SIVAS CUMHURIYET UNIVERSITY

TOPICS IN TECHNOLOGY ENHANCED
LANGUAGE LEARNING

Edited by **Ahmet Çekiç**

Expanded 2nd Edition

SİVAS **2024**

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PREFACE

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At the time of writing this preface, I have just recently returned from a 2.5-week trip to Turkiye as a visiting scholar and English Language Specialist. During my time in Turkiye, I had the great fortune to meet and work with students and faculty from English language teaching programs at five different universities around the country. My visit mainly consisted of facilitating various pedagogy workshops to pre-service teachers. These hours-long workshops ranged in topics from designing reading activities, to using authentic materials, to conducting peer observations, just to name a few. Although the locales and workshop topics were wide-ranging, the method of delivery had one aspect in common: the nearly 400 participants at these workshops used their smartphones to access the materials and complete the hands-on activities. As such, students' access to and understanding of digital technology, as well as my own, was essential for offering an engaging, interactive, and student-centered workshop experience that reflected best practices in the field of English language teaching. Without this access and understanding, students' learning and my own teaching surely would have suffered. What this experience has reemphasized for me is the importance and flexibility of technology as a learning and teaching tool in language teaching, and perhaps even more so in the English as a foreign language context. This experience has made it crystal clear for me why we need this book.

The editor of this book has brought together English language teaching educators from six different universities from around Turkiye, resulting in a collection of nine chapters covering diverse aspects of digital learning. Topics range from the challenges and affordances of mobile-assisted language learning, educators' shifting roles in the digital language classroom, creating new classroom spaces through videoconferencing, capitalizing on text to speech software and other technologies to teach vocabulary and language competencies, and creating innovative and immersive English language learning environments in a foreign language context through virtual reality, social networking, and digital games. These chapters, of course, do not simply lend themselves to teaching EFL in Turkiye but in

any global EFL learning context and beyond. This collection is a great resource for any language educator interested in ways to successfully use technology to motivate and engage students in their learning.

What I appreciate about this book, beyond its breadth of technological topics, is the way each chapter begins with several questions posed to the reader. The questions ask educators to reflect on their beliefs and teaching philosophies prior to reading, encouraging each one of us to consider our own unique contexts as we contemplate how to implement the suggestions found within this collection. Even as a very experienced English language educator myself who teaches within an L1 context in the U.S., I find this collection helpful in understanding new ways of using technology with my linguistically diverse students. While initially I thought this book would be a great tool for the professional development of the pre-service educators I work with, I quickly realized this book was also for me. I believe other experienced educators, and the ones they are preparing, will find this resource a useful addition to their teaching toolkit.

ACKNOWLEDGEMENTS

SHIFTING TEACHER ROLES IN THE CONTEXT OF TECHNOLOGY IN THE NEW LANGUAGE EDUCATION ERA

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Before you read, reflect on the following questions:
  1. What are implications of technological advancements for language education?
  2. Compare and contrast roles of current language teachers and those in the mid-twentieth century?
  3. What are the skills that language teachers should possess in the twenty-first century?
  4. What could technological developments in the current century imply for language teacher education?

Introduction

Improvements in technology have deeply affected education, particularly language instruction, and this has resulted in improvements in learning outcomes through interactive, interesting and engaging learning (Kuddus, 2018). Current technologies enable learners to investigate, access, process, make sense of information in ways that are different from the past decades. For example, learners can easily access knowledge on the Internet through web search, online books, and movies or through mobile software. Language learners have now ample opportunities for language learning, particularly through social networks and gaming (Godwin-Jones, 2015), and instruction is strongly supported by technology-mediated learning (Zhang, 2022).

In line with these developments, the roles and responsibilities that teachers (and students) assume have changed a lot in the last few decades (Dabhi, 2013; Hedayati, 2019), not only because of the recent technological developments but also because of the evolving nature of approaches and methods in the classroom. This chapter addresses the issue of changes in the roles of teachers in the 21st century, which is characterized by such notions

as agency, autonomy, learner-centeredness, inquiry and collaboration. It particularly elaborates on teacher roles in computer assisted language instruction, and it discusses the acquisition of new skills by teachers and learners in a globalized world in which English is the leading tool in communication between people from different language backgrounds.

Computer-Assisted Language Learning

Teachers and learners use digital technologies in academic settings extensively, implying that digital technology has assumed a dominating role. With easier and cheaper access to hardware and software, along with broadband Internet, computer-assisted language learning, CALL for short, has turned into a major practice in the world today. CALL "refers to any process in which the learner improves his or her language competence by using a computer" (Wang, 2021). This term features "learning," rather than teaching, to draw attention to the learner-centred nature of CALL practices, in which the learners are agents of their own learning and are able to learn autonomously. Information and communication technologies have a significant place in CALL, as outlined by Dabhi (2013) below:

> With ICT, teaching learning goes beyond rote memorization of facts, instructionist and behaviorist methodologies. It enhances learning more than teaching. It makes learning a process of knowledge creation. It has relieved education from the shackles of 'time' and 'space'. Technology is a tool, a tutor and also a tester. It provides students with everything—tools, devices, information, connectivity, collaboration, communication—to create knowledge on their own. (p. 44)

Although CALL has been a part of language instruction for decades, what we understand from CALL hardly resembles how it was practised in the 1960s or 1970s. This is because CALL has gone through significant changes in three phases from behaviouristic practices to communicative activities and to technology-mediated language use (Lawrence, 2014). The behaviourist CALL was based on drills, while communicative CALL aimed to promote meaningful communication in activities. Finally, integrative CALL made it possible to get involved in real-life communication by using technological tools and software programs.

