1 *Introduction*

1.1 Introduction

The use of technology in education has always been somewhat controversial. This may seem like an unusual statement to make at the start of a book that deals with the use of mobile technologies in teaching and learning contexts, but pointing this observation out from the outset helps to frame several of the relevant issues pertaining to the acceptance – and resistance – of technology, including its position in discussions of theoretical, empirical, and practical issues surrounding its use. Although technology has featured more prominently in education than could have possibly been imagined since the spread of the COVID-19 virus at the beginning of 2020, there still remain strongly divided opinions as to its long-term use as a viable option to quality education rather than a stopgap until the world recovers from the disaster. The controversy surrounding technology usage in education is caused by a complex net of interrelated factors that are difficult to explain in isolation of one another, and yet in some ways have shaped the way that technology has come to be viewed in the larger educational context. This includes, to some degree, how it has been viewed as an academic discipline. Attitudes towards technology have ranged from enthusiastic or overly optimistic at one end of the spectrum to critical or doubtful at the other, and these attitudes have both given rise to and resulted from the controversies surrounding technology use in education. Looking at these controversies and the reasons behind them may lead to a more balanced view of technology – including, of course, mobile technologies – in language teaching and learning to form a more solid foundation on which to understand the concepts and contexts, and to see how best to anticipate and deal with the potential challenges.

Among the many controversies, perhaps the most obvious has centred around *pedagogical* aspects. Since the beginning of the field

of computer-assisted language learning (CALL), discussions about the effects of learning through technological versus non-technological means have held prominence. Some practitioners have embraced new technologies as they appear, while others have been more hesitant to accept them. For some, technology is viewed as an integral part of keeping up with the times (Hanna, Brown, Dede, Olcott, Poley, Schmidt & Tallman, 2000; O'Flaherty & Phillips, 2015), where it is seen as an indispensable tool that provides significant benefits for teaching and learning. For others, however, such technologies are little more than a gimmick, something that can be used to perk student interest for a time but with little or no added real educational value, or even detracting from valuable class time (Reid, 2014; Rogers-Estable, 2014). Depending on the ways in which technology is used, however, both of these perspectives may actually be correct. Technology most certainly does have the potential to add elements to a teaching and learning environment that can enhance learning, but at the same time, if technology is simply used for the sake of the technology itself without careful planning and implementation, then the benefits for learning can be so greatly diminished that non-use can be a more effective option.

A second controversy is related to *socioeconomic* aspects. The digital divide (i.e., the disparity that exists between those with access to technologies and those without) has been a topic of discussion since the 1990s. Widespread access to information and communications technologies (ICT) was seen as being closely linked to socioeconomic development, and the setting up of infrastructure to allow stable and affordable Internet connections has been an ongoing challenge. Mobile devices such as mobile phones and tablets have been seen as potentially having an equalising effect, where mobile broadband has made Internet access more available to users in less affluent regions such as in Africa (Gillwald, 2017) and South America (Galperin, 2016). At the same time, however, debates have also taken place surrounding the dangers of accentuating the digital divide, where users around the world are spending considerably more money on communications than is stipulated in the statistics set out by the Broadband Commission for Digital Development (2015, cited in Gillwald, 2017). Although the digital divide has most widely been discussed at a national or regional level, the discrepancy is also relevant at an institutional or even an individual level. Institutionally, such divisions can result in a type of technological eliteness, where institutions that can afford expensive technologies are somehow seen as providing better services than those that with less advanced resources. It is not difficult to see how this links to pedagogical concerns, with many institutions

feeling real or perceived pressure to provide similar levels of technological resource infrastructure in order to provide an image of a better learning experience for learners (O'Callaghan, Neumann, Jones & Creed, 2017). While it would be difficult to draw a direct link to confirm whether wider access to technologies will necessarily result in better learning outcomes, it is also difficult to argue that there is *no* relationship either, and having greater access to technology does seem to provide greater opportunities for learning if it is used appropriately. That is to say, if learners have access to technology, there is at least the chance for learning to take place, but this is based heavily on how the technology is used. It is individually, however, that we may see the greatest impact of mobile learning with regard to the digital divide. Requiring learners to use their own mobile devices for education can impart burdens upon those in less advantaged socioeconomic circumstances than their peers, which can cause stress and/or embarrassment to them, feelings of inferiority, and potentially even detrimental impacts on motivation to engage in learning through their mobile devices at all.

