Mobile and Personal Learning for Newcomers to a City

Agnes Kukulska-Hulme
(agnes.kukulska-hulme@open.ac.uk)
The Open University, UK

Abstract

Growing numbers of newcomers arrive in cities across the globe as temporary visitors or for longer periods of time. They often face communication challenges and need to learn a new language or improve their knowledge quickly. The article considers the domain of language learning for social integration and inclusion, what it means to be a newcomer to a city, and the role of mobile technologies in advancing a more personal approach to language learning. Mobile learning research explores innovative and practical solutions to the specific challenges faced by newcomers, and it revives, develops or reinterprets pedagogical methods and underlying learning theories. To illustrate this, three research projects conducted at The Open University, UK, focusing on migrants' learning with mobile apps, are presented and reflected upon. Mobile learning experiences deliberately designed for newcomers to a city can support them in everyday language learning and in their efforts to explore their new environment. The article includes suggestions as to what seems to be missing from current apps for newcomers. It considers relevant issues and future directions for the design of mobile apps and services for this diverse target group.

1 Introduction

Mobility and migration have become global watchwords, notwithstanding their diverse meanings and connotations. The United Nations (2012, 2017) have identified migration as a growing phenomenon affecting many countries across the world, drawing attention also to the considerable rise in the global number of students pursuing tertiary education abroad. Growth in tourism and business travel is similarly a noteworthy phenomenon (Joshi, Poudyal, & Larson, 2017), escalating the demand for rapid cultural learning. A consequence of these developments is increasing numbers of "newcomers" arriving in cities across the world as temporary visitors or for longer periods of time. Providing support and learning opportunities for newcomers, including migrants and refugees, is a vitally important issue in many parts of the world (Capstick & Delaney, 2016; Cities of Migration, 2018; UNHCR, 2016, 2019).

Growth in the geographic mobility of individuals and populations has coincided with the expansion of mobile learning as a field of research and practice. Mobile learning spearheads the development of contemporary pedagogies based on flexibility, openness and access, which means that it is well aligned with the needs of learners who are increasingly mobile. In the domain of language learning, the use mobile technologies can enable more personalized language learning, which should be understood as an approach that takes account of learner differences and preferences (Kukulska-Hulme, 2016), rather than the use of systems that are predominantly focused on promoting efficiency – the latter presenting a danger of alienation, rightly highlighted by critics of technology-mediated

personalization (e.g. Frank, 2019). Mobile learning research explores innovative yet practical solutions to the specific and personal challenges faced by newcomers, sometimes treading a fine line between supporting learners' individual requirements in relation to their circumstances and personal goals while also offering efficiency (quicker learning). In so doing, it also revives, develops or reinterprets pedagogical methods and underlying learning theories.

In her foreword to the World Economic Forum's (2017) report on migration and its impact on cities, Louise Arbour notes that "more than half the world's population resides in urban areas, and cities continue to attract people in search of a better of life and greater job prospects and services" (p. 5). The report describes how 22 cities across the world have responded in creative ways to an influx of migrants. It is emphasized that information and communications technology (ICT) plays an important role in giving migrants access to information, and some mobile apps and services are mentioned, for example, the Ankommen app developed to help migrants get oriented in Germany in the first few weeks after arrival, and the Mobilearn service which translates government information in the UK. However the report has a broad remit and offers relatively few insights into how mobile phones, an everyday tool in the hands of migrants, can be used to support integration and informal language learning in the city. Our research projects with migrants using mobile applications in cities which are described in this article tackle this underexplored but promising challenge. The focus of this article is on how mobile learning experiences deliberately designed for newcomers to a city can support them in everyday language learning and in their efforts to get things done in an unfamiliar environment and communicate with local people. The newcomers might be using an app on their smartphone, but they are also moving about the city and can use the city as a resource for learning. The city as a learning resource includes people (observed or encountered), public announcements heard in subways and supermarkets, artifacts in information services, exhibitions, bookshops, libraries, and the visible language (shop signs, posters, displays) that is the "textual decor" in urban environments (Gorter, 2013). A city can be a daunting and confusing place for newcomers, but our research suggests that mobile technologies can assist with learning in, and from, such an environment.

