

# Open Research Online

---

The Open University's repository of research publications and other research outputs

## Mobile Assistance in Language Learning: A critical appraisal

### Book Section

#### How to cite:

Kukulska-Hulme, Agnes (2016). Mobile Assistance in Language Learning: A critical appraisal. In: Palalas, Agnieszka and Ally, Mohamed eds. The International Handbook of Mobile-Assisted Language Learning. Beijing: China Central Radio & TV University Press Co., Ltd., pp. 138–160.

For guidance on citations see [FAQs](#).

© 2016 China Central Radio TV University Press Co., Ltd.

Version: Accepted Manuscript

Link(s) to article on publisher's website:  
<http://www.crtvup.com.cn/zyxz/dj.asp?id=9>

---

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's [data policy](#) on reuse of materials please consult the policies page.

---

[oro.open.ac.uk](http://oro.open.ac.uk)

# Mobile Assistance in Language Learning: A Critical Appraisal

Agnes Kukulska-Hulme

The Open University, UK

*ACCEPTED MANUSCRIPT*

## 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.

## 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 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 (MALL) 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 most of the few reliable ones 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 and 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' (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? Or 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 improving 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 strongly 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 to be examined.

### **Mobile and animate assistance**

Working on the concept of mobile assistance, researchers Sumi et al. (1998) long ago declared their long-term goal to be the enhancement of communications and information sharing between people and ‘knowledgeable machines’, and 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. 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 (learning English as a Second Language), 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, and 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.

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 it 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 it 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 – but 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 of combining 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 research with Chinese parents, already mentioned earlier, showed that some had been directly training their children to be 'good language learners' by fostering certain behaviours and beliefs (Xuesong, 2006, 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', however, 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):

- 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” (p.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.maseltoveu.com](http://www.maseltoveu.com), 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; Kukulska-Hulme et al., 2012; Kukulska-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 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 further 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.

**Table 1: Types of assistance for mobile language learning**

<b>Motivation</b>	Motivational support
	Incentiviser
	Rewards for achievement or trying
<b>Well-being support</b>	Affective support
	Mood monitor
	Healthy learning advisor
	Confidence coach
<b>Progress monitoring</b>	Feedback on performance
	Rectification of mistakes
	Showing progress
	Reflection tool
<b>Direct help</b>	Instruction
	Guidance
	Recommendations
	Emergency help
<b>Sustained help</b>	Training
	Habit-formation
	Means of rehearsal
<b>Cognitive support</b>	Directing attention
	Noticing support
	Scaffolding and fading
	Association of ideas
	Memorisation aid
<b>Organisation</b>	Preparation aid
	Revision aid
	Reminders
	Available tools
<b>Social support</b>	Social contact
	Conversational partner

	Teamwork aid
	Experience sharing
	Resource sharing
<b>Personal development</b>	Development of teaching
	Learning skills and approaches
	Enculturation for self-direction
	Imagination and creativity support
	Alternative perspectives
<b>Individual requirements</b>	Disability support
	Supporting additional requirements
	Experience capture
	Logging actions, places, time
<b>Mediation</b>	Translation aid
	Interpreter
	Cultural guru
	Facilitation of social inclusion
<b>Communication</b>	Channels for communication
	Choice of media
	Language switching support
<b>Enrichment</b>	Augmentation of experiences
	Real-world contexts for practice

## Conclusions

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 in 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.

## References

Aleven, V., Stahl, E., Schworm, S., Fischer, F., & Wallace, R. (2003). Help seeking and help design in interactive learning environments. *Review of Educational Research, 73*(3), 277-320.

Arrigo, M., Di Giuseppe, O., Fulantelli, G., Gentile, M., Merlo, G., Seta, L., & Taibi, D. (Eds.) (2010). *Mobile technologies in lifelong learning: Best practices*. Palermo: Italian National Research Council – Institute for Educational Technology.

Attewell, J. (2004). *Mobile technologies and learning*. London: Learning and Skills Development Agency.

BlueAssist (2015). Charity home page. Retrieved June 15, 2015 from <http://www.blueassistuk.org.uk/>

Brown, J.S., Collins, A., & Duguid, P. (1989). Situated Cognition and the Culture of Learning. *Educational Researcher, 18*(1), 32-42.

