common comments highlighted that, regardless of how useful they are, apps are supplementary to formal learning and not replacements for it; neither can they replace human interaction or living in a country where the target language is spoken.

Discussion

Most research into mobile applications and how they are used has focused on app users only, so it is interesting to contrast the differences
among app users and app non-users in terms of age and sex, even if the numbers are rather small to draw meaningful conclusions. From a sample made up of 62.34% female and 37.66% male respondents, the fact that the gender split among app users was 63.79% male and 36.21% female strongly suggests that men are more likely to use apps. The differences in age also suggest that younger learners are more likely to use them. The decrease by over 10% in percentage of respondents who do not use apps between the pilot study and the current study (both with students taking the same course) is an indicator that with time more learners are beginning to introduce apps into their set of resources to support their language learning. It is also worth noting that over 80% of app non-users own devices in which apps can be used, so device ownership is not the deciding factor for non-users (except perhaps Windows phone users, who made reference to the lack of language learning apps in the Windows app store). Instead, preference for traditional methods, reliability, limited knowledge of device and apps, and time were the main factors. This suggests that training on the potential of mobile devices and apps available for them, as well as how to evaluate apps for their own learning needs, would be beneficial for those who as yet do not use apps for language learning as it would help them make the transition from “tech-comfy” to “tech-savvy” (Pegrum, 2014).

It is not surprising that vocabulary and translation are the most popular apps used by the language learners in this study. First, because these are the most widely available types of language apps, and second, because they are the type of app that can be utilised to check meaning “just in time” whilst doing something else (Traxler, 2007; Pegrum, 2014). It makes sense that grammar apps are also very popular, as these can be used for shorter or longer periods of time. Additionally, grammar apps as seen as convenient and rewarding to use; grammar is an area of language learning
that modern pedagogies (e.g., communicative language teaching or learner-centred approaches) do not always place at the forefront of language learning, yet it remains something that students believe they need to master, regardless of their language level. The small number of available apps that focus on speaking and interaction is the obvious reason for their low use, although there may be other reasons.

The results show that learners use apps mostly spontaneously, but a considerable proportion also use them in planned study sessions; age seems to be a factor in this. Over 48% use language learning apps at least once a day, and men tend to use them more often but for shorter lengths of time than women. There is no clear reason why women use apps less often but for longer, and this may be worthy of further research to ascertain whether it is a design issue that developers need to take into account. In terms of location where apps are used, the most popular answer was “at home”, which raises issues about how mobile the learning experience is, despite apps being used on mobile devices (Kukulska-Hulme & Traxler, 2005). As reported above, home use does not mean that they are used in planned study sessions as, within their homes, learners use them whilst doing other activities such as watching TV (19.64%) or in the bathroom (10.71%). This and the rest of the locations such as commuting, breaks at work, and waiting rooms suggest that engagement with learning apps may not be exclusive, and indeed users are engaging with other activities, which in turn suggests that the concepts of continuous partial attention (Stone, 2009) and the matter of distractions whilst engaging with mobile content (Kenning, 2007) are relevant to the use of apps. This result is of high relevance for app developers, and language learning app developers specifically, who will need to consider different levels of engagement when designing apps to attract and keep the user’s attention.
PART III: Research from Case Studies

The choice of device for those that own both smartphones and tablets seems motivated mostly by convenience, although the design of the app and how it is used are important factors. Hence, dictionaries and translation apps are mostly used on smartphones for quick reference, but there are also examples of learners using them for extended periods of time, depending on their needs.

Regarding features of language learning apps, the responses from the learners who took part in this study in terms of most appreciated features (rapid access, convenience, portability, gamification elements, ease of use) and least liked characteristics (reliability, interface, design, advertising and customisation among them) provide a valuable starting point for reflection around app and task design. It is interesting that learners wish for apps that can cover all language skills, a more integrative approach to language learning, when most of them engage in “app smashing” (using more than one app for a purpose) and know that they can get different things from different apps. A possible solution comes from the suggestion by one student for better synchronicity among apps so they can form part of a bigger personalised learning suite of tools.

Considering that most language learning apps provide very limited and impersonal feedback, mostly consisting of a simple tick or cross (or green or red) indication of whether the answer is correct, it is surprising that over 40% of respondents consider feedback either good or very good. In many of the available apps, when learners provide incorrect answers, they do not get any support to help them understand why their answer is incorrect and they can only try again until they get it right by elimination. In part, their satisfaction with the limited feedback may be due to low expectations of what an app can provide. Additionally, most activity types in language learning apps tend to be multiple choice, filling in blanks with multiple choices, and
matching exercises, activity types for which simple feedback might be seen as sufficient.

There seems to be a general attitude towards apps as something that should be free, both within and outside education, and this is reflected in the responses from the survey respondents and interviewees. The question of app payment is crucial for app developers; without generating income there is no business in app development, yet many users dislike advertisements and most are not willing to pay for apps or in-app purchases. Many providers, such as Busuu or Babbel, use a subscription model. Although data about the percentage of app users who choose to subscribe is not publicly available, it can be presumed that this is a viable model for them. Others offer free access to a limited amount of content and sell further content through in-app purchases. Duolingo does not offer subscription or in-app purchases, which may be the reason for its popularity and dominance on the market. Instead, their revenue comes from offering crowd-sourced translations that companies, not users, pay for (Simonite, 2012). Duolingo has recently ventured into the language testing and certification market and this may well be a direction that other app language providers will move towards.

It is clear from the results that learners who use apps feel that their use contributes to their language learning to some extent. This use is clearly supplementary in the case of the participants in this study, as they are enrolled in a language module. The extent to which apps contribute to their learning is not easily measurable, as different learners use apps for different purposes in different places, and engage in varied ways. Learners can choose to supplement their language learning with apps, which can constitute either a large or a small proportion of their supplementary learning.
Conclusion, Limitations and Further Research

Conclusion

This study has shed light on the practices and beliefs of language learners who choose to use apps to support their language learning, as well as some insights into those learners who choose not to use them. It is innovative in that it has produced the first comparison between app users and app non-users. It has also discussed the implications of the results in terms of app design and pedagogical practices.

Learners appear generally satisfied with what they are offered (although they wish for more and better quality content) which, considering that most do not and would not pay for apps, is perhaps appropriate. Some developers are striving for constant improvements, although others continue to use repetitive activities and focus on written language only.

Apps provide a good supplement for learners who are enrolled in formal instruction and a good starting point, perhaps primarily for independent learners. Anecdotal evidence seems to point towards a growing number of adults re-igniting their language learning (after some experience at school) by first using apps informally. Language learning apps may be a new way to attract students towards formal learning once they have discovered an appetite for languages and get past the basic language practice that apps tend to offer, something that would be welcome in areas where formal language teaching is in decline.

Finally, there is a case to be made for mobile device use training and potential for learning, including apps. Non-app using language learners may be unaware of mobile app potential, or may be reluctant to use them due to a lack of information or concerns surrounding data protection and online payments.
Limitations

A number of limitations affect this study. The data is self-reported and may be subject to the limitations that such research methods have (Paulhus & Vazire, 2007). In addition, the participants are registered on a distance-learning course and may be more used to engaging in independent learning than students taking traditional face-to-face courses. In addition, the comparison between app and app non-users is limited by the relatively small number of responses from app non-users.

Finally, no data was gathered on language acquisition gains or results from the course assessment. As this study was not designed within a language acquisition framework, no attempt was made to match questionnaire responses and course results for analysis. Additionally, causality between app use and linguistic outcomes would be impossible to measure with independent learners, due to the many different individual practices and levels of engagement reported.

Further research

It would be of great interest to replicate this research both in long and short-term studies. Software updates and new devices with improved and additional tools continue to appear in the market, and app use and mobile device ownership continue to grow. These changes mean that issues about what stops some device owners from using apps to support their language learning and the usage habits and beliefs of those who do will continue to be relevant for those interested in CALL and MALL, as well as language materials developers.

Whilst this study has provided a snapshot of app use among language learners enrolled in formal studies (as has also been the case with much of the previous research on language learning app use), it would be worthwhile to complement this data with research into how language learning apps are
used by independent learners and what they think about learning in such a way, in particular among users who utilise apps as their main medium for learning. This group of learners is also more likely to be a reliable source of data on actual language gains, since they may not take part in other activities towards language learning, which would make the effectiveness of app use towards language learning harder to prove. To supplement survey data, a future study to investigate informal learners who use apps for language learning could take an ethnographic or auto-ethnographic approach to generate rich qualitative data in a naturalistic setting.

**Recommendations for Practitioners**

It is important that learners understand how they can use any technology available to them to support their language learning. As evidenced in this chapter, some users of smartphones and tablets do not think of them as learning tools. It is advisable to encourage this use outside the curriculum, as, eventually, these learners will engage in informal learning. Apps can support language learners as they become lifelong learners rather than students of a subject in a formal educational setting. A few moments spent in class, discussing how students choose apps, sharing the apps they like best, how they find them and evaluate them, could help learners support their studies, whether formal or informal.

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Appendix A: Learner Questionnaire

Survey on use of apps: this survey aims to find out more about the use of language learning apps. Your answers will be completely anonymous. It should take around 5 minutes to complete. By completing this survey you give permission for the data collected to be used in an anonymous form in reports, presentations and published papers relating to this study for research purposes.

1. You are:
   Male Female I don’t identify as either male or female
2. How old are you?
3. Do you own a smartphone (Galaxy, iPhone or similar) or tablet (iPad, Kindle Fire, Samsung or similar)? Please circle
   Yes (please indicate which) Smartphone Tablet Both No
4. Do you use apps to support your learning of languages?
   Yes (go to question 6) No (go to question 5)
5. If "no", why not? (After answering this question you may return your questionnaire)
6. Which device do you mostly use to access apps?
   Tablet (e.g., iPad) mobile phone Other (Specify)
7. Which operating system does your device use?
   iOS (Apple) Android Windows phone Other (Specify) Don’t know
8. You use Language learning Apps for:
   Learning Teaching Both
9. How do you use Language learning apps? (Please tick one only)
   Mostly in planned learning sessions (e.g., routine evening sessions)
   More informally, as when and where the opportunity arises
   Both of the above
10. How often do you use Language learning apps?
   Several times a day    Every day    Several times a week
   About once a week      Less frequently than once a week

11. Where do you use language learning apps? (Tick all that apply)
   At home    Commuting   Quick breaks at work   Waiting rooms
   Whilst watching TV   In the bathroom   Any dead time I have
   Other (Specify)

12. Which specific areas do you use language learning apps for? (Tick all that apply)
   Grammar exercises   Vocabulary   Reading   Writing
   Listening practice   Speaking practice   Translating
   Interacting with others   Other (specify)

13. Do you use more than one app to learn Spanish?
   Yes    No

14. Which apps do you use to support your learning of Spanish? Give some examples:

15. Think of ONE specific app you use to learn Spanish. Which app is it?

16. How long do you normally spend using that App at a time?
   Less than 5 minutes   Around 5 minutes   Around 10 minutes
   Around 15 minutes   Between 16 and 30 minutes   Over 30 minutes

17. What do you think of feedback you get about your performance whilst using the app (e.g., on errors)?
   Very good   Good   OK   Not very good   Terrible I don’t get any feedback

18. What features do you like best in the language learning apps you use?

19. What features do you like least in the language learning apps you use?

20. What more would you like to get from Language learning apps?

21. Do you think using Language learning Apps has improved your knowledge of Spanish?
   A lot    Somewhat    A little    Not at all

22. Do you pay for Language learning apps?
   Most of the time    Sometimes    Never, I only download free apps
   Only after I have tried a "lite" version (if available)
23. Why? (Tick all that apply)
   - They’re normally good value for money
   - The prices are quite reasonable
   - The developers provide a service and therefore should get money for it.
   - I think all Language learning apps should be free
   - They’re too expensive
   - I don’t have a way of paying

24. Please share any other thoughts you have about learning with Language learning apps.

Thank you very much for taking part in this survey. Please return it to your tutor.
Chapter 20: In Search of the Effectiveness of MALL: A Case Study about Smartphone Based EFL Learning in a Chinese Vocational College

Yinjuan Shao

Bank of Communications, China

Liwei Wang

Changzhou Hygiene Vocational Technology College, China

Senlin Lü

China Online Education Research Institute, China

Abstract

In this chapter, the practice of MALL in a vocational college in China is discussed, and more precisely, a MALL study in a nursing college in JiangSu Province in China. Three classes of freshmen attending this college were selected to learn English in alternative methods: traditional paper-based learning and voluntary mobile learning. In this study, we keep our focus mostly on the latter method. Different learning channels were open for the participants to choose the most suitable way for their own learning. Most participants demonstrated positive feedback for learning with the mobile app “Smart Phone Class” (SPC), coupled with group discussion with mobile QQ. The possible correlations of different learning channels are illustrated for further systematic design of EFL with mobile technology. Weaknesses and possible improvements of this practice are also listed along with recommendations for further research and implementation in vocational
education systems of China.