Thirdly, there is *academic* controversy, one that somehow views CALL as a lesser field to the broader parent fields of second-language acquisition and information technology. CALL has often been branded as lacking in theoretical foundation and academic rigour, and while there may have been some evidence of this in the early days of CALL research, there is also an extremely solid foundation of well-conceived and well-conducted research that has made a significant contribution to our understanding of other fields as well. A seminal article by Coleman (2005) drew attention to this issue, indicating that CALL has often lacked the "mutual respect" (p. 20) of other fields, evidenced by publications in CALL journals citing research from respected SLA journals but very little evidence of the reverse. More than a decade after this observation, the trend still seems to stand largely true, as seen by the lack of references to CALL-related journals in articles that have a similar focus but do not use technology. Technology can provide relevant data on language teaching and learning and insights that are made possible only through the adoption of technology (Blake, 2000). Despite the fact that disseminating research in CALL journals has become increasingly competitive and publishing in high-ranking journals in the field is now considered extremely difficult, the image clearly persists of CALL research as being somehow less rigorous than other, more "established" fields (Leakey, 2011), and it is difficult to predict when or if it will be put on a similar standing with research in SLA or other educational fields.

Finally, technologies have been a part of *administrative* controversy, where pressures have been placed on teachers – and ultimately learners – to use new technologies, frequently with little explanation or support provided, and input in the selection of technological resources is often not sought from the teachers who will actually be expected to use them. The underlying reasons for technology adoption by administrators are, no doubt, complex and have ranged from actual or anticipated cost-cutting, promotion of institutional image, and betterment of the teaching and learning environment, although the real benefits in each of these regards have been somewhat questionable (Bowen, Chingos, Lack & Nygren, 2014; McPherson & Bacow, 2015). There have been, of course, multiple unanticipated outcomes from the introduction of technology by administration, some of which are more positive and others more negative. Positively, aside from the benefits associated with support for learning itself through technology, in some ways, it has made the exchange of information among administrators, teachers, and learners more transparent, where the channels of communication are somewhat more open than in the past. Negatively, the relative ease with which technology makes collecting and analysing data also means that teachers may be subjected to more frequent centrally administered online evaluations. While evaluations in themselves may not necessarily be problematic, they do have the potential to place greater pressure on teachers to strive towards higher evaluation scores (Lejonberg, Elstad & Christophersen, 2018), which may or may not be an accurate picture of better teaching. Moreover, evaluations may even contribute to less willingness to experiment or to be innovative in order to avoid potential failures (e.g., Bennett, Dawson, Bearman, Molloy & Boud, 2017; Carless, 2009).

The cost issue has always been a contentious one, and attempts to use technology to save money inevitably result in shifts towards other expenses such as maintenance of the technologies and hiring sufficient support staff to ensure that these technologies run smoothly (Reid, 2014). The quality of education that is provided by technologies designed to replace the teacher has consistently drawn debate from many stakeholders – administrators, teachers, students, and even parents – with claims by many commercial providers that their products are comparable with human teachers that are difficult to substantiate in actual practice. Apart from the oversimplification of the role of the teacher as little more than a provider of content and feedback, claiming that technology can completely replace human teachers largely ignores the myriad human interactions that are an integral part of learning in virtually all aspects of life. This argument itself brings us

back to the pedagogical controversy, which in turn clearly illustrates the interrelatedness of the various factors at play regarding technology in education.

