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On the Varying Effectiveness of Computer/Mobile-Assisted Language Learning

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ABSTRACT

Educational technology has evolved tremendously over the past fifty years. Computer- and mobile-assisted tools have enabled language learning to take place anytime and anyplace. This paper examines the effectiveness of computer/mobile-assisted language learning (C/MALL) by reviewing findings as reported in the literature and by discussing benefits as well as issues linked with using technology in second/foreign (L2) language education. Overall, despite reports that technology has enhanced language instruction and acquisition, some find that it has not been as effective as anticipated or may have even impeded learning. This paper argues that the deciding factor defining the depth and breadth of technology's effectiveness, in and outside of the classroom, is the teacher. Good teachers must precede technology for it to be effective in language learning. To improve the likelihood of effectively employing technology, this paper outlines key questions for teachers to consider when deciding whether to include technology in language instruction.

Keywords: *language acquisition; technology; mobile assisted language learning; CALL; MALL*

INTRODUCTION

Not long ago, many teachers would have explicitly forbidden the use of technological devices, such as cell phones or laptops, in the classroom. The fear was that those would distract students and impede learning. Gradually, however, technology made its way into the classroom and today is no longer seen as a source of distraction, but as a valuable educational tool. This paper reviews the current state of computer/mobile-assisted language learning (C/MALL) and discusses whether technology has enhanced or impeded language acquisition. A review of the literature reveals conflicting results as to the effectiveness of C/MALL, in general, and of cell phones in foreign/second (L2) language learning. While there are reports of positive results, such as increased student involvement and motivation, there is contention that technological tools have not been as effective as anticipated and may have, in fact, impoverished learning outcomes (such as development of poor spelling/vocabulary skills or decreased student attention span).

This paper argues that the effectiveness of technology in language learning is mostly defined by the quality of the teacher utilizing various technological tools. Technology cannot replace a good teacher. Technology is a tool and like any tool, it can aid; yet, when not handled correctly, it may serve no purpose, or, worse, do harm. Thus, it is the wielder of the tool that would define the nature of its impact and the extent of its utility. In this case, the wielder is the teacher. I argue that technological tools, such as cell phones, have had various degrees of effectiveness in language learning and the degree is largely defined by the teacher employing those tools. A good teacher must precede technology for it to be effective. A good teacher is someone who knows his/her craft, understands the basics as well as intricacies of his/her subject, and can explain complex concepts in simple terms. By virtue of having a good grasp of what s/he is teaching, a good teacher can wield technological tools more effectively so to maximize their instructional utility. Thus, I argue that while technological tools can aid the transmission of knowledge, they cannot substitute or cover up the lack thereof. When used to achieve the latter, technology will prove ineffective and can even do

harm (reportedly resulting in decreased student motivation, negative view of the learning process, or faulty learning outcomes).

To demonstrate the validity of the argument that a good teacher is a prerequisite for technology to be effective, this paper proceeds as follows. First, it defines key terms used in the evolution of educational technology. Second, it briefly summarizes leading theories on how technology and language learning intersect, before summarizing practical applications of C/MALL, and cell phones. Further, it discusses the benefits of as well as issues linked to C/MALL practices. Finally, it outlines key questions aimed at helping teachers decide 'if' and 'when' to include technology in language instruction to increase its effectiveness on student learning. The concluding remarks emphasize the centrality of good teachers in defining the impact of technology on language learning and point to the need with empirical studies to bridge the theoretical propositions here advanced to practical instructional applications.

DEFINING KEY TERMS IN THE EVOLUTION OF EDUCATIONAL TECHNOLOGY

In this paper, *technology* refers to any tool that relies "on computer chips, digital applications, and networks in all of their forms" (TESOL, 2009, p. 1). This definition put forward in the *TESOL Technology Standards Framework* (2009), does not limit technology to the commonly recognized desktop and laptop computers, but includes almost all electronic devices that have a type of embedded computer chip, such as cell phones, personal digital assistants (PDAs), MPR/MP4 players, personal listening devices (iPods), etc.