**Keywords:** vocational education, mixed learning channels, MALL

**Context and Background**

With the rapid development of ICT (Information and Communication Technologies), m-learning or mobile learning has lately enjoyed wider popularity in research and practice (Chinnery, 2006; Georgiev, Georgieva, & Smirkarov, 2004). The majority of m-learning researchers agree that m-learning, often regarded as an extended and evolved form of e-learning, can play a significant role in education, which was further evidenced by various initiatives and projects across the world (Arnedillo-Sánchez & Isaías, 2008; Arrigo et al., 2010; Collis, 1996; Jaldemark, 2013; Kukulska-Hulme, Evans, & Traxler, 2005; Lonsdale et al., 2005; Milrad & Jackson, 2008; Sharples, Corlett, & Westmancott, 2002; Sharples, Lonsdale, Meek, Rudman, & Vavoula, 2007; Thornton & Houser, 2005).

Language learning could be described as a process of thinking, communication and socializing, and cultural interchange. Contextualization is one key feature for successful language learning (Zhang & Wang, 2011). Mobile learning can be spontaneous, informal, contextual, portable, ubiquitous, and personal, as mobile technologies can support learning that is more experiential and contextualized under certain circumstances. Relying on various mobile device features has been verified useful for language learning; these mobile features include but are not limited to voice messaging, SMS text messaging, cameras, documenting, video recording and applications with social networking functions. Mobile Short Message Service (SMS) technology has proven especially effective for vocabulary learning (Houser, Thornton, & Kluge, 2002; Levy & Kennedy, 2005;
Stockwell, 2007; Lu, 2008; Cavus & Ibrahim, 2009). Document-reading features of mobile phones also enable learners to read course materials similar to PDAs, which has been successfully implemented in MALL practices reported in m-learning literature (Chinnery, 2006; Kukulsk-Hulme & Traxler, 2005; Paredes et al., 2005). Some of these built-in features were replaced or augmented by mobile apps, which could integrate different capabilities and take full advantage of each feature for designing and delivering communicative language learning.

The ever growing in numbers and functionality mobile apps have come to a leading position for language learning, combining a range of features and capabilities over the past few years. Contextualizing MALL practices have been shown to improve listening skills (Kim, 2013; Palalas, 2012), grammar skills (Guerrero, Ochoa, & Collazos, 2010), and reading skills (Lan, Sung, & Chang, 2007) in foreign language teaching and learning. Nearly a thousand public vocabulary-learning apps and over four thousand language-learning apps are available in app stores in China (Lü, 2015). These commercial apps provide synchronous and asynchronous services and supports for language learning. Although commercial language learning apps seem to have boomed recently, they were mainly designed for daily English, business English or for some specific English training that lead to exams for school and university entrance. Foreign language learning in primary and secondary schools, in universities, and business companies have attracted great attention, while less consideration has been given for language learning in vocational education, particularly for students in vocational colleges.

Vocational Education and Training (VET) helps prepare people for work, develops their skills while on the job, so that they can work in new or different occupations. In China, students who enroll in vocational colleges come mainly from two groups: students who did not perform well enough in
Gaokao, the National University Entrance Exam, or students who graduated from technical and vocational high schools. Most of these students exhibit a lower proficiency in English than university freshmen, and they also have low confidence and interest in learning English (Jin, 2004; Zhang, 2003). To improve English teaching and learning, vocational schools and colleges have tried to incorporate technologies in the learning experience. In terms of equipment, generally speaking, most vocational colleges receive little investment to improve language labs and multimedia settings for language teaching and learning.

English learning in vocational colleges in China has faced great challenges. English learning programs in Chinese vocational colleges focus on fostering the skills of applying English in practical work places, according to the needs of professional knowledge and skills (Wu, 2007). This required greater investment in teaching capacity and school infrastructure for English learning. Public prejudice toward vocational education in China leads to less concern and investment in vocational colleges. Additionally, the lower English proficiency amongst college freshman, compared to that of university students, made them less confident to learn English. As English has been regarded as less valuable than other practical skill courses in vocational colleges, students are also not motivated to learn the language. Moreover, these learners felt less confident about their learning competency because they were frustrated with relatively lower scores in their previous Gaokao exams; most traditional one-way teaching methods could not spark their interest in learning English, and a great majority of them could not sustain their daily language learning efforts (Chen, 2009).

Thanks to features supported by mobile phones and other mobile technologies, multimedia courses, including language learning anytime,
anywhere, can be delivered to learners also offering communication and interaction while learning on the go. In the past few years, many micro teaching courses or mini courses have been introduced to Chinese educational institutes, schools, and universities in China. Numerous studies in China have explored how micro teaching courses can offer learning resources to develop multi-level knowledge and skills (Hu, 2014; Leming Liang, 2013; Liang, Cao, & Zhang, 2013; Yuan & Guo, 2013). In some practices, these mini courses were also accessible through mobile phones. However, these research studies remained at the stage of design and development of mini e-courses with little evidence of their effectiveness. Few details of effectiveness and evaluations of those courses were examined or reported. Meanwhile, most academic research on mobile learning in China focused on formal learning in the classroom (Xiang, 2010; Yonghe Wu, 2013). Ma (2014) designed micro teaching courses for higher vocational institutes that provided favourable conditions for students’ independent learning and promoted students’ individualized learning and continuous improvement of the ability to learn English in an autonomous way. Little attention has been directed to real learners’ activities and behaviors in informal learning settings to support vocational English learning. Therefore, factors such as inadequate infrastructures, inadequate learning confidence, and inadequate access to learning resources have led to low willingness to learn English and low effectiveness of English learning courses in the vocational college context.

Objectives and Methodology

A mobile app was designed and developed to encourage students to learn English and to provide wider accessibility and availability for English learning, particularly for freshmen in a nursing college. The practice
intended to increase motivation for learning English in vocational colleges as well as examine the effectiveness of MALL with smartphones in vocational educational context.

The research was a comparative study conducted with freshmen who majored in nursing. Before the research, all the freshman students’ (8 classes) Gaokao marks were collected as a reference. Meanwhile, a pre-test of English was given to all enrolled students. According to their pre-test average scores, three classes of approximately same average scores were chosen, which totalled 153 students.

As mobile technology can be integrated into teaching and learning processes, educators need to understand how they can effectively support various kinds of learning (Kukulsk-Hulme & Shield, 2008). Researchers emphasize the importance of thoughtful pedagogy when considering mobile technologies for learning (Chinnery, 2006; Colpaert, 2004; Palalas, 2012); they also highlight the need to focus on the learner ahead of the technology. In our study, the core pedagogical concept of learner-centredness was employed as a guiding ideal. Different learning channels were established for learning in formal and informal settings, such as traditional teaching and learning in the classroom, learning through videos on blog sites, and group discussions conducted via QQ (Chinese social chatting software). The “Smart Phone Class” (SPC) was considered as an extra channel and employed for students’ language learning in informal settings, such as after class and anywhere outside the classroom; on campus, at dorms, at home, in canteens, and so on. During the research, eight English units were delivered to the chosen classes by the same teacher using the same teaching materials and teaching methods. At the end of each unit, students were required to re-access the contents using the same revision materials with assigned revision methods. Class 1 students were required to
revise in traditional methods by using textbooks, in-class notes, and paper exercises. Class 2 students were required to use methods backed by mobile applications on smart phones, including SPC. Class 3 students were encouraged, but not forced, to choose either traditional revision methods or m-learning ones following their own preferences. Apart from SPC, PowerPoint (PPT) slides of each class and course-related videos were shared on the college’s LMS, along with notices, task reminders and test scores, which were sent to learners via SMS. To go beyond the simple content-delivery model, as well as to make up for the deficiency of our mobile application SPC, communicative learning was carried out through mobile QQ to promote interaction and engagement. Group discussions via mobile QQ were conducted with Class 2 and 3, with 102 students joining in. Students’ performances were recorded in terms of ratio of revision exercises completed, time spent on revision per unit, revision test results scores, and ratio of mistakes in language point exercises.

The implementation and investigation started in December 2013 and continued until August 2014. At the end of the study, students completed a survey to express their feedback on the different revision methods. Semi-structured interviews and focus groups were conducted with Class 2 to get an insight of the learners’ authentic experiences and feedback. Log files of their everyday learning activities during those months were also recorded and collected.

**Technology and Infrastructure**

The BYOD (Bring Your Own Devices) method was deployed, as all students had their own mobile phones. Each learner of Class 2 was required to download the SPC, as it was available for Android or iOS systems. Both the campus Wi-Fi network and 3G were available for students, allowing SPC
courses to be used online or downloaded anytime, anywhere. The learning materials on SPC have been compressed to take up less memory space without condensing the necessary learning contents. SPC offered optional online and offline choices for learners to view learning materials without Internet connection. It also provided personal portfolio services such as management of downloaded units, vocabulary searching and personal favourites, management for individual preferences, and customized requirements.

The SPC was designed and developed to comprise four aspects of language skills training: Words and Expressions, Reading and Writing, Listening and Speaking, and Grammar Training, covering all corresponding units of the English textbook for those two semesters. “Words and Expressions” presents phonetic symbols, property, pronunciation and Chinese paraphrase. In “Reading and Writing”, students can follow the audio and practice by looking at the English scripts. Important words and expressions are highlighted in the texts to assist students to learn and remember them. In “Listening and Speaking”, videos of stories and dialogues are shown to learners. Lastly, in “Grammar Training”, specific explanations are laid out, as well as multiple-choice and cloze format tests. Courses downloaded were tracked while the learner was learning. Tracing records were submitted automatically to the web server once the learner accessed the Internet and logged into mobile SPC courses again. In SPC, students could freely make a mark for their favorite courses and stop and resume whenever they pleased throughout the learning process. Furthermore, they could establish their individual learning portfolio to manage courses they downloaded and learned, and exams they took. Those courses involve multimedia features such as pictures, animations, audio and video. In addition, the most popular courses, i.e., units downloaded and
learned most by all students, are also ranked. In the test sections, immediate feedback was given to learners in the form of question types: filling in blanks, multiple-choice and True/False. The figure (Figure 20.1) below shows some interfaces of this application.

Figure 20.1  Basic English Course Sample of Smart Phone Class
Learning Continued out of Classroom to Enhance Effectiveness

Learning out of classroom was carried on mainly in three ways in our study: downloading and sharing through LMS, individual learning with the Smart Phone Class, and group discussions through mobile QQ. The teacher would scaffold learning in formal settings, like classrooms, and informal settings outside of the classroom, such as dorms, in the canteen, other places on campus, shops, at home, and so on, with the aid of mobile technology and e-learning systems. Participants were found to perform revisions by SPC mainly to continue reading by following audio in the application, to review key points that the teacher referred to in class, and to do self-assessment by doing exercises supported by this application. Participants reported that the structural summaries and logical key points of learning contents helped them perform schemed revisions for easier reviewing and memorizing. Highlighted words and phrases with pop-up explanations and pronunciation helped them easily understand and remember new words and phrases by themselves. The SPC met their requirements for self-paced learning, anytime and anywhere. As a replacement and extension of the textbook, this pocket English application also offered practice of vocabulary memorizing, text reading and listening training. Vocabulary (46.1%) and text reading (23.8%) were rated as the favorite and most effective features of SPC. Participants reported that this application served to deepen and consolidate knowledge that was learned in class. The wider access to learning contents provided more practice of reading and listening. Participants stated their capability of listening and reading had been greatly enhanced since they could more easily and quickly read and catch the meaning of texts and audio.
PART III: Research from Case Studies

The group discussions held on mobile QQ enabled learning going on from SPC and from learning in the classroom. In the classroom, students were required to learn synchronously at the teacher’s pace. The three channels allowed effective revision of what they had learned in the classroom, in which learning on college LMS and learning and practice with SPC were both well structured by the teacher. Students got slightly more freedom to manage their own learning, granted by the feature supplied by the application. Learning through LMS and SPC were asynchronous, as the teacher could not support personal learning at the same time. There was a great risk that learners would get lost if they were put in the pure social context without any pedagogical guidance (Shao, 2011). However, with group discussions on mobile QQ, students were semi-structured by the teacher’s facilitation and immediate scaffolding. The teacher only joined the mobile QQ group to host discussions and give comments for two hours every week. Once the topic was given for discussion, asynchronous but constant responses appeared. In those two hours when the teacher was in, all students would log in and discuss. Results of discussion were also collected and reorganized for presentations to be done in the next class. Learning out of class using these three channels was interwoven with in-class learning. The figure below (Figure 20.2) illustrates the possible connections among different channels supported in this study.