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

Chen, X-B. (2013). Action research: Tablets for informal language learning: Student usage and attitudes. *Language Learning & Technology, 17*(1), 20-36.

Choi, S. & Clark, R.E. (2006). Cognitive and affective benefits of an animated pedagogical agent for learning English as a second language. *Journal of Educational Computing Research, 34*(4), 441-466.

Collins, A., Brown, J. S., & Newman, S. E. (1987). Cognitive apprenticeship: Teaching the craft of reading, writing and mathematics (Technical Report No. 403). BBN Laboratories, Cambridge, MA. Centre for the Study of Reading, University of Illinois.

Comas-Quinn, A., Mardomingo, R., & Valentine, C. (2009). Mobile blogs in language learning: making the most of informal and situated learning opportunities. *ReCALL, 21*(1), 96–112.

Cook, A.M., & Hussey, S.M. (1995). *Assistive technologies: Principles and practices*. (1<sup>st</sup> ed.). Baltimore: Mosby.

Cook, A.M., & Polgar, J.M. (2015). *Assistive technologies: Principles and practices*. (4<sup>th</sup> ed.). St.Louis: Mosby.

Da Lio, M., Biral, F., Bertolazzi, E., Galvani, M., Bosetti, P., Windridge, D., Saroldi, A., & Tango, F. (2015). Artificial co-drivers as a universal enabling technology for future intelligent vehicles and transportation systems. *IEEE Transactions on Intelligent Transportation Systems*, 16(1).

Díaz-Vera, J. (Ed.) (2012). *Left to My Own Devices: Learner Autonomy and Mobile-Assisted Language Learning*. Innovation and Leadership in English Language Teaching, Volume 6. Bingley: Emerald Group.

Gaved, M., Kukulska-Hulme, A., Jones, A., Scanlon, E., Dunwell, I., Lamerias, P., & Akiki, O. (2013, October). *Creating coherent incidental learning journeys on mobile devices through feedback and progress indicators*. Paper presented at the 12th World Conference on Mobile and Contextual Learning (mLearn 2013), Doha, Qatar.

Godwin-Jones, R. (2011). Emerging Technologies: Mobile Apps for Language Learning, *Language Learning & Technology*, 15(2), 2–11.

Hwang, I., Yoo, C., Hwang, C., Yim, D., Lee, Y., Min, C., Kim, J., & Song, J. (2014, February). *TalkBetter: Family-driven Mobile Intervention Care for Children with Language Delay*. Paper presented at CSCW'14, Baltimore, USA.

Kukulska-Hulme, A. (2015). Language as a bridge connecting formal and informal language learning through mobile devices. In: L-H. Wong, M. Milrad and M. Specht (Eds.) *Seamless Learning in the Age of Mobile Connectivity*. (pp. 281–294). Singapore: Springer.

Kukulska-Hulme, A. & Bull, S. (2009). Theory-based support for mobile language learning: noticing and recording. *International Journal of Interactive Mobile Technologies*, 3(2), 12–18.

Kukulska-Hulme, A. & de los Arcos, B. (2011, April). *Triumphs and frustrations of self-motivated language learners using mobile devices*. Paper presented at CAL Conference 2011 - Learning Futures: Education, Technology & Sustainability, Manchester.

Kukulska-Hulme, A., Norris L., & Donohue, J. (2015). *Mobile Pedagogy for English Language Teaching: a guide for teachers*. The British Council. Online publication. Retrieved June 15, 2015 from <http://englishagenda.britishcouncil.org/research-papers/mobile-pedagogy-english-language-teaching-guide-teachers>

Kukulska-Hulme, A., Sharples, M., Milrad, M., Arnedillo-Sánchez, I. & Vavoula, G. (2011). The genesis and development of mobile learning in Europe. In D. Parsons (Ed.) *Combining E-Learning and M-Learning: New Applications of Blended Educational Resources* (pp. 151–177). Hershey, PA: Information Science Reference.

Kukulska-Hulme, A., Gaved, M., Brasher, A., Jones, A., Scanlon, E., & Paletta, L. (2012, November). *Designing for inclusion through incidental language learning*. Paper presented at ICT for Language Learning (5th Edition), Florence, Italy.