The evolution of educational technology has been marked by several key events that took place in the twentieth century, namely (a) the emergence of the personal computer in the 1970s, which arguably marked the birth of educational technology; (b) the popularity of electronic communication, or email, which enhanced connectivity between teachers and students in the 1980s-1990s; (c) the growth of computer-assisted language learning (CALL) and the world wide web (the Internet) in the 1990s, that generated numerous stand-alone, language learning programs[1] in the 1990s; (d) the exponential growth of the world wide web and new websites added daily that contributed to the expansion of CALL in the late 1990s; and (e) the emergence of Web 2.0[2], social networking, and social media in the 2000s. Those technological developments had dramatic impacts on teaching and learning practices. One of the most noticeable impacts has been a gradual shift from traditional teacher-centered, one-way transmission of knowledge to a more participatory, student-led, interactive process of learning.

The development of Web 2.0 was an important step in this direction. With a plethora of blogs, wikis, video sites (such as YouTube and Vimeo), social networking sites (that is, Facebook, LinkedIn, and Twitter), ebooks, and numerous software applications that enable easy, direct exchanges between users. Web 2.0 has also been termed participatory or social web. Those terms reflect its emphasis on user-generated content, user-friendly interface, user participation, and interoperability (or

[1] Those included, for example, test-creation software programs (i.e. *Test Master,* Wida Software, 1998); writing applications (i.e. *HyperCard,* Apple Computer, 1989), video-based listening (i.e. *Real English Interactive,* Marzio 1999), game-like programs (i.e. *Oregon Trail,* Minnesota Educational Computing Consortium, 1974; *Escape from Planet Arizona,* EF Education, 1995), and many others (discussed in Sokolik, 2014:410).

[2] Web 2.0 is a term created by Darci DiNucci in 1999 to differentiate this evolution of the web from the original World Wide Web version (Web 1.0) invented by Tim Berners-Lee in 1989 that was meant to serve as "a collaboration medium, a place where we could all meet and read and write" (Richardson, 2009:1). In contrast, Web 2.0 focused on the centrality of users as well as on user-friendly interface and usability on/across different platforms.

usability on different platforms). O'Reilly (2005) argued that the development of Web 2.0 social networking growth helped to harness the so-called 'collective intelligence' (p. 2), or a compilation of knowledge wherein everyone can contribute. This step in the evolution of educational technology has made language learning ubiquitous as students, and teachers, are no longer bound to a place, a computer lab, or a classroom. Users can take advantage of all the global resources that technological connectivity offers to all, almost at any place and at any time.

Consequently, *computer-assisted language learning* (CALL) has developed into a field in applied linguistics that is concerned with the use of technology in language teaching and learning. CALL covers not only a variety of technologies and software available for language learning, but also theoretical principles and concepts underlying CALL design, research, and practice (Gitsaki, 2012). In the past, CALL focused on drill and practice software packages based on traditional behaviorist and audiolingual approaches to language learning. Nowadays, CALL encompasses more sophisticated language learning multimedia software as well as a vast array of web resources, Web 2.0 tools and social networking software (blogs, wikis, chat, podcasts, Twitter, virtual learning environments, audio/video and conferencing), learning management systems (LMS) and instructional tools (Canvas, BlackBoard, Moodle, Interactive Whiteboards) as well as mobile technologies (laptops, ipads, cell phones) that can be utilized both inside and outside of the classroom for language teaching and learning (Gitsaki, 2012; Peterson, 2009). Overall, CALL remains the umbrella acronym for the use of technology in language teaching and learning.

Within CALL, a narrower niche occupies *mobile-assisted language learning* (MALL). MALL, or m-learning, refers to "the acquisition of any knowledge and skill through the use of mobile technology, *anywhere, anytime*, which results in an alteration in behavior" (Geddes, 2004, p. 214, emphasis added). As such, MALL differs from CALL in its focus on personal, portable devices that enable quick, continuous access and interaction across different platforms and contexts. As Laurillard (2007, p.165) points out, "a typical m-learning activity could build in more opportunities for digitally-facilitated site-specific activities, and for ownership and control over what the learners do". Thus, MALL is credited with changing the nature of learning as it enables users to acquire and construct knowledge across diverse contexts (Sharples et al., 2007), at different places and different times. This decentralization of knowledge acquisition has, in turn, led to a pedagogical shift from a didactic, teacher-centered approach to more participatory, student-led learning (Facer et al., 2004; Wang & Shih, 2015).

Next the main theoretical developments on how technology and language learning intersect are summarized.