In Figure 20.2, knowledge learned in class was reviewed either by downloaded learning material from LMS or through SPC. Learning was extended to personal learning by revisions through those two channels. At the same time, collaborative learning through mobile QQ was another extension of learning in class. Likewise, individual learning and practice was also connected to group discussions by extending topics from the textbook and reinforcing the in-class activities. In other words, knowledge
obtained previously both in and outside of the classroom would be enhanced by reapplication of knowledge during student presentations in the following class.

**Figure 20.2 Possible Connections among Learning Channels**

### Evaluation and Outcomes

This research commenced a practical study on how mobile apps could enhance learning in vocational education in China. Our investigation reveals that not only was participants’ interest in English learning sparked, but their motivation and engagement were also greatly reinforced. Scaffolding and facilitation from the teacher also counted for much in the learning experience for Class 2. Students’ motivation was triggered when SPC was launched in December 2013, yet significantly increased in April and May of 2014 when the teacher conducted group discussions.

According to our data of survey and log files, 90% of students preferred to use m-learning methods, while only 10% of students voluntarily chose traditional revision methods. When comparing the mid-term test results and final provincial achievement test scores, students who employed m-learning methods completed more revision exercises than those who chose
traditional revision methods. Additionally, the time spent on revision by the students who employed m-learning methods almost doubled compared to that of their learning counterparts. Moreover, their increase in test scores was considerably higher than the traditional control group. Students in Class 2, the one that was fully encouraged to take m-learning, scored highest among the three classes in the last exam, while they had lowest average score in the entrance exam. From the score listed below, it is easy to see the significant rise between the mid-term and mock exams, which were taken before and after the teacher’s interference via mobile QQ organized discussion every week.

<table>
<thead>
<tr>
<th>Score (0-100)</th>
<th>Class</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrance Exam (September 2013)</td>
<td>1</td>
<td>43.3</td>
<td>91.7</td>
<td>74.5</td>
<td>9.74</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>51.7</td>
<td>90.3</td>
<td>72.7</td>
<td>9.42</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>56.7</td>
<td>91.3</td>
<td>76.5</td>
<td>7.48</td>
</tr>
<tr>
<td>Mid-term Exam (February 2014)</td>
<td>1</td>
<td>50.0</td>
<td>90.0</td>
<td>72.0</td>
<td>9.77</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>56.0</td>
<td>86.0</td>
<td>74.6</td>
<td>7.18</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>43.0</td>
<td>92.0</td>
<td>74.4</td>
<td>9.76</td>
</tr>
<tr>
<td>Mock Exam (June 2014)</td>
<td>1</td>
<td>49.0</td>
<td>94.0</td>
<td>75.9</td>
<td>7.91</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>61.0</td>
<td>97.0</td>
<td>85.9</td>
<td>7.62</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>58.5</td>
<td>92.5</td>
<td>79.3</td>
<td>8.42</td>
</tr>
</tbody>
</table>

**New Technology to Initiate Motivation**

Liwei (2013) indicated that over half of the students’ incentive to learn English were affected mainly by external factors. Parents, teachers and loved ones were those who persuaded them to learn. The textbooks and the knowledge sources referred to by the teachers were the two most reliable sources for learning. In addition, nearly 10% of participants demonstrated credence toward mobile and Internet content. They found these digital
resources useful and reliable considering them the third most reliable learning source.

All participants were “digital natives” (Prensky, 2001), aged 19-22. Most students said they never touched a mobile English learning app before they took part in this study, with the exception of a few of them, who had looked up words with mobile English-Chinese dictionary apps. The use of mobile technology had become a new interest point for learning English, as participants admitted its novelty. The SPC was considered as a multimedia pocket English textbook, with which they could easily preview and review an English textbook more frequently and with more flexible accessibility. Other than attending English classes twice a week, participants who used m-learning methods spent more time reading and listening to English outside of the classroom. The log files on the server also demonstrated their access activity to SPC and learning activities occurred more out of class than in the class. Figure 20.3 below shows log file data from Class 2’s 24-hour mobile access activities to SPC for self-study during those few months.

![Figure 20.3 24-hour Mobile Learning Activities](image-url)
In Figure 20.3, the peak time of access to SPC happened at noon. Our interviews also proved that participants preferred to use SPC at their dorms after lunch. Students claimed that the most significant usage of SPC was for reviewing what they had learnt in the classroom that day. Participants liked SPC better, since it was convenient for them to carry and get access to, as they replied in our interviews and focus groups. They could immediately start learning English when they wanted to, particularly at a point of need or when facing difficulties in learning.

Participants pointed out that SPC provided summaries and guidance incorporated with textbook content. They could easily go through and review those points in the textbook, which were scaffolded by new ways of slicing up (chunking up) and presenting contents in the mobile application. Multimedia features of learning materials presented on SPC were impressive and could help strengthen their memory.

Along with SPC supported by the college, QQ was also introduced to our study. Students felt it was easy to handle QQ group discussion, as they were already familiar with it. Although they could chat on PCs or laptops with QQ, participants said that most of the time they used Mobile QQ for discussion due to the convenience afforded to them by Wi-Fi hotspots available on campus, at shops, and at home. Furthermore, they all agreed that they could afford the cost of 3G by themselves because of the current cheap telecom traffic service.

**Tailoring Learning Methods to Enhance Engagement**

Students in our study evidently had different learning capabilities, learning capacities, and varied levels of motivation. To guarantee participants at all different learning levels developed knowledge and practice of English, several learning channels were offered to them.

The one-way content delivery was provided through LMS and SPC.
Participants saw LMS as a place to download extra learning materials, while SPC was more of a personal learning tool. The college LMS provided users with open access to the syllabi, lecture notes, course calendars, PPT, and reading lists, which worked for more reserved participants.

“One of the key features I like with SPC is I don’t need to talk or communicate with others. I can learn by myself with my own steps any time.” (Yang, a girl)

Figure 20.4 shows what learning materials students could view and download from LMS of the college.

![Figure 20.4 The College LMS](image)

Our tracking records illustrate some participants who were shy, such as Yang, spent a great deal of time on SPC. Yang, for instance, was found on the list of top 5 frequent users of SPC. It is obvious that some participants loved self-supported and self-paced learning with mobile aids.

Our study also verified Attwell’s (2007) hypothesis that potential applications for PLEs are for self-supported and peer group learning. It is beyond our expectation that unstructured and spontaneous collaborative learning was also to occur in our study. Our participants replied that the section they learned with most often by themselves was “Words and
Expressions”. Meanwhile, they would occasionally practice “Reading and Writing”, or complete tests with one or two classmates together. They might ask each other face-to-face how to read or what could be the right answer to a question when they were beside one another.

To encourage more collaboration and interaction during learning, the popular commercial social software QQ was applied. All learners had their individual QQ accounts. The most frequent mobile application that 37.5% participants admitted to using in their daily lives was QQ, compared with other public social software. Adapting to learners’ conveniences and preferences, group discussions were performed regularly via QQ almost every week, lasting for around two hours. One specific topic relevant to the in-class textbook coverage would be assigned per week. Participants were found to enjoy chatting within the QQ groups. They attempted to express themselves in English or in Chinese. Many sentences mixed with Chinese and English characters were found. The discussions sometimes were quite comical as a result. The following example captured some of these interesting moments:

![Image of QQ chat]

**Figure 20.5 Group Discussion on Mobile QQ**

This informal communication provided an easy and comfortable way for
learners to practice and employ English. Participants expressed enjoyment during the discussions and found it funny. Participants who took part in group discussions experienced a more hands-on practice of English, or at least, they were more concerned about learning English when they were in a group discussion trying to chat in English.

**Formative Evaluation to Maintain Learning Steadiness**

Participants of Class 2 were informed that the performance of exams was not the only assessment for their English learning. All formative evaluations, including the attendance of classes, the access to SPC, the completion of units, and discussions in the QQ group were counted. Participants agreed that they were actively involved in those activities, especially when the group discussion was going on. To keep up with group discussions, they reviewed the points that the teacher emphasized in class, as well as topics brought up by the teacher, either with SPC or with textbooks.

Their completion of each section was recorded, which is demonstrated in the following Figure 20.6. In total, 50% of learners finished 95% of the learning content; however, nearly 25% of learners’ progress halted short of 30% completion, tracked by SPC. Participants attributed the low rates of completion to technological malfunctions. However, most of them could restart devices immediately following the first or second failure, or asked for technical help from the technology assistants. In terms of completion of the various sections, “Words and Expressions” was the top category with the highest completion rate. Participants admitted that they would skim and scan the section “Reading and Writing” section of the unit, and thus spent less time completing “Words and Expressions”. At each stop point, they would resume when they had to take English Class or take part in a discussion.
Assessments were also made through those few months by observing the frequency of attendance in group discussion and their actions of using SPC and group presentations in class. The teacher set a standard of evaluation according to students’ responses on group discussion via mobile QQ and their completion of each section in SPC. Their attendance and engagement accounted for 5% of their final score of the semester. Participants claimed in interviews that they were driven by these requirements of assessment.

Limitations of the Study

Statistics from the research and feedback of participants showed that students in general prefer m-learning to traditional paper-based methods. MALL does play an essential role in motivating students’ learning initiatives, and thus results in better learning outcomes when compared with a control group. However, some of the students in this study also demonstrated negative impressions toward mobile learning. Some negative feedback stemmed from issues with technology: breakdowns would sometimes frustrate participants, especially when forced to try several times to restart the
application. The navigation within the application, particularly the “Go back” response was extremely slow. When participants spoke highly of the assistants of SPC aiming at participants’ weaknesses, they expected more interactive practices to examine how well they mastered the knowledge. Some participants thought the “fill-in” questions were slightly difficult for them, which indicates the application was not adaptive enough to individual learning.

The SPC did not have strong communicative functions to support collaborative learning and social interaction. As Mobile QQ is commercial software, some data of participants discussing activities were not able to be collected. This constraint had some effects on our observations and insight into their behaviors out of the classroom.

In addition, being short of assistants and teachers, only one teacher and two members of staff took full loads of support and facilitation for this study. In the group discussion, the support and scaffolding from the teacher was insufficient. More learner engagement would have been achieved had the scaffolding been improved. The interference by the teacher might have had some negative effects on participants’ learning initiatives, leading them to feel unhappy about being forced to learn. Some participants also complained that they could not resist surfing the web or chatting rather than just learning with SPC without distractions. Strategies were required to reduce the discomfort of learning under the teacher’s supervision as well as establish self-motivation, confidence, and learning concentration. Avoiding distraction and deviation from learning is one of those key issues when mobile students are out of teacher’s physical sight.
Possible Future Development

Based on our findings and the participants’ feedback, a key technological requirement is to strengthen communicative functions of SPC, e.g., incorporation of social features to the current application. More and better designed interactive activities should be embedded in this application to sustain learners’ attention even when they are distracted, such as asking users for a response and to increase levels of engagement when they are learning by themselves. Moreover, if the social feature could be incorporated into the current application to enable flexible grouping and collaboration, a bond could be created between individuals, and collaborative activities could be linked without switching back-and-forth between apps. Voice recording and playback could be added to the application in order to train and enhance speaking skills within group discussions. Ideally, adaptive schemes could be built up to sustain more responsive learning when individuals are learning with the mobile application alone. At the same time, the application should be more user-friendly and stable.

Some other studies of mobile technology in Chinese vocational colleges also indicated great potentials of MALL in vocational education in China (Li, 2012; Lu, 2008; Ma, 2014; Yuan & Guo, 2013; Zhang, 2012). The current MALL practices in Chinese vocational education are still in the initial stage. Pieces of MALL implementation could be easily found in vocational colleges with free software by individual teachers. However, no systematic design or practice of mobilized curriculum is available. Second language learning and training with technology has developed and matured. A great variety of books, videos, CDs, and websites have been heavily employed to enhance second language learning, but the overarching consideration of MALL in vocational EFL school and college curriculums is
missing. Mobile language learning apps form the biggest portion of educational applications in the Chinese technology-enhanced learning market (Lü, 2015). At the same time, not enough attention has been paid to vocational education. We suggest fostering professional English training early in vocational schools and colleges, rather than conducting extra language training on the job; fostering the capacity to read professional articles, speak with English-speaking colleagues, and write reports in English in the everyday workplace context is of particular importance.