Early CALL practitioners lamented the lack of appropriate teaching materials, software, and trained staff, likening these problems to those of the language laboratories which preceded them (Higgins & Johns, 1984). Indeed, the lessons that were to be learned from language laboratories were still painfully evident in much of the literature written at the time about using computers in language learning. Claims from CALL research also closely paralleled these concerns, and researchers were often in one of two camps: on the one hand, a lack of computers where learners competed with one another to use the limited machines available to them (Fitzgerald, Hattie & Hughes, 1985), and on the other, an over-prevalence of computers which remain underused due to insufficient skilled teachers and the paucity of appropriate teaching resources (Cuban, 2002; Dunkel, 1987). In recent years, we have an abundance of materials and technologies – particularly with most learners having their own devices – but a lack of infrastructure to ensure that these are used properly, meaning that these materials are often not being used in a time- and cost-effective manner.

These examples are far from exhaustive, but they do serve to give us some insights into the controversies that are involved in the adoption and integration of technology in language teaching and learning, of which technology itself is just one factor, and possibly even the factor which is most easily controlled. With the wider use of mobile devices such as mobile phones, smartphones, and wearable technologies appearing in language teaching and learning, these controversies still exist in many shapes and forms. Pedagogical factors remain central, with some believing that mobile learning is the answer to problems that occurred beforehand. This is a concern that was expressed by Bax (2003) about virtually any new technology in language teaching contexts, well before mobile learning started to enter the mainstream (see Stockwell & Reinders, 2019, for a discussion). Mobile learning has long attracted the interest of teachers and administrators, but pedagogy has generally lagged behind the prospects of what it might become. Even now, we see people who are considering using mobile learning ask what app to use, devoid of any contextual information. This question shows a lack of appreciation for the complexity of the field and is akin to asking what language textbook should be used without specifying the skills to be targeted, the level of the students, or the relationship with other elements of a course of study. MALL – like CALL – really does seem bound in expectations that it will make

teaching and learning easier, provided the appropriate app, software, or website can be located. Of course, this view is not universal, but from my experiences with talking about MALL around the world, this very is indicative of the type of questions that I am frequently asked.

From the Field: The Digital Divide

I recall that several years ago, all of the students in one of my classes had smartphones, apart from one. I was not aware of this initially, as all students had responded that they owned smartphones in an informal survey about the technologies that they owned in the first class of the semester. I asked students to try to use materials that they could access through their mobile phones in class, but this one student declined, looking only at his textbook. After class, he came to me and said that he did not have a smartphone as it was too expensive for him to afford the initial contract cost and the monthly charges, and he only owned a GSM phone so that he could keep in contact with their parents as necessary. I assured him that the materials functioned quite well on GSM phones, but the student said that he felt embarrassed to be seen using his older phone in front of the other students. Eventually, he did engage in a small proportion of the activities on his mobile phone, but I learned a valuable lesson as a teacher that day about the dangers of making assumptions regarding the technologies that our learners possess and their feelings about feeling inferior because they can't afford the technologies owned by their peers.

1.2 The Nature of MALL

The spread of mobile devices has taken place at an enormous rate, with contracts for Internet connections through mobile phones surpassing those of desktop computers from as early 2012 (see Pegrum, 2014, for a detailed overview). Mobile devices have become an everyday part of the lives of many people in their social, work, consumerist, and entertainment agendas (Castells, Fernández-Ardèvol, Qiu & Sey, 2007), to the extent that many people – particularly young adults – would find it difficult to survive without them (Burnell & Kuther, 2016). Mobile devices have in many ways become an extension of our bodies. We carry mobile devices – now most commonly smartphones, but also tablets or even wearable technologies – with us at nearly every waking moment (and as an increasingly common problem and to the detriment of the quality of our sleep, many people have them near their bedside even while sleeping). The fact that they are almost always close at hand is obviously one point that has made them