This research has wider implications for teaching and learning strategies in increasingly mobile and blended settings. Much of the research and development work in mobile learning to date has been located in classroom-based interventions or carefully crafted activities that connect classroom learning with a specific out-of-class activity such as a field trip, a museum visit or a homework assignment. There are also many examples of deployments of mobile devices and educational content to address challenges among underserved or disadvantaged populations (Pulla, 2017; UNESCO, 2013; Zha et al., 2020), and multiple ways in which mobile technologies are used in leisure or entertainment settings that also enrich or provoke everyday learning. Less widely recognized is the way in which rapid change in how people conduct their lives, in increasingly mobile circumstances, impacts upon conceptions of teaching and learning. Part of the problem is that there are difficulties around cross-fertilization of knowledge and experience across the growing number of academic disciplines and business sectors that now have a stake in the field of mobile learning. Designing mobile experiences for newcomers should be a collaborative, cross-disciplinary and cross-sector effort.

2   Language learning for social integration and inclusion

Cities face a fundamental challenge in how to support newcomers in learning the language (or languages) they need to be able to understand and use, which is so important for finding work and for social inclusion. Although language classes are usually available, conventional classroom-based language learning cannot fully meet the diverse needs of newcomers. Those who have recently arrived are likely to have different language learning needs in comparison with members of minority communities or workers who have lived there for several years. In recognition of the diverse experiences and needs of individual newcomers and of distinct demographic groups, a national or supranational language strategy for these groups needs to promote language learning opportunities in a range of styles and forms, including face-to-face, online and mobile learning.

Beacco, Krumm, Little, and Thalgott's (2017) edited collection on the linguistic integration of adult migrants explores some of the ways in which scientific evidence can inform the development

and implementation of policy and practice designed to support linguistic integration. The editors express the view that we should not make an assumption that if adult migrants first take a language course, linguistic integration will follow more or less automatically. They advocate integrated approaches that embed language learning "in the workplace or some other participatory context and thus ensure that from the beginning the language of the host society is part of the linguistic repertoire that the adult migrant deploys in daily life" (p. 3). They go on to say that for some migrants, especially refugees, language learning is not a top priority and offering language courses may not be the best way to help them. This is a strong argument for offering alternative language learning avenues and options, some of which will involve mobile technology.

A UK report from an inquiry into the integration of immigrants, led by the All-Party Parliamentary Group on Social Integration (APPG, 2017), called on the government to overcome barriers to integration by supporting English language learning, by redistributing migrant numbers and by empowering local leaders to promote integration. One of the recommendations made in the report was that policymakers should create incentives for ESOL (English for Speakers of Other Languages) programme providers, technology firms and academics to collaborate on the development of new approaches to language learning incorporating digital tools, apps and massive open online courses (MOOCs). The report emphasizes that policymakers must finally recognize:

> … advances in digital technology are already transforming the manner in which immigrants across the UK are interacting with language learning materials, and that ESOL programme curriculums too often fail to reflect this reality … The potential for massive open online courses (MOOCs) and mobile learning applications (apps) to support immigrants … to develop their language skills should be explored further. So too should the manner in which language learners use Facebook and other forms of social media, and the prospect of adapting ESOL programme curriculums to both make use of this common reference point and include more opportunities for interactive learning through the use of these platforms. (APPG, 2017, p. 79)

The authors of the report go on to say that, if channelled effectively, digital language learning will allow for more immigrants to benefit from personalization and enable the growth of social support networks which have been shown to improve learning outcomes.

A further challenge to social integration and inclusion is that newcomers may encounter several languages and dialects, as towns and cities across the globe have increasingly diverse populations. Migrants and other newcomers will face the challenge of recognizing a plethora of languages, dialects and accents in their social encounters and in their exposure to mass media in a new locality. Furthermore, Garcia (2017) reminds us that "the language of a particular geographic space is increasingly inhabited today by people of many provenances and with very different language practices, and the categorization of speakers as native/non-native has been increasingly questioned" (p. 13). This means that we need to look beyond the idea of migrants learning a second language and consider both how they can be supported in dealing with linguistic diversity and how an additional language positively expands (and integrates with) their existing linguistic repertoire (see also Kukulska-Hulme & Pegrum, 2018).