In this research, we explored the contribution of mobile educational application in EF in vocational education context. In light of the benefits that mobile technology brings to language learning, pedagogical strategies and methods should be updated and innovated. The employment of mobile technology in learning should not be excluded from curriculum design. Stakeholders and practitioners might have to take mobile learning into account when establishing new vocational English learning curriculum in and outside of classrooms for large-scale implementation. Both the teachers and students should be trained on how to efficiently exploit mobile technologies and devices in foreign language learning.

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Chapter 21: Enhancing Listening Comprehension and Vocabulary Recall in Mobile-Assisted Language Learning

Ting-Chia Hsu

“National” Taiwan Normal University, Taipei

Abstract

A variety of video-based language learning solutions have been developed on handheld devices for adaptive assistance in English comprehension and vocabulary recall for K-12 EFL students. These mechanisms were created based on different subtitle and caption modes for secondary school (study 1) and primary school (study 2), respectively. In the two studies, the English listening comprehension and vocabulary recall status of the students was assessed after each treatment. The findings revealed that only providing the subtitles or captions for hard and key words is sufficient to assist students in comprehension and learning foreign language, hence captions can by shortened to fit mobile devices. The listening comprehension of students will not be affected negatively when the videos only provide partial word information along with the foreign language sound track. Students using partial exhibited similar listening comprehension and vocabulary recall performance to those who used full captions.

Keywords: subtitle, caption, listening comprehension, vocabulary recall, mobile-assisted language learning, English as a foreign language (EFL)
Background and Objective

Studies on MALL highlight the growing academic interest in the relationship between multimedia and language learning. These studies have extensively investigated the areas of reading (Lysenko & Abrami, 2014) and vocabulary acquisition (Emine & Gülcan, 2012). However, the use of multimedia or mobile devices for listening comprehension remains relatively unexplored, particularly the effects of varying degrees of interference of first language (L1) information on listening comprehension and vocabulary recall. According to Palalas (2012), “researchers agree that listening is a prerequisite to learning a language and that, apart from being a vital performance skill, it is a primary channel for acquiring a second language” (p. 16). Listening is an essential skill in understanding a language (Chung, 1999; Liu, Chen, & Chang, 2009) and since 2013, every high school graduate in Taiwan is required to participate in the Test of English Listening Comprehension. Hence, providing Taiwanese high school students with more opportunities for foreign language listening practice is an urgent concern.

Before proceeding with the following exploration on using video for listening practice, the study needs to define two important concepts, “subtitles” and “captions”. According to Longman dictionary of contemporary English, “subtitles” refer to words printed over a film in a foreign language to translate what is being said, such as an English film with Chinese subtitles. It is contrasted with the concept of “captions”, which deals with words printed at the top or below a TV program, film, or video, and describe what it is about or provide further information to help viewers who are deaf or hard of hearing to follow the dialogue, and are usually provided in the same language, as defined in related studies (Hsu, Hwang,

Among the various learning resources available, audio and video are the most common and popular means of promoting English listening comprehension. Hence, studies on English as a foreign language (EFL) learning frequently choose videos as learning materials instead of audio or text (Chapple & Curtis, 2000; Vanderplank, 2010). Videos are popular learning materials partly because of the possibility to insert subtitles or captions. Chun and Plass (1997) stated that videos with captions are useful in learning a second language through reading. Hsu, Hwang, Chang, and Chang (2013) also indicated that hiding easy foreign vocabulary and showing only the difficult words in captions on handheld devices could promote the listening comprehension of elementary school students.

Several studies have confirmed the advantages of subtitles or captions in learning foreign languages through movies, films, or videos. In recent decades, studies have indicated that videos with subtitles are helpful in learning reading, vocabulary, and listening in a foreign language (Danan, 2004). Markham, Peter, and McCarthy (2001) stated that videos with subtitles are conducive to listening comprehension because students are encouraged to select the movies or videos they are interested in to practice their listening skills. Visuals also provide both context and non-verbal input. Videos simultaneously provide a means of viewing and hearing for foreign language students, which addresses the lack of language knowledge and comprehension that may result from learning by listening alone (Seo, 2002). Multimedia can also provide the listener with various conditions such as voice, vision, and texts in the form of subtitles or captions offered in different languages. Foreign language films with subtitles have also been shown to improve listening comprehension (Markham, Peter, & McCarthy, 2001). Other studies have shown that slowing down or speeding up
broadcasting tempo is not necessary for improving listening comprehension (Derwing & Munro, 2001; Vandergrift, 2007). Previous studies have also indicated that computer technology is useful for language learning and that multimedia use is conducive for vocabulary learning (Liu, Moore, Graham, & Lee, 2002). A study on English vocabulary learning was conducted by using mobile technologies for one year to enhance incidental vocabulary learning in English as a Medium of Instruction. The result of this study showed that the students used personal digital assistants to improve referential, situated, constructive, reflective, explorative, and conversational uses of vocabulary (Song & Fox, 2008). Therefore, the researchers concluded that mobile devices can be used in a flexible, novel, and extended manner for teaching EFL vocabulary and higher education learning that considers both the needs and contexts of students (Song & Fox, 2008). Another study focused specifically on the attitudes of language students toward using mobile phones for listening purposes by browsing wireless application protocol (WAP) sites and found that the WAP site was effective for learning listening skills (Peng et. al., 2009).

When learners are exposed to a new video message, they initially see or hear the message by paying attention. Figure 21.1 shows the integration of the study and the Information Processing Theory (IPT) (Miller, 1956). In IPT, memory is classified into three categories, namely sensory, short-term, and long-term memory (Card, Moran, & Newell, 1983). The external stimulus is received through the sensory organs, such as ears and eyes. After sensory registration, individuals select and filter the messages during information processing. The message is then stored in the short-term memory. After encoding or rehearsing the message in the short-term memory, the message forms will be translated into semantic or mental image forms and combined with the prior knowledge of the individual. People
usually recall a set of clues to retrieve relevant data in their long-term memory, and then send the obtained data back to their short-term memory, such as the memory of the tone, scene concept, body language, and so on. After the information is processed in the short-term memory, the new information that results from inferences and judgments is stored back to the long-term memory and the behavioral response of the individual will be produced from short-term memory (Lindsay & Norman, 1977).

![Figure 21.1 Information Processing Theory for Multimedia](image)

Short-term memory is limited, whereas long-term memory is infinite. Considering the limitations of short-term or working memory, EFL listening requires supports for students to focus on the message received from the sensory register. The capacity of short-term memory ranges from five to nine words (seven words on average) (Vaurio, 2004). This limitation causes most recollections to be forgotten immediately. Owing to the restrictions of short-term memory in IPT and the limitations of small smart phone and PDA screens, the subtitle and captions should be only partially provided for the students based on their foreign language proficiency level. Therefore, study 1 only showed partial captions on the smart phone to assist listening and learning of the secondary school students, and study 2 only showed partial subtitle with full captions on the PDA to assist listening comprehension of
the primary school students.

The two studies hypothesize that providing less L1 (partial Chinese) information will not affect the listening comprehension of students. Less L1 interference is also expected to be beneficial to the vocabulary recall of students. L1 interference or the so-called “cross-linguistic and language transfer” refers to the influence of native language structures on the performance and development of students in the target language (Hashim, 1999). Study 1 also discusses the relationship between videos with two degrees of difficulty based on the amount of subtitles or captions, as well as the learning performance in English listening comprehension and vocabulary recall of students. An experiment was conducted to investigate the following research questions:

1. Will providing partial subtitles, which are the translations of hard words, have an effect on the listening comprehension of secondary school students in study 1?
2. Will providing partial subtitles, which are the translations of hard words, have an effect on the vocabulary recall performance of secondary school students in study 1?
3. Will providing partial subtitles, which are the translations of target words, affect the listening comprehension of primary school students in study 2?
4. Will providing partial subtitles, which are the translations of target words, affect the vocabulary recall performance of primary school students in study 2?

**Method**

Previous literature shows that more than seventy percent of the words
that appear in the video are among the 2,200 most frequently used words (Hsu, Hwang, Chang, 2014). Researchers have pointed out that people rely on captions or subtitles (Koolstra & Beentjes, 1999), while another study indicated that most students gaze at the text in the video (Hsu, Hwang, Chang, & Chang, 2013). The drawback of displaying full captions and subtitles is that it prevents the students from getting used to the aural input (Latifi, Mobalegh, & Mohammadi, 2011). Hence, to balance the cognitive support for listening comprehension and the requirements for hearing recognition training, two studies were designed for K-12. The mechanisms designed for the two studies are described below.

Different Caption Processing Mechanisms for Primary and Secondary School Students

This study improved the interface adaption of the video played on the handheld devices by excluding unnecessary information in captions or subtitles, to block students from distractions that stem from simultaneous attention to images and captions, and to rectify the limited comprehension capacity of listening training materials. This approach balances the requirements for listening proficiency improvement and vocabulary acquisition. The approach will not only support listening comprehension, but also improve vocabulary recall. In other words, the hidden subtitles should not become learning obstacles but rather positively affect listening comprehension once the interface adaption for small screens is improved by cancelling partial word information. The previously mentioned objective was achieved by showing the hard words (described below) or target words in the caption, as well as the Chinese translation of the English captions to aid listening comprehension, as shown in Figure 21.2.
Two studies (study 1 and 2) are integrated here to explore the enhancement of listening comprehension and vocabulary recall in MALL for K-12. The participants in study 1 are secondary school students, whereas the participants in study 2 are primary school students. The caption processing mechanisms used for primary and secondary school students differ.

In study 1, the videos or films shown were related to daily life movies, such as Transformers, as secondary school students had learned English for at least seven to eight years and their language proficiency was expected to be adequate. The captions in the daily life videos would be relatively varied. In study 1, two difficulty degrees were arranged to partially hide the captions. The easy level would only process 220 Dolch Sight\(^1\) words when they appeared in the videos, whereas the difficult level would hide 1,000 frequently used words and 220 Dolch Sight words when they appeared in the video. After the frequently used captions or subtitles were hidden, not all of the captions or subtitles were shown in the small screen. Therefore, the remaining captions or subtitles would be named hard words or difficult words in this study, and the number of the harder words would be less than five words on average in each caption or subtitle and comparatively suitable for

\(^1\) A list of commonly used English words that was originally compiled by Edward William Dolch and published in his book "Problems in Reading" (1948).
small-screen smartphones. The design was expected to be adaptive to secondary school students to enhance their listening comprehension and vocabulary recall.

In study 2, the videos for primary school students were related to their English lessons, as these students were novices in learning EFL. Daily life videos are not appropriate for beginners or low-achieving English learners because low achievers are more reliant on captions to gain listening comprehension than higher-level learners (Leveridge & Yang, 2013). Therefore, target words were shown in the captions for the lesson videos. The target words refer to the new words in each English lesson. This study involves four lessons; therefore, one video is used for each lesson every week. A total of four short video clips are involved in study 2.

**Participants**

The participants in study 1 were eleventh graders from three classes with an average age of 17 years. During the MALL activities, one class of 44 students was assigned as experimental group 1, and another class of 40 students was assigned as experimental group 2, another class of 39 students was assigned as a control group. Study 1 involved a total of 123 secondary school EFL learners. The interventions of the three groups are shown in Table 21.1.

The caption in the easy level displays all English words (foreign language) and partial Chinese translations (first language) and hides the translation of 220 Dolch Sight words. Video 2 (V2) presents all English words (foreign language) and partial Chinese translations (first language) and hides the translation of the 1,000 most frequently used words. In the control group, both videos display no first language (Chinese) subtitles and full foreign language (English) captions. In experimental group 1, both videos display partial first language (Chinese) subtitles and full foreign
language (English) captions. In experimental group 2, both videos display no first language (Chinese) subtitles and partial foreign language (English) captions.

Table 21.1  The 11th-grade Participants in Study 1

<table>
<thead>
<tr>
<th>Control group (N = 39)</th>
<th>Experimental group 1 (N = 44)</th>
<th>Experimental group 2 (N = 40)</th>
</tr>
</thead>
</table>

The participants of study 2 were fifth graders from three classes, with an average age of 11 years. During MALL activities, one class of 28 students was assigned as experimental group 1, as shown in the left panel of Table 21.2. Another class of 26 students was assigned as experimental group 2, as shown in the middle panel of Table 21.2. Another class of 25 students was assigned as a control group, as shown in the right panel of Table 21.2. Overall, study 2 involved a total of 79 primary school students studying EFL.

Table 21.2  The Fifth-Grader Participants in Study 2

<table>
<thead>
<tr>
<th>Experimental group 1 (N = 28)</th>
<th>Experimental group 2 (N = 26)</th>
<th>Control group (N = 25)</th>
</tr>
</thead>
</table>
Research Design

In study 1, a quasi-experiment was conducted in a regular high school English course. Each student was equipped with one smartphone and a pair of earphones to watch the assigned video. The research design for study 1 was shown in the left portion of Figure 21.3. The students in each group were instructed to watch two video clips with two different degrees of difficulty, as explained above.