Kukulka-Hulme, A., Gaved, M., Paletta, L., Scanlon, E., Jones, A., & Brasher, A. (in press, 2015). Mobile Incidental Learning to Support the Inclusion of Recent Immigrants. *Ubiquitous Learning*.

Luckin, R., du Boulay, B., Smith, H., Underwood, J., Fitzpatrick, G., Holmberg, J., Kerawalla, L., Tunley, H., Brewster, D. & Pearce, D. (2005). Using Mobile Technology to Create Flexible Learning Contexts. *Journal of Interactive Media in Education* 2005(22). [jime.open.ac.uk/2005/22].

Macaro, E., Handley, Z., & Walter, C. (2012). A systematic review of CALL in English as a second language: Focus on primary and secondary education. *Language Teaching*, 45(1), 1–43.

Macedonia, M., Groher, I., & Roithmayr, F. (2014). Intelligent virtual agents as language trainers facilitate multilingualism. *Frontiers in Psychology*, 5, 295.

Matthews, M., Doherty, G., Sharry, J., & Fitzpatrick, C. (2008). Mobile Phone Mood Charting for Adolescents. *British Journal of Guidance and Counselling*, 36(2), 113-129.

Mäkitalo-Siegl, K., & Fischer, F. (2011). Stretching the limits in help-seeking research: Theoretical, methodological, and technological advances. *Learning and Instruction*, 21(2), 243–246.

Nelson-Le Gall, S. (1981). Help-seeking: An understudied problem solving skill in children. *Developmental Review*, 1, 224-246.

Palalas, A. (2012). *Design Guidelines for a Mobile-Enabled Language Learning System Supporting the Development of ESP Listening Skills*. Unpublished EdD Dissertation. Athabasca University.

Park, M., & Slater, T. (2014). A Typology of Tasks for Mobile-Assisted Language Learning: Recommendations from a Small-Scale Needs Analysis. *TESL Canada Journal /Revue TESL du Canada*, 31(8), 93-115.

Perez Cavana, M-L., & Edwards, C. (2014). Developing the Language Learning Support Dimensions (LLSD) from research into second language acquisition and informed by the Effective Lifelong Learning Inventory (ELLI) In Hans P. Krings, B. Kühn (Eds.) *Fremdsprachliche Lernprozesse beobachten- initiier- ensteuern - begleiten*. Proceedings of 4th Bremer Symposions zum Fremdsprachenlernen an Hochschulen. Bochum: AKS-Verlag.

Petersen, S.A., Procter-Legg, E. & Cacchione, A. (2014). LingoBee: Engaging Mobile Language Learners Through Crowd-Sourcing. *International Journal of Mobile and Blended Learning*, 6(2). 58-73.

Pollak, D. (Ed.) (2009) *Neurodiversity in Higher Education: Positive Responses to Specific Learning Differences*. Chichester: Wiley-Blackwell.

SALSA (2015). Sensors and Apps for Languages in Smart Areas. SALSA project blog. Retrieved June 15, 2015, from <http://www.open.ac.uk/blogs/salsa/>

Scanlon, E., Gaved, M., Jones, A., Kukulska-Hulme, A., Paletta, L., & Dunwell, I. (2014). Representations of an incidental learning framework to support mobile learning. *Proceedings of the 10th International Conference on Mobile Learning 2014* (pp. 238–242). IADIS Press: Madrid.

Schroeter, Ch., Mueller, S., Volkhardt, M., Einhorn, E., Huijnen, C., van den Heuvel, H., van Berlo, A., Bley, A., & Gross, H.-M. (2013). Realization and User Evaluation of a Companion Robot for People with Mild Cognitive Impairments. *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA 2013)* (pp. 1145-1151). IEEE: Karlsruhe.

Sellen, A.J., & Whittaker, S. (2010). Beyond total capture: a constructive critique of lifelogging. *Communications of the ACM*, 53(5), 70-77.

Selwyn, N. (2010). Looking beyond learning: notes towards the critical study of educational technology. *Journal of Computer Assisted Learning*, 26(1), 65–73.

Selwyn, N. (2015). Minding our language: why education and technology is full of bullshit ... and what might be done about it. *Learning, Media and Technology*. Published online 22 April 2015. DOI:10.1080/17439884.2015.1012523

Sharples, M., Corlett, D., & Westmancott, O. (2002). The Design and Implementation of a Mobile Learning Resource. *Personal and Ubiquitous Computing*, 6, 220–234.