a target for educators, but if we are to consider how they might be used effectively in learning contexts, we also need to think about what it is about these mobile technologies that makes them such a central part of our everyday lives. Carr (2011) suggests that technologies may be roughly divided up into four main categories: (1) an extension of our physical strength, dexterity, or resilience; (2) an extension of the range or sensitivity of our senses; (3) a way of enabling us to reshape nature to better serve our needs or desires; and (4) a way to extend or support our mental powers. Mobile devices may take on any one of these roles in some way, but the most obvious links to language learning would be their ability to extend the range of our senses (such as enabling us to communicate with others at a distance) and extending or supporting our mental powers (through acting as a notebook, a camera, a dictionary, or a search engine, to name but a few). This ready access enables learners to "exploit small amounts of time and space for learning" (Traxler, 2007, p. 8), but exploiting these times and spaces requires learners to make learning a part of their everyday schedule, where they can take advantage of times that may previously have been wasted. In other words, if learners carry their mobile devices with them to both learning and non-learning locations, they will have greater opportunity for engaging in learning activities, if only they decide to make the most of them.

The portability of mobile devices makes possible another potential benefit helping to contextualise learning – that is, to make learning relevant to the specific situations that learners find themselves on a day-to-day basis (Stockwell, 2014). In other words, the attractiveness of mobile learning is that it not only allows learners to spend more time engaging in learning tasks, but also that these tasks can be made to relate to actual experiences to make them more meaningful to each individual learner. Having access to mobile devices that can provide information means that unexpected or unplanned learning situations, such as needing to explain something in the target language to someone on the street, can be taken advantage of by seeking and immediately using this information in authentic contexts. In addition to portability, mobile devices also allow improved opportunities for communication. The fact that mobile devices are typically associated with various social activities of users throughout the day also makes them attractive to attempt to exploit this social element of learning (see Ushioda, 2011). Furthermore, the flexibility and multimodal and non-linear possibilities of mobile devices make them ideal for learners to adjust them to their own particular learning times, spaces, preferences, and goals (Kress & Pachler, 2007). In all, mobile devices, theoretically at the very least, seem to be an ideal tool in which to make language

learning more accessible and relevant to learners. However, the problem is that this has also led to expectations that have often preceded actual empirical outcomes.

This brings us to ask what mobile-assisted language learning really is, how it is perceived, and what these expectations that are held about it actually are. Pegrum (2019) proposes that the "mobile" part of mobile learning may relate not only to mobile devices but also to mobile learners and mobile learning experiences. Although the general perception of mobile learning is typically bound to the use of mobile devices, those devices can, of course, be linked to the mobility of learners and their experiences (mobility is discussed in more detail in Chapter 9). Thus, in the context of this book, MALL refers to learning a second or foreign language[1] through the use of one or more of various mobile devices including, but not restricted to, mobile phones (including smartphones), tablets, personal digital assistants (PDAs), MP3/MP4 players, electronic dictionaries, and gaming consoles. The definition of what is actually included in the list of mobile devices has been surprisingly difficult to determine. Some have contended that the list might include laptop computers (Kukulska-Hulme & Shield, 2008), while others have argued against this (van't Hoof & Vahey, 2007). On this issue, Puentedura's description (cited in Pegrum, 2014) provides a useful distinction between *mobile* and *portable* devices, where portable devices are typically used at Point A, closed down, and then used again at Point B, whereas mobile devices can be used at Point A, Point B, and anywhere in between if so desired.

A commonly held view of MALL by laypersons is that it refers exclusively to the use of these mobile devices in "outside" locations when the user is in transit or, using the previous example, when learners are at somewhere between Point A and Point B. This is, of course, a common use of mobile devices, but research has shown that many learners opt to use them at home, even when other technologies are available (e.g., Stockwell & Liu, 2015). MALL can also be used to refer to the use of these devices inside the classroom, where learners use mobile devices to carry out certain learning tasks or activities. These devices may be provided by the teacher for the duration of the task or activity, or learners may use their own devices – such as using their own phones, tablets, other similar devices. Thus, I would argue that learning through mobile devices does not necessarily need to refer

[1] It could be argued that MALL, like CALL, could also include learning of the first language, but this type of inclusion in extremely rare in the literature. For this reason, MALL has been limited to the learning of a second language in both second and foreign language contexts only in this book.

to learning on the move, and that using mobile devices such as smartphones or tablets at home is still very much a part of mobile learning in that the users feel the devices they are using are a part of their toolkit of resources that they may choose from for learning. The distinction between the mobility or portability of devices may end up being a moot point. We are starting to see a merge between different devices that were once considered to be separate entities, such as laptops and tablets, where the functionalities are overlapping. Laptops are exhibiting the features that were once associated with tablets, for example a touchscreen; and tablets and even smartphones are becoming used more widely for functions that might have been in the realm of laptop and desktop computers – such as word processing, creating spreadsheets, or other office-related uses.