Study 1

<table>
<thead>
<tr>
<th>Eleventh graders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group (Full English Captions and Non-Chinese Subtitles)</td>
</tr>
<tr>
<td>Experimental group 1 (Full English Captions and Hard-word Chinese Subtitles)</td>
</tr>
<tr>
<td>Control group 2 (Hard-word English Captions and Non-Chinese Subtitles)</td>
</tr>
<tr>
<td>Listening Comprehension Test</td>
</tr>
<tr>
<td>Vocabulary Recall Test</td>
</tr>
</tbody>
</table>

Study 2

<table>
<thead>
<tr>
<th>Fifth graders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental group 1 (Full English Captions and Target-word Chinese Subtitles)</td>
</tr>
<tr>
<td>Experimental group 2 (Target-word English captions and Target-word Chinese subtitles)</td>
</tr>
<tr>
<td>Control group (Non-English Captions and Non-Chinese Subtitles)</td>
</tr>
<tr>
<td>Listening Comprehension Test</td>
</tr>
<tr>
<td>Vocabulary Recall Test</td>
</tr>
</tbody>
</table>

Figure 21.3 Learning Systems and Experimental Procedures for the Two Student Groups

After watching each video, the students took a listening comprehension test and a vocabulary recall test. All the videos were fifteen minutes long.
All students can operate the smartphone player to “play”, “pause”, or “replay” the video in accordance with their respective watching requirements within the given time (twenty minutes). After watching each video, both groups took a listening comprehension test and a vocabulary recall test.

Two experts in teaching English developed the listening comprehension test and vocabulary recall test. One expert is an experienced university professor and the other is an oral English instructor who is also a native speaker. The listening comprehension test consisted of five multiple-choice questions, each accounting for twenty points, with a perfect score of 100. The vocabulary recall test consisted of two parts. The first part was the dictation test composed of five questions, each accounting for eight points. The second part was the vocabulary recall test, which consisted of six questions, each accounting for ten points. The two parts add up to a perfect score of one hundred.

The research design of study 2 is shown in the right portion of Figure 21.3. The students in each group watched four short video clips. The videos for the three groups in study 2 consisted of the same content with different caption modes. Full English captions and Chinese target words were provided for the experimental group 1, target English words and their Chinese translations were provided for experimental group 2, and no captions or subtitles were provided for control group 2. Considering that the primary school students have only been learning English for two years, the foreign language video was kept short, with a running time of about four minutes. A timer was used to remind the students of the time limit while watching the video. The students watched one video per week. A listening comprehension test and a vocabulary recall test were administered to the students after the students completed watching the video. Therefore, the students spent a total of four weeks to complete the experiment.
The listening comprehension and vocabulary recall tests were developed by two experienced primary school teachers. The pre-test consisted of two groups of questions on students’ prior knowledge of the listening comprehension content and their vocabulary capability. The pre-test consisted of 26 multiple-choice items that examine listening comprehension and 24 multiple-choice items that test vocabulary capability, with a perfect score of 100. The weekly assessment and post-test consisted of five multiple-choice items that evaluated the listening comprehension of students and five multiple-choice items that assessed their vocabulary acquisition for the lesson unit. The perfect score for the weekly tests and the post-test was 100. Each listening comprehension test was aired through audio broadcast, and the students were instructed to listen to the questions and fill out the answer sheet.

Results of Study 1

ANOVA of Listening Comprehension for Secondary School Students

Study 1 employed Analysis of Variance (ANOVA) to compare the listening comprehension test scores of the three groups. When the senior high school students used the easy-level video, which only included the 220 Dolch Sight words in the caption, the results showed that the mean values and standard deviations of the listening comprehension test scores were 50.00 and 18.04 for the experimental group 1, 40.51 and 25.33 for control group, and 42.05 and 23.53 for experimental group 2, as shown in Table 21.3. The results indicated no significant difference among the three groups on the listening comprehension test ($F = 2.19; p > 0.05$) for the easy level. Hence, hiding the 220 Dolch Sight words and their translations from the captions or subtitles did not have a remarkable effect on the listening comprehension of senior high school students.
Chapter 21: Enhancing Listening Comprehension and Vocabulary Recall...

Table 21.3 ANOVA of Listening Comprehension

<table>
<thead>
<tr>
<th>Level</th>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>SE</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy</td>
<td>Experimental group 1</td>
<td>44</td>
<td>50.00</td>
<td>18.04</td>
<td>2.72</td>
<td>2.19</td>
</tr>
<tr>
<td></td>
<td>Experimental group 2</td>
<td>40</td>
<td>42.05</td>
<td>23.53</td>
<td>3.72</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control group</td>
<td>39</td>
<td>40.51</td>
<td>25.33</td>
<td>4.06</td>
<td></td>
</tr>
<tr>
<td>Difficult</td>
<td>Experimental group 1</td>
<td>44</td>
<td>28.18</td>
<td>20.83</td>
<td>3.14</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>Experimental 2</td>
<td>40</td>
<td>27.50</td>
<td>16.76</td>
<td>2.65</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control group</td>
<td>39</td>
<td>25.64</td>
<td>15.18</td>
<td>2.43</td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>Experimental group 1</td>
<td>44</td>
<td>39.09</td>
<td>13.09</td>
<td>1.97</td>
<td>2.05</td>
</tr>
<tr>
<td></td>
<td>Experimental 2</td>
<td>40</td>
<td>34.78</td>
<td>14.21</td>
<td>2.25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control group</td>
<td>39</td>
<td>33.08</td>
<td>14.90</td>
<td>2.39</td>
<td></td>
</tr>
</tbody>
</table>

When the senior high school students used the difficult-level video, which processed 220 Dolch Sight words and 1,000 most-frequently used words in the captions, the results showed that the mean values and standard deviations for the listening comprehension test scores were 28.18 and 20.83 for the experimental group 1, 25.64 and 15.18 for control group, and 27.50 and 16.76 for experimental group 2, as shown in Table 21.3. The results showed that experimental group did better, but did not significantly differ from the other two groups on the listening comprehension test (\( F = 0.22; \ p > 0.05 \)) for the difficult level. The results indicated that hiding the translations of the 220 Dolch Sight words and 1,000 most frequently used words had no significant effect on the listening comprehension of senior high school students. Hence, teachers could consider providing the students only with partial captions to prevent them from relying excessively on the captions or subtitles and fit in better with the small screen of smart phone when partial captions achieved the effects of full captions on listening comprehension.
ANOVA of Vocabulary Recall for Secondary School Students

Study 1 utilized ANOVA to compare the vocabulary recall test scores of the three groups. When the senior high school students used the easy-level video, which contained only the 220 Dolch Sight words in the caption, the results showed that the mean values and standard deviations of the vocabulary recall test scores were 35.27 and 15.20 for the experimental group 1, 33.08 and 18.55 for control group, and 32.00 and 17.59 for experimental group 2, as shown in Table 21.4. The results also indicated the absence of a significant difference among the three groups in the vocabulary recall test ($F = 0.40$; $p > 0.05$) for the easy level. Therefore, no further comparison among the three groups was performed. The results implied that hiding the 220 Dolch Sight words and their translations from the captions or subtitles had no significant effect on the vocabulary learning of senior high school students.

<table>
<thead>
<tr>
<th>Level</th>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>SE</th>
<th>F</th>
<th>Scheffe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy</td>
<td>Experimental group 1</td>
<td>44</td>
<td>35.27</td>
<td>15.20</td>
<td>2.29</td>
<td>0.40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental group 2</td>
<td>40</td>
<td>32.00</td>
<td>17.59</td>
<td>2.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control group</td>
<td>39</td>
<td>33.08</td>
<td>18.55</td>
<td>2.97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult</td>
<td>Experimental group 1 (a)</td>
<td>44</td>
<td>43.14</td>
<td>19.28</td>
<td>2.91</td>
<td>3.38 *</td>
<td>a &gt; c</td>
</tr>
<tr>
<td></td>
<td>Experimental group 2 (b)</td>
<td>40</td>
<td>36.00</td>
<td>14.06</td>
<td>2.22</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control group (c)</td>
<td>39</td>
<td>33.85</td>
<td>17.51</td>
<td>2.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>Experimental group 1</td>
<td>44</td>
<td>39.20</td>
<td>14.04</td>
<td>2.12</td>
<td>2.25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental group 2</td>
<td>40</td>
<td>34.00</td>
<td>12.23</td>
<td>1.93</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control group</td>
<td>39</td>
<td>33.46</td>
<td>14.83</td>
<td>2.38</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $p < 0.05$

When the senior high school students used the difficult-level video that
processed 220 Dolch Sight words and 1,000 most frequently used words in the captions, the results showed that mean values and standard deviations of the vocabulary recall test scores were 43.14 and 19.28 for the experimental group 1, 33.85 and 17.51 for control group, and 36.00 and 14.06 for experimental group 2 as shown in Table 21.4. The results showed a significant difference among the three groups in the vocabulary recall test \( (F = 3.38; p < 0.05) \) for the difficult level. The results implied that highlighting difficult words that are not included in the 220 Dolch Sight words and 1,000 most frequently used words would have a notable effect on the attention of senior high school students toward the difficult vocabulary shown in the video. Therefore, this study suggested that to enhance the English proficiency of students, teachers should provide only partial captions or subtitles, including the difficult words or the translations of difficult words, to cue the students when they watch a video in a foreign language.

**Results of Study 2**

**ANCOVA of Listening Comprehension for Primary School Students**

Study 2 examined the learning progress of the listening comprehension of students within four weeks. The study found that the three groups achieved progress each week, as shown in Table 21.5. Both the experimental group 1 and 2 displayed significantly higher learning effectiveness than control group, particularly from the third week. Both experimental groups 1 and 2 had similar learning performances during the month. The significant difference in the third week was because the students in experimental group 1 had made remarkable progress after two weeks of treatment. However, the experimental group 2 and control group did not make large progress after two weeks of treatment.
## Table 21.5 ANCOVA of Listening Comprehension Tests for Each Week

<table>
<thead>
<tr>
<th>Week</th>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Adjust Mean</th>
<th>SE</th>
<th>F</th>
<th>Pairwise Comparisons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Experimental group 1 (a)</td>
<td>28</td>
<td>53.57</td>
<td>26.14</td>
<td>54.28</td>
<td>4.25</td>
<td>3.04</td>
<td>a &gt; c</td>
</tr>
<tr>
<td></td>
<td>Experimental group 2 (b)</td>
<td>26</td>
<td>53.85</td>
<td>29.27</td>
<td>53.46</td>
<td>4.40</td>
<td></td>
<td>b &gt; c</td>
</tr>
<tr>
<td></td>
<td>Control group (c)</td>
<td>25</td>
<td>40.80</td>
<td>18.69</td>
<td>40.51</td>
<td>4.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental group 1 (a)</td>
<td>28</td>
<td>55.71</td>
<td>24.56</td>
<td>56.15</td>
<td>4.16</td>
<td>0.41</td>
<td>a &gt; c</td>
</tr>
<tr>
<td></td>
<td>Experimental group 2 (b)</td>
<td>26</td>
<td>51.54</td>
<td>29.49</td>
<td>51.20</td>
<td>4.31</td>
<td></td>
<td>b &gt; c</td>
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<tr>
<td></td>
<td>Control group (c)</td>
<td>25</td>
<td>52.00</td>
<td>14.14</td>
<td>51.80</td>
<td>4.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental group 1 (a)</td>
<td>28</td>
<td>73.57</td>
<td>20.41</td>
<td>74.30</td>
<td>3.93</td>
<td>4.92 * *</td>
<td>a &gt; c</td>
</tr>
<tr>
<td></td>
<td>Experimental group 2 (b)</td>
<td>26</td>
<td>68.46</td>
<td>26.03</td>
<td>68.24</td>
<td>4.07</td>
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<td>b &gt; c</td>
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<tr>
<td></td>
<td>Control group (c)</td>
<td>25</td>
<td>56.80</td>
<td>19.73</td>
<td>56.56</td>
<td>4.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental group 1 (a)</td>
<td>28</td>
<td>77.14</td>
<td>24.77</td>
<td>77.89</td>
<td>4.18</td>
<td>1.49</td>
<td>a &gt; c</td>
</tr>
<tr>
<td></td>
<td>Experimental group 2 (b)</td>
<td>26</td>
<td>71.54</td>
<td>24.77</td>
<td>71.28</td>
<td>4.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control group (c)</td>
<td>25</td>
<td>68.00</td>
<td>22.36</td>
<td>67.58</td>
<td>4.42</td>
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<td></td>
</tr>
</tbody>
</table>