3 Being a newcomer: An unusual and an everyday experience

Newcomers arrive in a new place alone or with friends, colleagues, partners and families. Being a newcomer can be associated with great upheaval (Cranston, 2016), but in some respects, it is also a common human experience, exemplified in everyday life by starting a new job or joining a group to pursue a new activity. Inevitably, newcomers' needs and goals are diverse, but they often have language learning needs in common. We normally continue to broaden our knowledge of languages throughout our lives, even our own "native" language(s). Drivers for it include: the use of new technology; undertaking academic studies (Kobayashi, Zappa-Hollman, & Duff, 2017); becoming a parent; changing jobs and careers; being diagnosed with a medical condition; and there are many others. Language learning is thus a lifelong enterprise for everyone. However mobility – especially cross-border mobility – can present a new hurdle and intensify the need to engage with language learning and language change. Furthermore, newcomers' arrival in a place may be associated with tension

and conflict, as they may pose challenges to local customs, established ways of living and working and even to the social order. Being unable to communicate with ease and precision can create barriers to social acceptance. If technology can be applied for the common good, to help overcome such barriers, it is worthwhile considering how this can be achieved.

By definition newcomers are mobile in that they have travelled from one place to another, but additionally they may have smartphones and other mobile devices that are vital tools for travel and that support mobility. In the context of mobile device supported learning (mobile learning) we recognise different types of mobility, in particular physical, technological, conceptual, social and temporal (Kukulska-Hulme, Sharples, Milrad, Arnedillo-Sánchez, & Vavoula, 2011). Furthermore, mobility can be seen as an emergent property of interactions between people and technologies, as illustrated in this example:

> While discovering a city during a vacation, a tourist may have learnt about it through multiple channels: from a travel internet site on a home desktop computer, a phone conversation with a friend who visited the city, an in-flight travel magazine and promotional video, a Google map of the city on a mobile phone, an interactive multimedia guide in the tourist information office, printed brochures, handheld audio-guides in the tourist locations, and interactions with local people. It is the combined experience that constitutes mobile learning. (Kukulska-Hulme et al., 2011, pp. 158–159)

This description of mobile learning encompasses a wide range of resources, including people and technologies. Mobile devices are increasingly available as part of any such combination. Despite their diversity, many newcomers are able to take advantage of opportunities for informal or semiformal learning mediated by mobile devices. Using a smartphone, either their own or one that is shared with others, they can access information, language learning materials and social networks to explore and practise the target language or languages.

Depending on personal circumstances and plans, the learning can be done within the scope of conventional language classes (e.g. as a complementary out-of-class activity), or as a separate activity that is woven into the fabric of everyday life, work or study. Mobile learning is a distinctive way of learning in that it makes use of easily accessible technology. It lends itself to supporting learning across diverse settings, and it offers an abundance of options as to content and interaction. Gaining new language skills and competencies by using a smartphone or tablet may be seen in terms of personal progress and achievement, or in terms of the advancement of one's family group, friendship group or wider group of people (e.g. an ethnic group). From a societal perspective, there may be imperatives to promote language learning so as to promote social mobility, integration and social inclusion, especially when the newcomers settle down to stay (APPG, 2017; Ćatibušić, Gallagher, & Karazi, 2019; OECD/EU, 2015; Prince-St-Amand, 2016;).

4   Mobile learning: Disciplinary foundations and theoretical developments

Research in mobile learning is interdisciplinary, but projects have frequently been conceived within computing, engineering and information science, especially those that have emphasized the development and application of advanced technologies and data management. In the early days, experts from other disciplines would be drafted in for specific contributions, such as to evaluate what learning had taken place. In theoretically-grounded projects, the research has largely drawn on foundations from the social sciences including education, psychology, sociology and human geography, with more recent forays into cognitive science and neuroscience. When Sharples, Taylor and Vavoula (2007) proposed a theory of mobile learning, they stated that it encompassed both learning supported by mobile devices and also learning in an era characterized by mobility of people and knowledge. Development of theory in mobile learning, which happens in piecemeal fashion and can be found in publications spanning various disciplines, tends to highlight cognition, motivation, behaviour and social interaction in situated contexts.

The theory of situated cognition suggests that knowledge is situated within physical, social and cultural contexts, and cannot be separated from them. Brown, Collins and Duguid (1989) led the way in arguing that knowledge is situated, being in part a product of the activity, context, and culture

in which the knowledge is developed and used. It follows that it is better to acquire new knowledge in context, immersed in the cultural conditions in which the knowledge was produced. This also applies to knowledge of language; for example, learning words in the context of ordinary communication rather than from decontextualized sentences and definitions (Brown, Collins, & Duguid, 1989, p. 32). The authors emphasize that language understanding is developed through continued, situated use.