THEORIES ON THE USE OF TECHNOLOGY IN LANGUAGE LEARNING

Throughout its 50 years of existence, CALL practitioners and researchers have developed several different learning theories to guide the design and use of technology in the classroom. For example, the *social interactionist theory* (SIT), or *task-based theory*, emphasized the role of social interaction, positing that interactive, computer-based tasks facilitate and promote language acquisition among learners (Gitsaki, 2012; Peterson, 2009). Its off-shoot, *sociocultural theory* has been applied to collaborative CALL/MALL tasks to demonstrate the importance of learning in social groups (Gnem-Gutirrez, 2009). In addition, *constructivist theory* emphasized the salience of context in language learning and has been used to advocate not only for collaborative learning, but also for actively involving the learner in discovering, investigating, and acquiring, the actual language. Further, the *activity theory* explicitly explored the effects that the integration of technology has had on learning, while the *focus-on-form* (FonF) approach, proposed by Michael Long in 1988, stressed the importance of communication via individual CALL/MALL tasks that integrate and build on the language forms/concepts that learners already know (Yilmaz & Granena, 2010).

Among those, constructivism has emerged as a dominant paradigm in education, and has found a central place in language learning. Constructivism posits that each learner constructs knowledge individually and socially. The key to that accumulation of knowledge is meaning. As knowledge, arguably, is an interpretation of reality, giving meaning to that reality helps one understand and acquire knowledge.[3] Constructivists argue that language learning occurs when learners are actively involved in the process of understanding by giving meaning to language structures, forms, and concepts. As learners create meaning through experience, constructivist language theory emphasises the *role of students as active participants* and any technological devices as tools used by students to create the structure, processes, and activities of learning. This student-directed language learning environment is juxtaposed to traditional classrooms where learners are mostly passive recipients of information.[4] Within this theoretical scope, mobile devices are said to contribute uniquely to making the learning environment into something more dynamic and engaging. The question posed and explored in several studies, thus, has been: how can mobile devices, such as cell phones practically contribute to language learning and instruction?

One answer, offered and explored in several studies, has been through the task-based language learning approach, which links constructivist theory to cell phones' unique features. The teaching of language through tasks has become one of the most important language practices that focuses on *meaning* to master a language. In explaining what a task is, Ellis (2003), gave the following definition:

> "A task seeks to engage learners in using language pragmatically rather than displaying language. It seeks to develop L2 proficiency through communicating. Thus, it requires a primary focus on meaning. To this end, a task will incorporate some kind of 'gap', that is, information, opinion, or reasoning gap. The gap motivates learners to close it." (p. 9)

Indeed, cell phones, equipped with unique features (that is, mobility, instant availability, content adaptability, and Internet connectivity) offer endless possibilities for learners to give meaning to the language learning process by generating, practicing, and adapting such communication gap tasks. Simply put, a MALL task-based approach to language learning positioned within a constructivist framework would entail allowing students to complete specific oral, written, listening, or reading tasks that (a) are meaningful to them/can be related to their own experience and (b) can be done *anytime, anyplace* using cell phones.

While in theory this sounds like the perfect synchronicity between technology and language learning, in practice, studies report conflicting results. Below, we review how technology has been integrated in language learning and discuss the conflicting effect of those C/MALL practices as reported in research findings.

REVIEW OF COMPUTER/MOBILE-ASSISTED LANGUAGE LEARNING APPLICATIONS

CALL Research

[3] Also discussed in Aljohani (2017) and Citrayasa (2019) among others.

[4] Using a constructivist framework, Citrayasa (2019), for instance, examined the effects that using the mobile application *Bussu* had on students learning English. Students had to record specific personal experiences, and their interpretation thereof on *Bussu* using English. Citrayasa (2019) found that this method was both a fun and beneficial way for students to improve their language skills as they had to use the English language to relate personal, meaningful experiences using an online app. However, the sample was very limited in terms of the small number of participants as well as limited time duration (no follow up study and no long-term effects reported).