* * * p < 0.01

### ANCOVA of Vocabulary Recall for Primary School Students

Study 2 also examined the learning progress of the vocabulary acquisition of students within four weeks. The study found that all three groups achieved progress each week. Both experimental and control group 1 demonstrated significantly higher learning effectiveness than control group 2, particularly from the second week. Table 21.6 shows that both the experimental and control group 1 displayed similar learning performance during the month.
Table 21.6 ANCOVA of Vocabulary Recall Tests for Each Week

<table>
<thead>
<tr>
<th>Week</th>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Adjust Mean</th>
<th>SE</th>
<th>F</th>
<th>Pairwise Comparisons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Experimental group 1(a)</td>
<td>28</td>
<td>35.71</td>
<td>19.13</td>
<td>35.51</td>
<td>3.75</td>
<td>2.88</td>
<td>a &gt; c</td>
</tr>
<tr>
<td></td>
<td>Experimental group 2(b)</td>
<td>26</td>
<td>35.38</td>
<td>21.40</td>
<td>35.55</td>
<td>3.89</td>
<td></td>
<td>b &gt; c</td>
</tr>
<tr>
<td></td>
<td>Control group(c)</td>
<td>25</td>
<td>24.00</td>
<td>20.82</td>
<td>24.00</td>
<td>3.97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 2</td>
<td>Experimental group 1(a)</td>
<td>28</td>
<td>54.29</td>
<td>31.20</td>
<td>53.90</td>
<td>5.23</td>
<td>5.29**</td>
<td>a &gt; c</td>
</tr>
<tr>
<td></td>
<td>Experimental group 2(b)</td>
<td>26</td>
<td>62.31</td>
<td>30.11</td>
<td>62.41</td>
<td>5.43</td>
<td></td>
<td>b &gt; c</td>
</tr>
<tr>
<td></td>
<td>Control group(c)</td>
<td>25</td>
<td>37.60</td>
<td>24.03</td>
<td>37.60</td>
<td>5.53</td>
<td></td>
<td></td>
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<tr>
<td>Week 3</td>
<td>Experimental group 1(a)</td>
<td>28</td>
<td>67.86</td>
<td>29.48</td>
<td>67.57</td>
<td>4.52</td>
<td>9.62***</td>
<td>a &gt; c</td>
</tr>
<tr>
<td></td>
<td>Experimental 2(b)</td>
<td>26</td>
<td>61.54</td>
<td>28.80</td>
<td>61.94</td>
<td>4.69</td>
<td></td>
<td>b &gt; c</td>
</tr>
<tr>
<td></td>
<td>Control group(c)</td>
<td>25</td>
<td>40.00</td>
<td>18.26</td>
<td>40.00</td>
<td>4.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 4</td>
<td>Experimental group 1(a)</td>
<td>28</td>
<td>71.43</td>
<td>26.35</td>
<td>71.09</td>
<td>4.91</td>
<td>6.11**</td>
<td>a &gt; c</td>
</tr>
<tr>
<td></td>
<td>Experimental group 2(b)</td>
<td>26</td>
<td>70.00</td>
<td>33.11</td>
<td>70.41</td>
<td>5.10</td>
<td></td>
<td>b &gt; c</td>
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<tr>
<td></td>
<td>Control group(c)</td>
<td>25</td>
<td>48.80</td>
<td>25.22</td>
<td>48.80</td>
<td>5.20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* *p < 0.01; * * *p < 0.001

Discussion and Conclusions

The two empirical studies in K-12 revealed that providing subtitles or captions for hard and target words is sufficient to help students comprehend and learn foreign language through videos. Moreover, by omitting easier or non-target words, the length of the captions or subtitles become shorter thus better fitting the small screen of a mobile device. The two studies arrive at
the same conclusion that providing students with full captions or subtitles is unnecessary. The listening comprehension of students will not be affected negatively when the videos only provide partial textual information (words, phrases and expressions) along with the foreign language sound track. The question is how many words or what amount of text can be removed from the video subtitles before the listening comprehension decreases compared to that of students shown full subtitles or captions. The answer to such a question depends on the English proficiency of the students (Leveridge & Yang, 2013). Therefore, when the users are primary school students, study 2 suggests that the video should not be too long and should provide information on new words (target words in the lesson). Such approach will also improve the interface adaptation for the small screen in MALL. In case of secondary school students, study 1 suggests that the video should provide information on hard words (excluding the most frequently used words) to improve the interface adaptation for the small screen of mobile devices.

Other learners with similar EFL backgrounds, such as in mainland China, can refer to the results of the two studies. In Europe, scholars have also found that providing partial captions is enough when the students use TV programs or videos in learning a foreign language. European scholars used French keyword captions for students who watched a video (Guillory, 1998). As students in non-native speaking countries generally possess limited vocabulary of foreign languages, they require higher assistance from text when watching videos (Hsu, 2015). An excellent opportunity to learn a foreign language for students with handheld devices is to watch videos on the go. These students synchronize what they hear and see. The theoretical background presented in Figure 21.1, shows that when students watch a video, flashing the meanings of new or difficult words serves as scaffolding to help improve their perception and cognitive processing. Linking the
videos to learners’ prior knowledge could contribute to increasing their learning and lowering their cognitive loading (Schweppe & Rummer, 2014). As mentioned above, shortened captions or subtitles also contribute to the interface of small-screen handheld devices. Displaying familiar or easy words or their translations becomes redundant for students, and showing excessive information using too much media may distract their attention (Mayer & Moreno, 2003). Therefore, MALL should achieve a balance between the constraints of screen size and the requirements for student learning. Excluding any redundant information from the text aids students’ cognitive comprehension when they watch foreign language videos. Hiding partial information in the text also trains students to direct their attention to other sensory inputs to notice phenomena in connected speech, such as reduced forms, assimilation, elision, re-syllabification, and so on. Accordingly, the two current studies have integrated the advantages of displaying sufficient text information in videos broadcasted on handheld devices and fitting this information on the small screen to provide adaptive scaffolding for listening training in a foreign language. Overall, the two MALL studies, which demonstrated how K-12 students used different caption and subtitle mechanisms on their handheld devices, contributed to a better understanding of the application of videos in learning language with mobiles.

Acknowledgements

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Chapter 22: Usability in Mobile Learning Content: English for Technical Purposes

Norazah Nordin
Universiti Kebangsaan Malaysia
Melor Md Yunus
Universiti Kebangsaan Malaysia
Yusma Yusof
Politeknik Tuanku Sultanah Bahiyah, Malaysia
Muhammad Amin Embi
Universiti Kebangsaan Malaysia

Abstract

Mobile computing technology enables accessibility of the Internet and the content of the World Wide Web on mobile devices. Inevitably, this opens immense opportunities for learning. Almost all learning disciplines benefit from this technology, and language learning is no exception. Nonetheless, language learning has its own properties that need to be adhered to. The four language skills (reading, listening, writing, and speaking) might not be equally emphasized in language learning through mobile devices. Mobile features, such as small screens and limited download capacity, may impede the value of content and interaction with the content. This, in turn, could frustrate learners and delay understanding of

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1 This chapter is an expanded version of the article entitled ‘The Usability of the English for Technical Purposes Mobile Learning Content in Malaysia’, published in the Mlearn 2011 Conference Proceeding.
learning points. Hence, the objective of this chapter is to examine learners’ responses toward mobile learning through usability analysis. Using English for Technical Purposes as the subject, research was conducted on forty-three students pursuing technical courses at four polytechnics in Malaysia. Students were asked to access the MALL materials designed in the study, using their mobile phones of various brands. In order for them to be able to access the materials, they were required to have an internet capable phone. Some mobile phones required only GPRS whilst others utilized the Wi-Fi services available at the learning premises. After testing the materials, students answered twenty-eight usability questions. The statistical analysis revealed that the mean of the usability items was at 5.640, and Cronbach’s coefficient alpha reliability statistics stood at 0.984, indicating that the items used were reliable. The results of this study suggest that, in order to ensure greater usability, English MALL materials have to be produced with more consideration for proper technology and pedagogy integration.

**Keywords:** mobile learning, usability, technical usability and English language learning, polytechnic, technical purposes

**Introduction**

The use of computers in second language learning dates back to the 1960s (Warschauer & Healey, 1998). However, it was not until the 1980s that computers were widely accepted in language learning classrooms (Jones & Fortesque, 1987), promoting the communicative approach. The introduction of multimedia later in the decade witnessed an abundant supply of learning materials on CD ROMs. Learning through CD ROMs allowed the flexibility of time. Learners were able to revise a learning point as and when they desired, provided they had a computer in front of them. Matters became more interesting when learners could interact with the lessons on the
computer, which made learning more meaningful (Warschauer & Healey, 1998).

Nowadays, teachers in the language classroom have a range of technology options to utilize when teaching. On one end, they may just use the word processor facilities to produce a piece of writing material, thus encouraging learners to go through the process of writing. On the other end, the use of the World Wide Web and the Internet makes second language learning more interesting, as it offers information at the fingertips of the learners. Through forums and chat channels, learning can occur in the real-time context (Norazah et al., 2010a).

The rapid evolution of educational technology has brought the world into the kingdom of mobile learning. Since the Internet is now mobile through portable devices such as smartphones and tablets, teaching and learning is no longer restricted to the four walls of the classroom. Learning can happen anytime and anywhere. Educators need to examine ways in which the emerging technologies could help learners learn and contribute to the subject of effective pedagogy (Norazah et al., 2010b). As mentioned by Kukulska-Hulme et al. (2015), educators need to be actively designing effective MALL solutions; in fact, both “teachers and learners are active participants in making and shaping language learning” (p. 7), and teachers need to understand how their learners use their mobile devices and design MALL activities accordingly (Palalas & Hoven, this volume). It is essential to understand the unique context in which MALL education takes place and adjust learning goals and experiences accordingly. The aim of this chapter is to examine learners’ responses towards MALL through usability analysis and illustrate the responses to MALL in the Malaysian context.
Mobile-Assisted Language Learning in the Malaysian Context

Technologies such as mobile phones and tablets have become a significant component of the educational landscape, as they gave birth to mobile learning. This innovative approach to learning has also impacted Malaysia where new mobile technologies have been embraced and tested in technology-assisted learning environments, including language learning. Mobile technologies offer numerous practical uses in language learning, such as the delivery of learning content to mobile devices (Ally, 2009 & Norazah et al., 2010c) and practice of language skills mediated by mobile devices (Kukulska-Hulme & Shield, 2008; Palalas, 2011). One of the key benefits of mobile learning is that it allows students to become more autonomous and flexible. They are able to record their thoughts immediately and revisit their ideas later. Ally and Kroeker (2005) noted this advantage, stating that “creativity can be captured when it flashes into existence; often not when the learner is sitting at the work station” (p.187). In other words, the main attraction of mobile learning is that learners can access and record information anytime and at their own pace. Consequently, they can benefit from the continuity and flexibility of learning both in and out of the classroom, across time and place barriers (Palalas, 2013).

Mobile-assisted language learning is a rather new educational approach on the language learning landscape, especially in developing countries. In Malaysia, for instance, MALL is considered a brand new trend that emerged from e-learning. It has been identified as one of the Critical Agenda Projects (CAPs) and Key Result Area (KRA) of Ministry of Higher Education (MOHE). The use of portable technologies in the context of a developing country like Malaysia often remains unrealised because of many factors, such as lack of access, bandwidth, and cost to students. At the same time, most
students have mobile phones, thus providing an ideal opportunity for Higher Education Institutions (HEIs) to increase the effectiveness of learning, and specifically in learning the English language. The Malaysian government has put forth, as a national aspiration, the vision 2020 that includes integration of mobile learning. As MALL is in early development in Malaysia, more studies and research initiatives are critically needed in order to contribute to this national goal.

In general, many research studies have recently been conducted by Malaysian researchers in the area of mobile learning and, despite the mixed results, the use of mobile technology for learning and teaching are seen as promising and encouraging areas to be explored (Hashim, Wan Fatimah, & Rohiza, 2010; Ismail, Gunasegaran, Koh, & Idrus, 2010; Issack, Mussawir, & Ramsawok, 2006; Jacob & Isaac, 2008; Shukri & Razak, 2011; Nordin, Embi, Yasin, Rahman, & Yunus, 2010). The findings of the studies have motivated researchers to investigate the area of mobile learning, particularly MALL.