Stead, G. (2003). Meeting the challenge: producing m-learning materials for young adults with numeracy and literacy needs. Retrieved June 15, 2015, from <http://www.eee.bham.ac.uk/mlearn/papers/CTAD%20paper.pdf>

Sumi, Y., Etani, T., Felsy, S., Simonetz, N., Kobayashix, K., & Mase, K. (1998). C-MAP: Building a Context-Aware Mobile Assistant for Exhibition Tours. In T. Ishida (Ed.) *Community Computing and Support Systems* (pp. 137-154), Berlin: Springer-Verlag.

Swan, M. (2012). Sensor Mania! The Internet of Things, Wearable Computing, Objective Metrics, and the Quantified Self 2.0. *Journal of Sensor and Actuator Networks*. (2012)1, 217-253.

TFL (2015). Visually impaired Londoners trial new travel app. Transport for London. Retrieved June 15, 2015, from <https://www.tfl.gov.uk/info-for/media/news-articles/visually-impaired-londoners-trial-new-travel-app>

Tullis, J.G., Goldstone, R.L., & Hanson, A.J. (2015). Scheduling Scaffolding: The Extent and Arrangement of Assistance During Training Impacts Test Performance. *Journal of Motor Behavior*, 47(5). Published online March 2015. Retrieved June 15, 2015 from DOI:10.1080/00222895.2015.1008686.

Velghe, F. & Blommaert, J. (2014). Emergent New Literacies and the Mobile Phone: Informal Language Learning, Voice and Identity in a South African Township. In B. Geraghty and J.E. Conacher (Eds.) *Intercultural Contact, Language Learning and Migration* (pp.89-111). London: Bloomsbury Academic.

Vincent, J. (2006). Emotional attachment and mobile phones. *Knowledge, Technology & Policy*, 19(1), 39-44.

Vincent, J., Taipale, S., Sapio, B., Lugano, G., & Fortunati, L. (Eds.) (2015). *Social Robots from a Human Perspective*. London: Springer.

Vygotsky, L. S. (1978). *Mind in society: the development of higher psychological processes* (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Translators.). Cambridge, MA: Harvard University Press.

Walker, L., with Logan, A. (2009). *Using digital technologies to promote inclusive practices in education. A Futurelab handbook*. Bristol: Futurelab.

Walsh, C.S. & Shaheen, R. (2013, April). English in Action (EIA): mobile phones as an agent of change for large-scale teacher professional development and English language learning in Bangladesh. *Paper presented at the American Educational Research Association Annual Conference 2013*, San Francisco, CA.

Walsh, C. S.; Power, T., Khatoon, M., Biswas, S.K., Paul, A.K.; Sarka, B.C., & Griffiths, M. (2013). The ‘trainer in your pocket’: mobile phones within a teacher continuing professional development (CDP) program in Bangladesh. *Professional Development in Education*, 39(2), 186–200.

Whitson, J.R. (2013). Gaming the Quantified Self. *Surveillance and Society*. 11(1/2): 163-176.

Wik, P., & Hjalmarsson, A. (2009). Embodied conversational agents in computer assisted language learning. *Speech communication*, 51(10), 1024-1037.

Wolf, G. (2010). The Data-Driven Life. *New York Times*, 2 May 2010, online edition. Retrieved June 15, 2015 from: [http://www.nytimes.com/2010/05/02/magazine/02self-measurement-t.html?\\_r=1&pagewanted=all](http://www.nytimes.com/2010/05/02/magazine/02self-measurement-t.html?_r=1&pagewanted=all)

Wong, L.-H., Chai, C. S., Aw, G. P., & King, R. B. (in press, 2015). Enculturating Seamless Language Learning through Artifact Creation and Social Interaction Process. *Interactive Learning Environments*. Retrieved June 15, 2015 from DOI: 10.1080/10494820.2015.1016534.

Xuesong, G. (2006). Strategies Used by Chinese Parents to Support English Language Learning: Voices of ‘Elite’ University Students. *RELC Journal*, 37(3), 285-298.

Zhao, Y. (2003). Recent Developments in Technology and Language Learning: A Literature Review and Meta-analysis. *CALICO Journal*, 21(1), 7-27.