CALL research can be classified into two major categories: survey studies and comparative studies. *Survey studies* primarily probe learners' attitudes and perceptions toward the use of technology for learning. Studies that fall in this category tend to examine how a new technological tool/software has been used in language teaching and measure its effects on student motivation and engagement using survey-type methodology (Taylor & Gitsaki, 2003). Such studies overwhelmingly show that technology exercises a positive influence on students' attitudes, motivation, and engagement. However, very few studies address the 'novelty' aspect of new technologies: as students are usually surveyed immediately after using a new technological tool, they tend to react favorably as its inclusion meant a change from their daily classroom routine (Levy & Stockwell, 2006; Vandewaeter & Desmet, 2009). On the other hand, *comparative studies* can be either broader in scope comparing CALL to non-CALL educational contexts (Alabbad & al., 2010) or comparing the effects of specific software design features on language learning (Al-Shehri & Gitsaki, 2010). Comparative studies often suffer from 'broad-brush' comparisons between technology-based and face-to-face teaching, which is often not particularly helpful in terms of actual classroom applications of technology (Levy & Stockwell, 2006; Chapelle, 2003). Thus, comparative studies that examine the conditions under which different technology-based tasks may be more useful for language learning, could also prove more helpful to both educators and learners (Felix, 2008).

MALL Research

While MALL includes a variety of mobile technologies, such as cell phones, MPR/MP4 players, personal digital assistants (PDAs), personal listening devices (iPods), and laptop computers among other devices a review of the literature reveals that the main focus has been the use of mobile phones in language learning.[5] In this regard, studies have focused either on content - types of activities and learning materials, or on design - issues related to developing and delivering materials or activities on mobile devices[6] (Kukulska-Hulme & Shield, 2008).

In studying the role of mobile phones, *content-focused studies* have examined the impact of the following cell-phone based activities on language learning:

a) *sending text messaging to learn vocabulary* (Andrews, 2003; Norbrook & Scott, 2003; Pincas, 2004; Levy & Kennedy, 2005; McNicol, 2005; Stockwell, 2007; Li, 2009; Song, 2008, Cavus & Ibrahim, 2009)[7],
b) *taking quizzes and surveys via cell phones* (Norbrook & Scott, 2003; Levy & Kennedy, 2005; McNicol, 2005),
c) *having learners exchange emails with one another to practice target language structures* (Kiernan & Aizawa, 2004),
d) *students using the browsing function on their phones to conduct internet searches on specific topics* (Taylor & Gitsaki, 2003),
e) *using texts to relay class or assignment information* (Levy & Kennedy, 2005),
f) *using different cell phone apps to practice vocabulary* (Brown and Culligan, 2008; Chen, Hsieh, & Kinshuk, 2008; Stockwell, 2010),
g) *watching video lessons on English constructs using mobile phones* (Thornton & Houser, 2005),

[5] A study of the use of various mobile technologies funded by the European Union since 2001 (Pecherzewska & Knot, 2007) found that mobile phones appear to be used in the majority of MALL activities.
[6] Discussed in detail by Kukulska-Hulme & Shield (2008).
[7] One example of using mobile cell phones to aid vocabulary learning is through the so called "intelligent tutor system": after creating a profile for each user, an application delivers and adjusts vocabulary activities based on the language level of each learner (Stockwell, 2007).

h) *sending mini-lessons to learners' mobile phones several times a day to contextualize vocabulary learning in different settings at different times* (Thornton & Houser, 2005; Kennedy & Levy, 2008).

Design-related studies, on the other hand, examine *how* activities/materials are delivered to learners and issues related to this process. The argument is that the way that something is delivered affects its usage. Hence, if a system/software/app is easier to use, it is more likely that learners would access it and spend time learning from/on it. For instance, the Japanese system for English language learning: ***Pocket Eijirō***, proved successful in engaging learners because (a) the system was easy to use without requiring special training or explanation, (b) it encouraged user involvement by allowing user-generated content and by having user-friendly interface; and (c) it worked across different platforms. Studies note that language learning materials that need to be used on mobile devices must be appropriately designed, easy to use, and transferable across different platforms for a mobile based learning system "ought to assume that learners will not prepare time to learn with [it]…*[as]* the learning takes place in their spare-time such as during their waiting time" (Morita, 2003 p. 1; Trifanova & Ronchetti, 2003).[8]

FINDINGS: VARYING EFFECTIVENESS OF COMPUTER/MOBILE-ASSISTED LANGUAGE LEARNING

M/CALL Effective

CALL studies generally agree that technology offers many learning benefits to students. For example, some show that the use of CALL tools improves both student motivation and teacher instruction (Grgurovic & Chapelle, 2007; Warschauer, 1996). One possible reason advanced by TESOL (2009), is that the "use of technology in English language teaching and learning can encourage the development of strategies necessary for modern survival: communication, collaboration, and information gathering and retrieval" (p.15).