In a study conducted by Arif, Yazi, Radzi, Husin and Embi (2013), the influence of demographics on Mobile Learning Readiness (MLR) in science and social science undergraduates was investigated. The study investigated Malaysian university students’ reception to mobile language learning and aimed to identify demographic determinants or constructs that affect students’ intention to use mobile learning (Arif et al., 2013). This exploratory study developed and validated a framework of mobile language learning for Malaysian students. It attempted to compare MLR between two types of students; those with an educational background in science (n = 36) and those with an educational background in social science (n = 33), using a MLR instrument designed by Hussin, Manap, Amir, and Krish (2012). The study investigated the respondents’ MLR and how it was
influenced by their educational backgrounds, with focus on their physical readiness, skill readiness, psychological readiness, and mobile language-learning readiness.

From the study, Arif et al. (2013) found significant differences of basic physical and skill readiness towards mobile learning between students majoring in science and those majoring in social science. The culture of the science field had encouraged its students not only to accept technology more readily, but also called for a higher awareness of technologically competence for the purposes of e-learning. They concluded that educational background influenced learners’ readiness to use mobile learning, and there was a need for specific approaches that would cater to students with varying educational backgrounds. Different types of approaches to MALL for students with different educational backgrounds and for students studying different knowledge disciplines are recommended (Arif et al., 2013). Moreover, students’ technological competence is a key factor in their readiness to use mobile devices for learning. Students’ background knowledge, interests, and their technological competence have to be considered when selecting MALL solutions.

Daud and Hussin (2013) also conducted a study on the use of mobile phones for a reading comprehension course. Their justification was that while mobile phones are increasingly and frequently used by students, studies on their use to supplement a reading comprehension course are seldom reported in the literature. The main purpose of their study was to determine whether texting reading comprehension exercises to students could contribute to the improvement in their reading performance. It also intended to determine which level of proficiency would benefit most from such an exercise. A quasi-experimental design was adopted in the study to determine if the use of mobile phones contributed to the improvement in learners’
reading comprehension. The participants of this study were students who owned mobile phones. A total of 651 students were selected to enrol in language proficiency courses, which offered practice for grammar and the four language skills (reading, writing, listening, and speaking) at the language centre (CELPAD) of the International Islamic University, Gombak, Malaysia. They participated for over 3 months, and the sample was taken randomly from each level of proficiency courses. Reading scores gains were taken based on a pre-test and a post-test. Reading materials were texted to students in the experimental group every day for approximately 3 months. To ensure the appropriateness of the reading materials, an online readability test was carried out.

The results of the study showed that there were significant differences between the groups in terms of their overall performance in the reading comprehension pre-test. Almost all of the English language proficiency courses, regardless of the proficiency levels, showed significant differences in mean reading comprehension post-test performance. There was an overall improvement in the performance of the students based on the comparison of the mean reading comprehension scores pre- and post-tests, i.e., they showed an improvement in their reading scores. Although there was an improvement in reading comprehension ability across the groups, the increase in scores was not statistically significant. The ANOVA analysis indicated that there were significant mean differences across the population regarding the English language bands obtained in the reading comprehension pre-test. The analysis of results indicated that, on the whole, students who participated in the study were able to perform better in their reading comprehension tests. In sum, as the study results demonstrate, the use of mobile devices for learning can assist students to achieve their learning objectives, including reading comprehension, due to the format flexibility
for knowledge transmission. These findings also suggest that there is a potential in using mobile phones to supplement classroom learning. Thus, the use of mobile phones for reading demonstrated that such an activity is pedagogically beneficial to the learners.

The studies conducted on the use of mobile devices in general, and on MALL in particular, are regarded as ground breaking and promising in Malaysia. However, despite the paramount importance of mobile technologies in making language learning and education more accessible and vigorous in developing countries, more rigorous studies are clearly needed to deepen the understanding of the MALL area (Embi & Nordin, 2013).

Although a number of MALL research studies have been carried out, there is still a lot of work left and a large amount of information to be uncovered in the growing field of mobile language learning. These studies have to address a range of issues that impact the effectiveness of mobile learning. The remaining part of this chapter presents one of the recent MALL studies in Malaysia, namely, an investigation into usability issues of the English for Technical Purposes m-learning content.

**General Usability**

Usability is an issue that concerns many types of products that are used by a vast majority of people. Electronic items, such as photocopiers, video cameras, microwaves, mobile phones, and computers lend themselves readily to the issue of usability. A product is normally designed to ensure that users can accomplish tasks using the items at minimum hassle. After all, most of the products were designed to aid users in accomplishing complicated tasks without requiring too much re-skilling. As mentioned by Adler and Winograd (1992),
...new technologies will be more effective when designed to augment rather than to replace the skills of the users. The key challenge in designing new technologies is how best to take advantage of users’ skills in creating the most effective and productive working environment. We call this the usability challenge. (p. 3)

Hence, in designing a product, the development team should consider the skills that users already possess and try to include the features that users need in order to accomplish a particular task, presenting those features in such a way that users can easily grasp them and find them efficient for long-term use (Wilkund, 1994; Zaharias, 2004). Take, for instance, the introduction of word processors in the early 1980s. Word processors capitalized on users’ skill in typing. However, today’s word processing software includes instruction buttons that makes the writing process easier and almost effortless. There are buttons or icons that can type and retype, erase words, change fonts, insert tables, and so on. This makes word processing software very usable. Aptly, Wilkund (1994) defines usability as a design philosophy that places users’ needs high, if not first, on the list of design priorities. Thus, usability analysis is important, as it provides an insight into how users view the product or object.

In web-design, Nielsen (2000) claims that usability rules the web. According to Nielsen (2000), if a customer cannot find a product, then she or he will not buy it. Usability has a vital place in the net-economy, which might not be the case in traditional marketing. For instance, in the traditional market, customers do not have the chance to use the product before purchasing it. If someone bought a video camera and later discovered that the procedure of recording was rather tedious, then there is nothing much that the customer could do except to deal with the difficulty. This
would be a loss on the customer’s part, as the product is not user-friendly, but the manufacturer would still manage to sell the product. However, this is not the case with the software market. The software market is more aware of usability issues. Software is designed to be user-friendly and usable. This is achieved by providing call centres or support systems to address users’ difficulties or queries about their software. Furthermore, as Zaharias (2004) pointed out, users of software could return repeatedly and gradually learn the interface. This is not the case with instructional interfaces on the web. Consequently, in web marketing, the issue of usability is pursued more aggressively. Users experience usability first before purchasing anything. When usability or user-friendly products equate with profit, usability becomes a challenge that manufacturers have to address. Nielsen (1993) proposed five usability components:

1. Learnability
2. Efficiency
3. Memorability
4. Errors, and
5. Satisfaction

Learnability deals with how easy it is for users to accomplish basic tasks on their first try with the product. Efficiency relates to how quickly users can perform tasks once they have learned to use the product. Memorability refers to how easily can users reestablish their proficiency after not using the product for a period of time. Errors refer to the number of errors, the recovery from errors and the severity of those errors, should users perform errors. Satisfaction answers the question of how pleasant it is to use the product.

Preece, Rogers, and Sharp (2007) have taken the idea further and developed the components into goals. Usability is generally regarded as
“ensuring that interactive products are easy to learn, effective to use and enjoyable from the users’ perspective” (Preece et al., 2007, p. 19). Preece et al. (2007) added another three goals for usability, which are:

- Effective to use (effectiveness)
- Safe to use (safety), and
- Having good utility (utility)

Preece et al. (2007) considered effectiveness of a product to be how good a product is at doing what it is designed to do. For instance, does a mobile vocabulary app positively affect the learner’s vocabulary repertoire? Preece and colleagues (2007) also included safety as one of the usability goals. Safety involves the protection that users need from hazardous products, such as products with high-radiation. It must also involve the feeling of being in control when dealing with hazardous products. For example, users must have the ability to control the product’s interface to ascertain whether they are not exposing themselves to dangerous situation. As far as using the Internet is concerned, a warning, a dialog box or pop-up row allows the user to reconsider his or her intentions. This, indirectly, reduces the risk of performing an action unintentionally.

Utility, on the other hand, refers to the functionality of the product (Preece et al., 2007). Does the product provide the right kind of functionality to enable users to do what they want to do? An example of a product with poor utility is a banking website with no ability to transfer money from one account to another. In the MALL context, an SMS software that does not provide an option for group formation would be an example of a technology with limited utility.

Briefly, the goals of effectiveness, safety and utility, coupled with
Nielsen’s (1993) five components of learnability, efficiency, memorability, errors, and satisfaction touches the physical aspect of usability. If all the components or goals are met, will the users feel satisfied in using the products? Preece et al. (2007) suggested that apart from the physical aspect of the products that usability normally addresses, there is another criterion that one should look into, and that is user experience. User experience deals with subjective aspects, such as satisfying, enjoyable, engaging, pleasurable, aesthetically pleasing, supportive of creativity, motivating, fun, provocative, helpful, cognitively stimulating, enhancing sociability, challenging, emotionally fulfilling, and exciting. In short, these aspects answer the question of users experience when using the product in a more complete way.

In the case of MALL – a language learner experience with an m-learning hardware and/or software design – user experience relates to how a product behaves and is used by people in the real world (Preece et al., 2007). Garrett (2003) stressed that every product that is used by someone has a user experience. User experience is about how users feel about the product when looking at it, holding it, using it, opening it or closing it. Take mobile phones for instance, some mobile phones are designed to fit the palm, be placed in a pocket, opened with one hand, for texting with the thumb, and so on. Users who are looking for a small, slick, and handy mobile phone will probably feel satisfied and at ease with the product. If mobile phones are designed to be bulky and difficult to operate, then those mobile phones might not score highly on the user experience score sheet.

User experience may not be pleasant at all times. Research conducted by Nielsen and Budiu (2009) examined the usability of websites displayed on mobile phones. Nielsen and Budiu (2009) used three usability methods: diary study, user testing, and cross-platform review. In the diary
study, fourteen international students participated and were asked to log everything they did using their mobile devices. In user testing, thirty-three participants from the US and 15 participants from the UK were selected and were given tasks that require them to log on to the Internet using their mobile phones in order to get information. Finally, in the cross-platform review, twenty websites were reviewed on their designs. The results of the study were not encouraging. They reported a success rate of viewing websites with a mobile screen to be a mere 59%, which is far from the success rate of 80% when testing websites using regular computers (Neilson & Budiu, 2009). However, when participants used sites that were designed specifically for mobile users, the success rate increased to 64%.

Many factors influence user experience in usability analysis. Nielsen and Budiu (2009), Bertini, Catarci, Kimani, and Dix (2005), and Uther (2002) point to the small screen factor and limited input as potential deterrents. Nielsen and Budiu (2009) suggested that the lack of a mouse might result in typo-errors, thus delaying information gathering. Another crucial factor is download delays. Because of the limited capacity of mobile phones, downloading can be slow. This frustrates users, especially when they need to download graphics and multimedia texts.

Nielsen and Budiu (2009) further concluded that designing websites for mobile devices is difficult. They emphasized the clash between making content and navigation salient and designing for a small screen and slow downloading process. In relation to designing for learning content, Nielsen and Budiu's (2009) study alerted mobile designers and subject matter experts to designing specifically for mobile screen to create a better user experience. In other words, considerations should be given to the special features and limitations of mobile phones if mobile learning is meant to be a success. Even with those considerations, there is no guarantee that user
experience will be a favorable one.

In conclusion, it is inevitable for usability to be evaluated. Content developers and mobile designers need to understand what works and what does not when delivering content through mobile devices. There are many guidelines available; IBM provides an example on how to use questionnaires in evaluating technical usability; Ryu (2006) discusses reliability and validity of mobile phone questionnaires; Lund (2001) provides useful insights on how to evaluate usability. Cautioned by his own maxim in usability (Lund, 1997), Lund (2001) came up with a set of constructs that can be used for evaluating usability. The constructs fall under four groups: usefulness, satisfaction, ease of use, and ease of learning. The questionnaire is referred to as the USE questionnaire. The items of this questionnaire are adapted to suit the purpose of the reported research study.

Methodology

The purpose of this research was to examine the technical usability of the English for Technical Purposes materials designed for mobile delivery. The research was conducted with forty-three students, who were learning English while pursuing technical courses at four polytechnics in Malaysia. A quantitative method was employed. After testing the materials, students answered twenty-eight usability questions. The instrument was adapted from Lund’s USE questionnaire and administered to the respondents from four polytechnics. Four Malaysian polytechnics were involved:

1. Sultan Idris Shah Polytechnic, Sabak Bernam
2. Merlimau Polytechnic, Melaka
3. Sultan Mizan Zainal Abidin Polytechnic, Dungun
4. Kuching Polytechnic, Sarawak
Students were asked to access the materials, which were modified to suit the mobile domain, using their mobile phones of various brands. In order for them to be able to access the materials, they were required to have an internet capable phone. Some mobile phones required only GPRS, while others utilized the Wi-Fi services available at the learning premises. The respondents were asked to view and try out materials on the mobile site using their personal mobile phones. After trying out all the components, the respondents were then asked to evaluate the usability of the site via the questionnaire using a 7-point Likert’s scale.