Defining specific devices for mobile learning is becoming increasingly more difficult. Emerging wearable technologies, most notably watches and other devices like Google Glass™, would also be classified as mobile devices, and although there is only a limited amount of research on wearable technologies for language learning at the time of writing (de la Guía, Lopez Camacho, Orozco-Barbosa, Brea Luján, Penichet & Lozano Pérez, 2016), the potential is certainly evident (Bower & Sturman, 2015; Sykes, 2018). These devices typically require an interface with another mobile device such as a smartphone or tablet (although there are some devices that can operate with an independent Internet connection), so the correlation with or dependence on other technologies would need to remain in the consideration of the factors in their use. Furthermore, implanted technologies would be considered as mobile in that they must naturally be carried inside the body with the user at all times, but at this stage, research is limited to assistive technologies such as for people suffering from hearing disorders (e.g., Beeres-Scheenstra, Ohnsorg, Candreia, Heinzmann, Castellanos, De Min & Linder, 2017). These are areas where mobile learning is likely to continue to develop in the future, and they are discussed in more depth in Chapter 9.

The ways in which mobile devices are selected and used will vary considerably depending on the functionality and availability of technology – as well as the experiences, skills, goals, attitudes, and preferences of the multiple participants in the individual context such as the teachers, learners, and administrators. This is obviously an enormous issue, and it takes up a large portion of this book, but specific examples of designing for MALL are included in Chapter 8. As already described, one of the goals of MALL activities is to take learning outside of the classroom and into reality, where learners can not only take advantage of those gaps in time and space but also take

their learning into the world; other goals of MALL activities include personalising learning for 'learners' own needs (Kukulska-Hulme, 2016); interacting with the environment using wireless, GPS, or QR code functions (e.g., Chen, Liu and Hwang, 2015); providing information suited to specific situations through context awareness (e.g., Santos, Saneiro, Boticario and Rodriguez-Sanchez (2016); and expanding upon computer-based activities to keep content fresh in learners' minds (e.g., Sharples, 2014). At the same time, MALL also strives to enrich activities inside the classroom. Learners can have access to learning resources (de la Fuente, 2014) and authentic materials (Ducate & Lomicka, 2013), or teachers can augment existing paper-based materials by providing links to multimedia that can enable a more interactive experience (Solak & Cakır, 2015), to name a few of the potential in-class uses. While these are just a sample of the types of activities that might be included in MALL, it is evident that MALL should encompass more than just delivering simplified and somewhat colourless content and activities on mobile devices as a substitute for computer- or paper-based versions (Squire, 2009). MALL can be highly dynamic, creative, and personalised if carefully planned and implemented, and it is this potential that should drive educators to explore how they can use it in their teaching and learning environments.

Needless to say, mobile learning does not mean that learning must be limited only to the device which is being used to engage in tasks or activities. The mobile devices may be used in conjunction with other non-mobile devices, and also with more traditional non-technological means, such as paper-based resources and materials. This can be seen through mobile devices being used to augment reality (see Godwin-Jones, 2016), such as enabling learners to interact with materials or even places around them, even with limited technological skills. This can even be achieved through using mobile resources that act as a supplement to paper-based or other materials, such as audio- or video-based resources that can also be used together with a textbook or other paper-based materials. Of course, mobile technologies can be used to support other activities through other devices like computers which have larger screens and keyboards that are easier for reading or typing, by acting as a resource such as a dictionary, reference tool, communication device, or an audio or video player. In this way, MALL is becoming a multimodal, multiplatform experience where the learner is interacting with multiple technological and non-technological options as a larger part of their learning experience.