Mobile language learning research has explored situated learning in foreign language acquisition, but often with groups of students learning a language (e.g. English) in places where the language is not generally spoken. For example, Huang, Yang, Chiang, & Su (2016) report how they designed and evaluated situated mobile learning of vocabulary among groups of students in Taiwan. They explain that in teaching English as a Foreign Language (EFL), "situational English classrooms" can be created that are immersive and simulate real-life situations, but that learning in real situations is even better, since it enhances learning motivation and outcomes. Their study of situated mobile vocabulary learning involved learners visiting an outdoor learning site and the mobile application providing them with learning material according to their situation (e.g. ordering some food and drink). Students interacted with the content and practised relevant dialogues with their peers. The researchers use their findings to claim that "through interaction in real situations, the students clearly understood and remembered the learned vocabulary" (p. 273); furthermore, learning in a group was beneficial to some of the low ability students. They also anticipate that technologies related to augmented reality, context awareness and physiological awareness can be applied to further develop situated mobile learning.

Situated learning designs can create specific opportunities for "embodied cognition," an approach which is based on observations that movements of the body have a direct impact on the mind (FitzGerald, 2012). Indeed, as noted by Ladouce, Donaldson, Dudchenko, & Ietswaart (2017), human cognition is inherently reliant on its situated position in the environment. An extensive range of mobile technologies can now be used to understand people's natural interactions with the world, including learning. This emerging research approach has been named "mobile cognition," since it incorporates the ability to record brain activity and body dynamics as well as natural human behaviours (Ladouce et al., 2017, 2019). As such, it is considered superior to previous laboratory-based research on human cognition. The approach is still in its infancy, yet already we can envisage how analysis of activity and behaviours will become more complex with the advent of mobile augmented reality for learning.

Augmentation is an approach that considers how learning can be enhanced by technology or by resources in the learner's surrounding environment and is reflected in the trend towards augmented reality applications which combine real and virtual experiences. Explorez is an example of an augmented reality game in which university students interacted with characters, physical items and media on their phones as they discovered different areas of their university campus and practised their French language skills (Perry, 2015). LangAR, from Pearson Labs (2013), was a prototype of an augmented reality talking phrasebook that enabled users to look at their environment through the phone's camera and to select a point of interest; the app would show useful phrases and these could be tapped on the screen to hear how they are spoken. Godwin-Jones (2016) gives many examples of the use of augmented reality in language learning, such as the HELLO project (Liu, 2009) in which QR codes were attached to objects around a school and students could engage in a dialogue with a virtual learning tutor at those locations. For language learning, the idea of an "augmented place" is particularly important as mobile learning creates more opportunities to learn in linguistically rich or immersive environments beyond the classroom (Kukulska-Hulme, 2016). However it has also been argued that the latest uses of technology are not in fact augmenting our reality "but rather diluting, depleting and diminishing" it (Traxler, 2016, p. 205). Therefore whenever a new or more advanced technology is used, it is wise to consider what is lost as well as what is gained. While many of us argue that mobile learning can enhance newcomers' experience in a city, and that some forms of augmentation might be an additional benefit, it is our responsibility also to consider whether augmentation will diminish the newcomer's experience or have some negative impact.

The next generation of mobile learning is becoming "context-aware," which means that it takes advantage of mobile and personal technologies "in the design of learning experiences that exploit the richness and uniqueness of the learner's indoor and outdoor environment" (Traxler & Kukulska-Hulme, 2016, p. 1), both social and material. Context-aware technologies can adapt content or learning activities to the learner's context, for example, the learner's location, movements, social networks, current goals or interests. The aim of such adaptation can be to make the learning more personalized. The next section considers the meanings of personalization and personal learning and their relevance to the needs and circumstances of newcomers to a city.

5   Personal learning and personalization

Mobile learning research emphasizes the process of learning as well as the discovery of what it is like for learners to engage personally in this process. Mobile phones and handheld devices have long been thought of as personal tools, which has forged a strong connection between mobile and personal learning.

A distinction can be made between personalized and personal learning (Kukulska-Hulme, 2016). From a teaching perspective, personalization may be understood as a teaching approach that takes account of learner differences and preferences while enabling individuals or groups to reach pre-determined or negotiated goals. The teacher's leading role is foregrounded in this interpretation of personalization, whereas personal learning foregrounds the learner's ability to take control of their own learning. For example, in a school setting, where the teacher's role is considered vital, personalization is intended to allow every student "a different way into the same learning" while also ensuring that all students are working towards the same goals (Wiliam, n.d.). In other words, personalized learning implies a strategy to adapt content, methods, environment and so on to target learners. In contrast, in informal contexts such as community action or leisure pursuits, people are often considered to be capable of setting their own goals. They may even build their own learning environments according to their needs and aspirations, so that they can take complete control of their learning (Mikroyannidis, 2013).