Several studies report the positive effects that MALL has had on language acquisition. Pettit and Kukulska-Hulme (2007) describe cognitive and affective benefits that learners experience when using mobile devices, as the latter enables students to access information instantly and engage in social exchanges. Others argue that mobile devices allow users to personalize learning and engage in collaborative projects, both of which are seen as motivational factors to learning (Hsu et al., 2013; Looi et al., 2009; Zurita & Nussbaum, 2004). As mobile devices enable greater time and space flexibility, learning and movement can occur at the same time, which is seen as conducive to learning (Kukulska-Hulme, 2009; Looi et al., 2009). Finally, mobile learning has unique features, most notable of which are immediacy in delivering and receiving desired content as well as flexibility as to when and where to receive/complete target tasks. Both of these features are said to contribute to sustaining student motivation and to creating positive, affective language learning experiences (Li, 2009; Song, 2008). In terms of effectiveness, Wang and Shih (2015) report that students using mobile vocabulary learning application programs to learn new words scored significantly higher on tests than students who studied the same learning materials in a paper-based format. Similarly, studies have shown that MALL supports improving specific language skills such as *vocabulary* (Zhang et al., 2011; Basoglu & Akdemir, 2010; Cavus & Ibrahim, 2009; Lu, 2008; Stockwell, 2010; Thornton & Houser, 2005; Wang & Shih, 2015); *reading comprehension* (Chen & Hsu, 2008; Hsu et al., 2013), *writing* (Li & Hegelheimer, 2013), *listening* (Edirisingha et al, 2007; Nah et al., 2008), *pronunciation* (Ducate & Lomicka, 2009; Godwin-Jones, 2008), and *speaking* (Gromik, 2012).

[8] One suggestion to achieve this is to make use of the 'highly fragmented' attention of m-learners by providing 'short (from 30 seconds to 10 minutes) learning modules" (Trifanova & Ronchetti, 2003:1796).

For instance, in investigating how cell phones can benefit vocabulary acquisition, Chen, Hsieh, and Kinshuk (2008) found that flashcards with pictorial annotations sent to learners' mobile phones via SMS helped students retain the said vocabulary, at least in the short term. Similarly, an experimental study done by Chen & Chung (2008) found that cellphones enabled more personalized English vocabulary learning that significantly enhanced learners' English vocabulary as m-activities were adapted to learners' individual interests. A two-week study by Thornton and Houser (2005) on using mobile phones outside the classroom by sending learners mini vocabulary lessons three times a day, showed that learners who received such mini-lessons on their phones scored better on tests than those who didn't. Finally, a study conducted by Sandberg, Maris, & de Geus (2011) confirmed that cell phones can motivate students to become more engaged in the learning process by enabling them to learn in informal contexts during their spare time.

C/MALL Not Effective, even Impeding

On the other hand, many CALL researchers concur that the extent and likelihood of technology-assisted learning benefits are defined by how successful teachers are in integrating technology as a teaching and learning tool in and outside of their classrooms. Not all CALL studies find that technology has contributed positively to classroom learning. Wenglinski (1998), for example, reported a negative relationship between the overall frequency of use of school computers and student achievement, although also noting some positive effects of technology in certain situations. Pelgrum and Plomp (2002) offer further support to Wenglinski's findings showing that mere access to computers does not guarantee improved student learning: even though students have more access to computers, teachers must learn how to use computers effectively to promote student achievement.

Similarly, while many MALL studies report positive benefits of using different cell phone features in language learning, the actual educational, motivational, and, especially, long-term benefits of cell phones are still questionable. Some argue that certain features of mobile phones, such as instant messaging, may distract students (Peck, Deans, & Scokhausen, 2010) as well as intrude into learning and remove the teacher's centrality[9] in teaching (Cavus, 2009). Others found that MALL does not have a significant and lasting effect on learners. For example, Reinders & Cho (2012) report that the use of mobile technology in informal[10] language learning did not result in learners acquiring the target language structures and did not contribute substantially to language learning. One reason for this is given by learners in Stockwell's (2008) study who argued that the cell phone is "not a tool for studying" because they "couldn't get into study mode with the mobile" (p. 260). Similar results are reported by Loewen et al., (2019). The authors noted that students were frustrated with instructional materials while using the m-learning app Duolingo and, perhaps, as a result, demonstrated variable degrees of learning motivation.[11] Overall, studies indicate that further technological improvements and development of practical applications are needed to transform mobile devices into appropriate outlets for delivering as well eliciting educational materials to/from students (Motiwalla, 2007; Oliver & Goerke, 2008; Pouezevara & Khan, 2007; Shudong & Higgins, 2006). One of the arguments is that, as learning requires an effort, most people would not choose to study with a phone, because they perceive its main purpose to be for entertainment. Shudong & Higgins (2006) also point out that "people lack the motivation needed to use mobile learning consistently." (p. 4). The authors argue that the surrounding environment can be an additional source of distraction, the cell phone capacity can be wanting, Internet browsing slow, the screen