Results and Discussion

In order to determine the reliability of the questions set, the items were analyzed using Cronbach’s coefficient alpha (Cronbach, 1951). Netemeyer, Bearden and Sharma (2003) agreed that an acceptable level of adequacy for coefficient alpha has been at least 0.70. The question items were analyzed using Statistical Package for Social Sciences (SPSS) software. The value of Cronbach’s Alpha for all the items was 0.98. Table 22.1 shows the coefficient alpha values for each of the four categories. All values of coefficient alpha exceeded 0.90.

<table>
<thead>
<tr>
<th>Table 22.1 Coefficient Alpha Value for Each Category</th>
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<tr>
<td><strong>Category</strong></td>
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<td>-------------</td>
</tr>
<tr>
<td>Usefulness</td>
</tr>
<tr>
<td>Ease of Use</td>
</tr>
<tr>
<td>Ease of Learning</td>
</tr>
<tr>
<td>Satisfaction</td>
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<td></td>
</tr>
</tbody>
</table>
After determining the reliability level of the question items, the items were analyzed to obtain the means. Means allowed us to look at the overall perception of the respondents. The first analysis addressed the respondents’ opinion on the usefulness of the mobile learning materials. The means ranged from 5.58 to 5.76. This shows that on the criteria of usefulness, respondents agreed that learning materials presented using mobile phones were well received; hence, the materials were viewed as useful. Generally, respondents felt that mobile learning materials were useful.

| Table 22.2  Means and Standard Deviations of the Items on Usefulness |
|-------------|-------------|-------------|
|             | Usefulness  | Mean        | Std Deviation |
| 1           | It helps me learn more effectively | 5.62        | 1.30         |
| 2           | It helps me be more productive    | 5.58        | 1.48         |
| 3           | It is useful                      | 5.60        | 1.54         |
| 4           | It gives me more control over my language learning activities. | 5.58        | 1.34         |
| 5           | It makes language learning easier. | 5.65        | 1.44         |
| 6           | It saves me time when I use it.   | 5.76        | 1.61         |
| 7           | It is useful for my learning.     | 5.76        | 1.34         |

The second analysis reported on the respondents’ opinion on the ease of use of the MALL materials. Similar to the first analysis, the results showed that the respondents found the materials presented using mobile phones easy to use. The mean ranged from 5.34 and 5.81.

| Table 22.3  Means and Standard Deviation for the Items on Ease of Use |
|-------------|-------------|-------------|
|             | Ease of Use | Mean        | Std Deviation |
| 1           | It is easy to use the materials presented on mobile phone | 5.67        | 1.49         |
The third analysis addressed the respondents’ opinion on ease of learning. With the items mean ranging from 5.44 to 5.65, the results showed that the respondents found it easy to learn using the English for Technical Purposes content presented on mobile phones.

Table 22.4 Means and Standard Deviation for the Items on Ease of Learning

<table>
<thead>
<tr>
<th>Ease of Learning</th>
<th>Mean</th>
<th>Std Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 I learned to use it quickly</td>
<td>5.62</td>
<td>1.54</td>
</tr>
<tr>
<td>2 I easily remember how to use it</td>
<td>5.44</td>
<td>1.66</td>
</tr>
<tr>
<td>3 It is easy to learn to use it</td>
<td>5.65</td>
<td>1.47</td>
</tr>
<tr>
<td>4 I quickly became skilful with it</td>
<td>5.39</td>
<td>1.51</td>
</tr>
</tbody>
</table>

The fourth analysis addressed the respondents’ opinion on satisfaction when using materials delivered through mobile phones. The minimum mean stands at 5.62 and the maximum was 6.06. Hence, the respondents were satisfied with the mobile language learning materials delivered through
mobile phones.

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<th>Means and Standard Deviation for the Items on Satisfaction</th>
</tr>
</thead>
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<td></td>
<td>Satisfaction</td>
</tr>
<tr>
<td>1</td>
<td>It is fun to use</td>
</tr>
<tr>
<td>2</td>
<td>I would recommend it to a friend</td>
</tr>
<tr>
<td>3</td>
<td>I am satisfied with it</td>
</tr>
<tr>
<td>4</td>
<td>It works the way I want it to work</td>
</tr>
<tr>
<td>5</td>
<td>It is wonderful</td>
</tr>
<tr>
<td>6</td>
<td>I feel I need to have it</td>
</tr>
<tr>
<td>7</td>
<td>It is pleasant to use</td>
</tr>
</tbody>
</table>

The results of the survey demonstrated respondents’ positive learning experiences and their favourable attitudes towards language learning through mobile devices, more specifically accessing English for Technical Purposes content using their own mobile phones. The respondents felt that the MALL method was useful, easy to learn, easy to use, and generally felt satisfied with the mobile English for Technical Purposes materials and the method they were presented. This could reflect Nielsen’s (1990) argument that usability refers to how well the users are able to use the function offered by the system. Indirectly, it can be concluded that since all items bear the mean of five and above in all sections of the USE questionnaire, the English language materials delivered through mobile phones were usable by the population that the respondents represented.

Conclusion

As mobile learning is still in its infancy stage in Malaysia, data gathered could not be compared with any other studies in the same field, and as to date, none has been conducted. However, the results are encouraging
and promote a better understanding of how Malaysian polytechnic students respond to language learning using innovative mobile technology. It also provides reasons to develop a much more comprehensive mobile-assisted English language learning modules to cater to the use and needs of the polytechnic students. Careful planning of proper technology integration and pedagogy will also help ensure that the modules achieve their intended purpose. In line with the global online learning agenda in the Malaysia Higher Education Blueprint (2015-2025) (Ministry of Education, 2015), MALL will definitely play an important role in the Malaysian foreign language educational system.

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PART III: Research from Case Studies

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Technologies in Education.


Epilogue

Mohamed Ally

Athabasca University, Canada

Summary and Looking into the Future

The chapters in the International Handbook of Mobile-Assisted Language Learning were written by authors from thirteen different countries who reported on MALL studies in twice as many educational contexts, thus the handbook gives a truly international perspective on mobile language learning. The first section of the handbook provides the theoretical foundation of MALL. It describes guidelines and principles for designing high quality language learning materials using appropriate mobile technology and pedagogy. Part I also suggests guidelines for evaluating and selecting existing mobile language learning resources. The chapters in Part II describe practical applications of the use of mobile technology for language learning. Since the chapters in the second section are authored by experts from around the world, they give an indication of what is happening internationally in the field of mobile language learning. Part III presents results of case studies, which exemplify the diversity of language learning contexts and corresponding best practices for designing, developing, and implementing the use of mobile technology in language learning and language training.

As a result of globalization and increasing use of the Internet and social media, there is a growing need for language training so that people around the world can learn different languages and understand each other better.
People should be able to learn language from any location and at their convenience. In some cases, citizens in countries need to learn a language just-in-time and in-context as they interact with different cultures. Hence, the training has to be flexible so that learners can access it whenever required. The use of mobile technology in language learning and training provides that flexibility. In addition to allowing for flexibility in learning, the multimedia capabilities of mobile technology enable the use of videos and audio in MALL. Learners can access multimedia language materials and they can also practice their language skills by recording themselves and replaying the recordings for feedback. From a teaching perspective, the language teacher can interact with learners using audio and video to communicate and evaluate their language skills. They can also provide rich feedback on those language samples.

Some languages learners are adult learners who are uncomfortable attending a formal class to learn a new language or to improve their language skills. Mobile-assisted language learning allows adult learners to learn independently and interact with the teacher on a one-to-one basis. Adult learners can also stay in their local community or workplace and improve their language skills without the need to attend a language class in a distant location or at an inconvenient time. Language learning can be done on an informal basis using mobile technology since learners can access the learning materials as needed to apply in different contexts. Similarly, learners can capture information in their surroundings and translate it into their own language on-demand. For example, when a learner is travelling in a foreign country, he or she can use the mobile device to capture a picture of a sign and translate it into the learner’s first language. Software residing on a mobile device can even provide description of a photographed object in language of the learner’s choice.
For language learning to be effective, proper pedagogical models must be used to develop the knowledge and skills of the learners and allow them to transfer what they learn into the real world environment. The use of mobile technology allows for enhanced teacher-learner and learner-learner interactivity. The use of social media helps learners to interact with each other to improve their language skills and exchange peer feedback, which is a non-threatening way to learn. Mobile technology also supports adaptive learning where the learning system adapts the language instruction to individual learners. This is critical in language learning since different learners tend to be at different stages and require personalized interventions.

The use of technology to capture indigenous and other languages that are being lost or ignored will help to preserve these languages. Mobile technology can be used to capture these languages and training programs can be developed to train the younger generations to preserve the languages. As technology evolves and becomes smarter, there will be the capability of voice input and voice output where learners will be able to seamlessly interact with the technology to improve their language knowledge and skills. In addition, the technology will be able to accurately translate from one language to another. Future research should be conducted on the use of smart technology in language learning to make full use of the technology.

Mohamed Ally, Ph. D.
Glossary

ABE – Alternative Basic Education

App smashing – The process of using multiple apps in conjunction with one another to complete a task or project

BYOD – Bring Your Own Device

CLIL – Content and Language Integrated Learning, i.e., teaching and learning non-linguistic subjects in a foreign language

Computational thinking – The ability of a human to define a problem in such a way that it can be solved with the use of digital technology

Digital natives – According to Prensky, a generation that is expected to have a high level of computer skills because of their young age

ESP – English for specific purposes

Extrinsic motivation – The performance of an activity to obtain a desired outcome; it is the motivation that someone has when she or he performs or engages in an activity in order to earn an external reward or avoid punishment

Gamification – The use of game mechanics in non-game contexts for the purpose of increasing user engagement

ICT – Information and communication(s) technology; a term that includes any communication device of application

ICT4D – Information and Communication(s) Technologies for Development; the use of ICT technologies in global development strategies, focusing on the fields of international and socioeconomic development and human rights

Intrinsic motivation – The self-desire to seek out new things and new
challenges, to analyze one’s capacity, to observe and to gain knowledge; it is the motivation that someone has when they engage in an activity because it is personally rewarding, without any desire for an external reward

IoT – The Internet of Things; the network of physical objects, including devices, vehicles, buildings and other items which are embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data

L1 – first language
L2 – second language

LCI – Learning Combination Inventory

Learning dashboards – A form of feedback that is provided within e-learning systems; they can be used to provide summative or formative feedback and are often viewable by learners

LMS – Learning Management System

M4D – Mobile(s) for Development; the use of mobile technologies in global development strategies, focusing on the fields of international and socioeconomic development and human rights

MALL – Mobile-assisted language learning
m-learning – Mobile learning

MLL – Mobile language learning (used interchangeably with MALL)
MT – Mobile technologies

Multimedia Message Service (MMS) - A standard way to send messages that include multimedia content to and from mobile phones over a cellular network

OLA – Out-of-School Literacy Assessment

PC – Personal computer

Persuasive technology – Technology that is designed to change the attitudes and behaviours of users through persuasion and social influence
RFID – Radio frequency identification: a technology that incorporates the use of electronic tags placed on objects, people, or animals to uniquely identify an object, animal, or person and relay identifying information to an electronic reader.

Self-regulated learning – Learning that is guided by metacognition (i.e., awareness of one’s thoughts) and a motivation to learn; it involves planning, monitoring, and evaluating personal progress against some standard.

SLA – Second language acquisition: the process of learning other languages in addition to the native language.

SMS – Short Message Service or text messages.

Social networking – The use of applications or websites to build social networks between people who share interests.

Tele-collaboration – The use of technologies that facilitate interaction between remote groups.

TESOL – Teachers of English as a Second or Other Language.
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The International Handbook of Mobile-Assisted Language Learning

- This is a practical resource book on mobile-assisted language learning (MALL). It is about a new understanding of language teaching and learning—a perspective enriched by voices of educators from diverse cultural and educational backgrounds.
- Each chapter provides a unique vantage point on mobile language learning, the book reflects diverse perspectives on MALL from across the globe.
- The twenty-two chapters are divided into three sections. Part I introduces key concepts and notions underpinning mobile language learning. Part II explores practical applications of MALL in diverse language learning settings in Germany, Senegal, Australia, Greece, Spain, Brazil, Canada, and the UK. Part III presents case studies in the United Arab Emirates, Poland, Liberia, Czech, the UK, China, and Malaysia.