It is important to note that both personalized and personal learning can apply to individual learning and to learning in groups. In other words, a group may have common needs and goals, and personalization is then oriented to the group. Personal learning can take place when a group determine common goals for the group. The social nature of mobile learning has come to the fore with the advent of social media, collaborative approaches and the realization that it is not unusual for phones and tablets to be passed around or shared within a group.

From a device perspective, personalization features of mobile devices range from simple adjustments of settings, to the sophistication of software agents that can interact with the user and provide intelligent assistance. Personal learning embraces individual challenges such as visual impairment (e.g. through use of text-to-speech readers), memory problems (e.g. through reminders), or reluctance to engage (e.g. through change of communication medium). We should always remember that newcomers to a city are highly diverse learners of all ages and backgrounds, whose personal requirements and preferences will affect their ability to learn. Being in the environment where an unfamiliar language is spoken also confronts some learners with the need to speak, whereas before they may have been content to listen, read, and write. Confidence to speak is an important part of language learning and use, and mobile devices give additional opportunities to rehearse, record oneself and keep practising, all of which can help to build confidence (Sánchez Vaca, 2019).

It is likely that in the future, new wearable devices, together with smart environments where devices, displays and objects communicate with one another (and with their owners/users), may turn mobile learning into ubiquitous learning, although this will happen at very different rates across the globe. In a ubiquitous learning environment, devices and sensors can identify the context (the location, activity, problems etc.) of the learner which can be used to automatically recommend some content, or to advise the learner about opportunities to interact with certain people (Aljohani, Davis, & Loke, 2012). Learning is then likely to become even more intimately entwined with personal daily experience, and learners will probably spend more time using voice communication with various

objects and devices. Speech recognition systems are constantly improving and can give opportunities to practise reading or speaking, including in places or houses without access to the Internet (Jayakumar et al., 2016). The next generation of intelligent assistants that currently answer questions and give recommendations on smartphones will be robots and various forms of human-like help, some with the ability to offer language learning assistance (see Alemi, Meghdari, Basiri, & Taheri, 2015; van den Berghe, Verhagen, Oudgenoeg-Paz, van der Ven, & Leseman, 2019). Human and artificial intelligences may be able to work together to help learners or challenge them in productive ways.

6   Mobile assistance in life and learning

Kukulska-Hulme, Gaved, Jones, Norris and Peasgood (2017) have summarised key findings from three Open University research projects investigating how mobile technologies can support migrants in achieving greater language immersion through situated, informal and incidental language learning beyond the classroom. The research, briefly outlined in this section, highlights the affordances and constraints of the city space as an emerging environment for semi-structured informal learning, and the scope for learners to have more control though the adoption of mobile, personal learning.

In the EU-FP7 MASELTOV project (Mobile Assistance for Social Inclusion and Empowerment of Immigrants with Persuasive Learning Technologies and Social Network Services), a prototype context-aware smartphone app was developed by the consortium in response to the needs of immigrants arriving in Europe. It comprised an integrated suite of navigation, information, social interaction, language learning and game playing services, and it was trialled in four major cities across Europe (Gaved, Jones, Kukulska-Hulme, & Scanlon, 2012; Gaved et al., 2014). Learners could decide how, when and where to use these services and in what combination. As part of this project, an Incidental Learning Framework was proposed by the Open University team as a way to map everyday tasks to dimensions of time, place, tools, social support and outcomes of the immigrant's learning journey (Kukulska-Hulme et al., 2015). An additional field trial took place in Milton Keynes in the UK at the end of the project (Jones et al., 2018); findings from this final user trial suggest that the MASELTOV smartphone app helped migrants with their confidence, with relevant language learning and with practice of different language skills, and that it supported social learning within a social forum in the app.

In our SALSA project (Sensors and Apps for Languages in Smart Areas), location-triggered mobile language lessons were delivered in 27 locations in Milton Keynes, UK, as part of the local smart city initiative. Small Bluetooth beacons were deployed on streets, buildings and buses, constituting a treasure hunt or trail. The beacons triggered lessons on English language learners' smartphones when users approached the beacons with the SALSA app on their phones (Gaved, Greenwood, & Peasgood, 2015). The project built on the experience of MASELTOV and aimed to encourage learners to explore the town, practise listening to location-relevant sample dialogues and announcements, and study expressions and vocabulary relevant to specific locations. The language lessons could be used in situ (when triggered in a location) or at any time after that.