[9] Making learning less teacher-centered is not always viewed as a negative byproduct of technology.
[10] Informal learning is learning outside of formal education. Formal education refers to the structured, standardized way of learning that most learning institutions follow.
[11] The study does not follow up to report any long-term effects, which is lacking in almost all studies in this field.

size: too small, and tests/quizzes administered through cell phones: too cumbersome to complete. As a result, the independent online learning productivity may be slow and personal motivation: low.

Such limitations must be considered and countered if technology, in general, and mobile phones, in particular, are to be integrated successfully in language learning. To that end, issues linked to C/MALL are discussed next.

ISSUES WITH USING TECHNOLOGY/CELL PHONES IN LANGUAGE LEARNING

Based on C/MALL research, the following issues can be noted when using technology in language learning and instruction.

First, despite numerous ways to include m-technology in learning, delivering language content via mobile devices, such as cell phones, has usually been one-way, teacher-to-learner, text communication rather than a multi-way, multimedia task encouraging learners to communicate with each other as well as with their teachers (Kukulska-Hulme & Shield, 2008). In other words, even though cell phones have been used in different activities, learners have been mostly passive and on the receiving end of those activities. Several studies have tried to address this issue. Some, for instance, have set web-boards with links to English language learning sites that can be accessed via mobile phones: such scenarios are meant to encourage learners to take the initiative, to go and visit those sites, as well as to interact asynchronously with each other, their teachers, or any guest visitors (Dias 2002a, 2002b). However, even such activities are mostly text-based. Others have attempted to integrate cellphones using multimedia. For instance, City College in Southampton set up a web-board that was accessible to students both via text as well as via video and voice recordings (JISC, 2005). When using the web-board, students were tasked to obtain specific information, either oral or visual, and upload it online so that it could be accessed by teachers or other students. To complete some of the tasks, learners had to also move physically to different locations, which took advantage of the portability of mobile devices and engaged the kinetic memory of learners. So, while this first issue has a solution, the solution is often time consuming and practiced by a few.

A second issue is that very few reported MALL/cell phone activities promote learner-learner collaborative interaction or co-construction of knowledge. Studies have shown that most assignments were delivered to learners using a text messaging system or directing them to certain websites. Although some teachers have attempted to involve students in the learning process and in collaborating with their peers (JISC, 2005; Dias 2002 a, 2002b; Lan et al., 2007, Samuels, 2003), those attempts met several impediments. The latter included difficulties coordinating between participants' conflicting schedules, problematic logistics, using text during synchronous oral chat sessions, and/or no evidence of m-technology structuring students' language knowledge in any significant way (Samuels, 2003).

Third, even though one of the notable advantages of cell phones is their portability/mobility, very few activities take advantage of those features to enhance learning. Most often, the 'anytime, anywhere' affordances offered by mobile devices are either ignored or underused. For example, some have examined the effectiveness of SMS vocabulary building messages sent to learners at set times during the day and/or on set days (Levy & Kennedy, 2005). This begs the question: why? Thanks to cell phones, learners should be able to access this information whenever they want.

Fourth, m-learning has also underused mobile phones' oral/voice functions. Even though cell phones were developed for oral communication, MALL activities rarely take advantage of this affordance (Kukulska-Hulme & Shield, 2008). Some exceptions to this can be found. A study by Stanford University, for instance, examined the effectiveness of coaching learners orally over cell

phones as well as making learners participate in voice-controlled grammar and vocabulary quizzes (Cooney & Keogh, 2007). However, scheduling difficulties as well as issues with voice recognitions software impeded the continuation of those voice-enabled activities (McCrocklin, 2019). Therefore, promoting oral delivery and oral production via cell phones has lagged in mobile language learning activities: both in practice and in studies.