In our Mobile Pedagogy for English Language Teaching project, supported by a British Council ELTRA award, international students and their teachers were interviewed in Brighton, UK, to discover their informal language learning practices with their phones and tablets. The key idea was to support teachers in the design of new language learning activities that would be well aligned with existing informal practices and extend learning beyond the classroom into the city. The conceptual work, based partly on the interview findings, included the development of a Mobile Pedagogy framework and the practical outcome was a guide for teachers to help them design mobile language learning experiences in and beyond the classroom (Kukulska-Hulme, Norris, & Donohue 2015). The teacher guide explains the notion of a mobile pedagogy and the framework. It contains points of reflection for teachers to help them rethink their learning activity design practices, orienting them toward encouraging students to take advantage of mobile device features and their mobility to investigate the dynamic nature of language and how language is used in their environment.

Pedagogical models arising from these research projects emphasize learners' agency and engagement through self-directed and social learning. For example, a learner or group of learners can formulate a personally relevant inquiry about how certain words or expressions are used locally. They can use their smartphones over a period of time to collect data relating to this inquiry, for example, notes from conversations, results of searches, recordings, and photographs. They might work with their teacher (or with local volunteers supporting migrants) to understand their findings and rehearse the use of one or more expressions. Finally, they can reflect on their learning, perhaps make plans for a further inquiry, and capture this reflection (e.g. on their mobile phone). Outcomes from such an activity could include the development of self-direction and language awareness, and increased contact with local people and with the city environment.

7 Conclusion and future directions

The projects outlined in the previous section have advanced our understanding of how mobile and social platforms can open up opportunities for personal language learning and for exploration of the urban environment as a space for semi-structured informal learning and social encounters. Within a growing ecology of apps and online resources supporting newcomers in their language learning, translation, cultural knowledge acquisition and participation as new citizens, findings from these projects (and the direct experience of engaging with migrants in their daily learning efforts) add to our collective understanding of how mobile and personal learning can offer support.

In the course of running these research projects, and subsequently, we also reviewed many existing mobile apps and online resources for newcomers to a country or city, particularly migrants. Reflection on what is perhaps still missing from current apps and other mobile services, or what is less well covered, include the observation that existing learning resources generally do not provide the following:

1) Information about diverse communities and languages spoken in the city or country;
2) Audio content, particularly hearing different accents and public announcements;
3) Preparation for emergencies and unusual occurrences in the city;
4) Personal choice of content and modes of interaction;
5) Support for passing through an intermediate country on the way to another country; and
6) How newcomers can be a help or a resource for others (both other newcomers and locally established people)

The last point on this list is being addressed through innovations such as Chatterbox (https://www.chatterbox.io/) which was set up to offer online language tutoring delivered by trained refugee tutors, and through initiatives like MIT's Refugee Learning Accelerator (https://refugeelearning.media.mit.edu/) which supports engineers and computer scientists from the Middle East to create technologies for refugee learners.

Recently, there has been a realization that some apps and resources for newcomers are no longer working or their content is out of date, having been abandoned by their sponsors and developers. Broken internet links, dormant websites, and apps that are no longer updated and maintained might mislead their users and are harmful for vulnerable migrants and refugees (Benton, 2019). Increasingly, newcomers turn to social media for help and current information.

Future developments of language apps and other digital resources for newcomers will be driven by technological and design advancements and greater insight into migrant learner needs. Mobile applications will continue to be developed. They are likely to be more "context-aware" and behave in smart ways that are suggestive of intelligence. They will feature dynamic, personalized content (Demmans Epp, 2015), improved speech recognition (Mattila-Niemi, 2016) and automatic feedback (Yarra, Srinivasan, Gottimukkala, & Ghosh, 2019). There are also strong indications that there will be more apps for augmented and immersive learning (Godwin-Jones, 2016; Sydorenko, Hellermann, Thorne, & Howe, 2019). Augmented reality became very popular in 2016 thanks to the Pokémon Go game on smartphones and it is likely to feature increasingly in future developments of mobile apps for entertainment, education and support for daily life. For the foreseeable future, we are likely to see some tension between the learning opportunities offered by sophisticated apps and the digital

competencies of the large numbers of people who may want to use them. Nevertheless, mobile and personal learning continues to offer unprecedented access to learning and adaptation to learner needs.

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