Fifth, very limited MALL research has been done in the areas of speaking and listening (Kukulska-Hulme & Shield, 2008). While it has been suggested that speaking and listening activities can be used to successfully promote collaborative learning via mobile phones, this has failed to be a focus of academic research or practice. Again, studies have focused only on asynchronous speaking and listening activities or on synchronous text-based tasks (Samuels 2003; Ogata & Yano, 2003). Technical and scheduling difficulties appear to be the main culprits for shortcomings of m-listening and speaking activities. One exception is a study by Lan et al. (2007) that explored assignments in which students read aloud to each other via Skype and receive feedback from other students in the form of pronunciation errors appearing on the screen. While this activity is a good example of interactive, collaborative learning, it is still done in a formal setting: students must be present at a certain time and place, which does not take advantage of the 'anytime, anywhere' attribute of m-learning. Similarly, Gromik (2012) studied whether 30-second video recordings done by students on their cell phones weekly, increase their spoken fluency. While the results indicated that the number of words students spoke in one recorded monologue indeed increased, the reported sample was very small (nine participants) and it used asynchronous, thus passive way of oral communication (students recording and then uploading their files).

Finally, while barriers to synchronous speaking and listening activities are often related to practical issues (that is, scheduling, availability), another problem that learners often encounter is cost. Using mobile phones to send or receive messages, or even having a cellphone, is often costly. As such, cost may be a barrier impeding student participation and learning. Some have suggested that rather than expecting students to use their own devices, schools must provide mobile phones to learners and a budget to cover any expenses related to class activities (McCarty, 2005; JISC, 2005). This, however, would be highly dependent on individual school budgets and instructors' insistence on integrating MALL in language teaching and learning.

Overall, m-language learning has focused mostly on formal activities, such as the delivery of traditional activities (that is, quizzes and vocabulary items) that teachers believe would benefit their students. Thus, the less formal use of cell phones in language learning, including empowering learners to take control of their own learning and letting them immerse themselves from their own volition into different language contexts – anytime, anyplace - has been underused. In this context, Rosell-Aguilar (2007) argues that 'having audio or video online is not new, but what is innovative is to provide it as stand-alone items for independent learning." (p.481). In other words, while the technology is here and is available, teachers must still devise a pedagogical approach that (a) takes full advantage of everything that cell phones offer, and (b) allows students to participate fully in the learning process by engaging *anytime, anywhere* with the learning process and with each other. The common denominator to achieve both objectives is teachers.

Teachers play a central role in deciding how to integrate available technology in the learning process and in defining it, thereby, its effectiveness. Key questions to help decide 'if' and 'when' to use technology in L2 instruction are discussed next.

"IF" AND "WHEN" TO USE TECHNOLOGY IN LANGUAGE INSTRUCTION

With new opportunities come unique challenges. When faced with many technological tools, teachers are often confronted with the dilemma: which ones to use to make a positive contribution to language learning? To address this, one must first evaluate (a) the need for technology in the

classroom and (b) the type of technology to be included to respond to that need. It is important to note, that technology most often *supplements*, but does not replace teaching. To make the best use of available technological tools, a teacher must, first and foremost, be a good teacher; that is, s/he must know his/her craft. Only then, can s/he make best use of available resources to enhance language learning. If a teacher does not *comprehend* or has a superficial grasp of the subject to be taught, no technology can substitute or improve on this lack of understanding. To effectively utilize available technological tools, teachers, must address the following questions.[12]

Do I, the teacher, need technology?

Sometimes, the answer can be a simple 'no'. Not every topic necessitates the use of technology. In fact, some have found that technology can also distract students and, thus, impede understanding. An article in *Education World* (Education World Tech Team, 2008) expressed a similar view:

> "In a classroom where technology is appropriately integrated, sometimes print will be the best format for a particular lesson; sometimes a video will be; sometimes a podcast. Instead of starting with a form of technology and making it fit what you do, successful educators first determine whether or not that technology is the best way to deliver the instruction." (n.p.)

The teacher, not technology, must impart the knowledge, explain, deconstruct, and enlighten students. Even as we are moving away from didactic, teacher-centered classrooms to more participatory, student-driven learning, a teacher still has the same role: s/he must explicate the essence of the matter. To do so, a teacher must understand that essence. Without having such understanding, a person cannot teach effectively, regardless of how many technological gadgets and apps are used.

In teaching the topic of the day, which activities can be explained better using technology?

This necessitates a more targeted approach focusing not only on accomplishing specific tasks, but also on accommodating different learning styles. In terms of tasks, when discussing parts of speech and word families, for instance, using a paper dictionary may be as effective as using an electronic dictionary. However, the convenience, speed, time, and online exchanges (that is, discussion boards, blogs, social media posting, chat messaging) that m-learning affords may help students practice, contextualize, and understand better how parts of speech/word families can be used anytime, anywhere. In this case, we must choose wisely the type of tech activities (also in terms of their number to avoid overwhelming students).

What technology is available for the level and age of students that I teach? Do all my students have access to this technology?

It is often difficult to find age and level appropriate technology that will gauge and sustain the interest of all students. It is even more difficult to ensure that all students can equally access those same technological tools. A good bet, of course, is to use online resources that, if level and age appropriate, will be available to all, free of charge. YouTube videos, for instance, are often used by teachers to demonstrate different concepts; however, YouTube is often not available in all countries. In addition, Internet connectivity may also be a problem in some remote areas. Thus,

[12] Partly discussed in Sokolik (2014).

relevance as well as the availability of technology must be considered when deciding whether to include tech-based activities.

How do I know if the technology is good?

It is difficult to assess, at times, whether a tool is good or effective until we use it. Usually, a tool is used to achieve an objective. We use a knife to cut and a fork to eat. If we *can* accomplish those goals: cutting with a knife and eating with a fork, then the tools are good. In terms of technology, the question then is *what **are** the learning objectives that I, as a teacher, seek to achieve? How will technology help me to reach those goals?* If a teacher, for instance, is teaching reading and wants to introduce podcasts to integrate listening into reading, a good question would be: "How would using podcasts support reading?" There must be a clear connection between technological tools and learning objectives.

How do my students feel about this technology? What do others say about this technology?

If students perceive that a technological tool is too time consuming, 'boring', or requires them to do extra work, the ensuing lack of enthusiasm may impede learning. One way to see how students may respond to a particular technology is to find out how it was received by others. Reading reviews and comments online can help assess the viability as well as the reception of such technology. In addition, it is always helpful to talk with colleagues who may have used similar technological tools. However, one teacher's experience may not necessarily translate into another's as teaching conditions may differ.

CONCLUSION

The evolution of educational technology has come a long way. The first cell phone was invented in the early 1970s by Martin Cooper. It weighed 2 pounds (0.9 kg) and was the size of a small loaf of bread. Nine years later, cell phones became available to the public. By 1990, there were a million cell phone users worldwide. It is estimated that in 2019 more than 5 billion people have at least one mobile phone, and over half of those are smartphones[13] (PEW Research Center, 2019). In most countries, most people own a mobile phone: in some advanced countries, like South Korea and France, ownership rates are above 90%, while in developing countries those range from a low of 24% in India to a high of 69% in Brazil and South Africa (PEW Research Center, 2019). Cell phones are increasingly light, portable, easy to use, content adaptable, interoperable, allowing access to information in an instant, collective knowledge, and synchronous social connectivity. It is no surprise, therefore, that m-learning has entered education. While some teachers may still ask students to turn their mobile devices off when in class, others have decided to embrace those technological tools arguing that they offer unique advantages, including encouraging collaborative learning exchanges and learners' autonomy.

How effective has technology been to language learning? This paper examined this question by reviewing the key early studies on computer/mobile-assisted language learning. The overarching conclusion is that the jury is still out: while some report clear benefits that technology brings to language learning, others question both the depth and breadth of its effectiveness. As such, this review has proposed that the key to wielding technology successfully in language acquisition is a good teacher. Teachers who know their subject well must precede the introduction of any new technological tool for the latter to be successful, both in teaching and learning. To aid in the decision of whether to include technology in language instruction, this paper posed several questions that teachers can address to position the effective integration of technology in language learning.

[13] Smartphones are cell phones that can access the internet and internet-based applications.

Further empirical studies are needed to bridge the theoretical propositions, as advanced in this paper, to developing and testing practical instructional applications that can aid teachers to integrate the available technological tools more effectively in language instruction and learning.

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