Modern conceptions CALL should integrate technologies with materials and sound pedagogical principles to support the teacher. However, Catelly (2012) notes that the commonly voiced need for technology training is meant to be about the mechanical aspects of technology use, rather than educational justification or rationale behind it. Such a theory of technology integration could be called "techno-oriented incorporation" (Duan et al., 2022, p. 2). However, a "techno-pedagogical incorporation method" (Duan et al., 2022, p. 2) is suggested as a solution. This is because technology integration without pedagogical principles is bound to fail. The reason why teachers need to get training on how to integrate digital technologies into their classes is that they need to do this based on a pedagogical framework (Catelly, 2012). In other words, CALL involves a collaboration between technology, pedagogy and content, which is theorized as technological

pedagogical content knowledge, TPACK for short. The TPACK framework should be a focus of attention in teacher education programs. These skills are essential not only for better learning at university but also for carving out a niche for oneself in the job market after graduation. Today, CALL supports 21st century skills and provides room for the acquisition of these skills in language instruction.

Twenty-First Century Skills

Being offshoots of recent advancements in technology and new developments in educational theory, 21st century skills have become much desired competencies intellectual skills essential for successful teaching and learning. Therefore, helping students acquire 21st century skills has been a buzzword recently. These skills are essential not only for better learning at university but also for success in professional life after graduation.

There are quite a few competencies that are labeled as 21st century skills by educators and employers. According to a recent study, the most frequently demanded competencies for the 21st century are digital literacy, critical thinking and problem-solving; these are often found to be what employers looked for in their employees (Peredrienko et al., 2020). Other key skills include, but are not limited to autonomy, collaboration, creativity, cross-cultural understanding. The next sections briefly explain the basics of such key competencies, which are essential for being a part of the current competitive world.

Digital Literacy

Being one of the 21st century skills, digital literacy is a major agent of change in pedagogical contexts. It is essential that both teachers and learners be digitally literate to make technology integration possible. Digital literacy can be defined as the ability to use information and communication technologies to create and consume content in digital environments, particularly on the Internet. It involves the knowledge of online and offline tools, hardware and software, along with the knowledge of what technology to use for specific tasks and making a distinction between what is useful and what is not.

Younger generations are often portrayed as tech savvy individuals. This is true in terms of using everyday applications, such as social media or entertainment-oriented tools. However, research has shown that younger people are not as competent in using current educational technologies as expected; they use technology for everyday transactions, rather than for learning purposes (Bakla, 2019). Lending support to this, other research studies have found that access to technology (i.e., the Internet and digital devices) can help learners become digitally competent in daily life but this might not be the case in academic settings (Gurung & Rutledge, 2014; Margaryan et al., 2011; Selwyn, 2009). Students also need more guidance on technology-related issues. For example, in a study on student perception of teacher roles in students' autonomous learning using technology (Lai et al., 2016), the students expected their teachers to support them in their effort to

learn autonomously through higher involvement and more active teacher roles, whereas the teachers thought that they had a minimal role to play in this as they overestimated the students' abilities and did not feel confident of their own abilities in using technology. In support of this, in a study by Kan and Tang (2018), student participants thought that teachers assumed a minor role in their mobile-assisted learning practices and that they expected more support from teachers, particularly by taking part in online student discussions, guiding learners in finding and using learning materials and assessing their learning. These research results collectively imply that language teacher trainees, in-service teachers and language learners need training to learn how to use information and communication technologies for language learning. These results also indicate that teachers themselves should be digitally literate to help learners acquire digital literacy. Kuddus (2018) notes that teacher training programs should offer ICT and computer skills courses to achieve this. Teachers should function as guides who help their students learn autonomously, yet both teachers and learners should take responsibilities. Table 1 compares teacher and student responsibilities in learning some sample skills.

Table 1 *Student and Teacher Roles/Responsibilities in the 21st century*

Focus/Skill	What students have to do	What teachers have to do
Using online tools for learning	To acquire the skills necessary to use online tools	To provide a set of tools for learning and communication by considering pedagogical principles
Inquiry	To find and evaluate the usefulness and accuracy of information in digital environments	To guide the students in finding and evaluating information in digital environments
Communication	To interact with peers	To establish appropriate settings for interaction and to provide the essential tools (and to monitor the interaction)
Evaluating usefulness and relevance	To assess if information is useful and relevant	To teach the learners assessment methods
Verifying accuracy of information	To learn methods of verification and use them whenever needed	To help the students to understand the importance of verification and raise their awareness of verification methods
Dealing with copyright	To learn the basics of copyright and learn to respect copyright and to learn how to access open-source materials	To teach the basics of copyright and provide learners how to use open-access materials
Collaboration	To study in peers or groups to learn from each other	To team-teach and informally share materials/experience with colleagues

Autonomy

Autonomy is defined in different ways by different educators. It usually refers to the ability to learn independently and to make informed decisions during the learning process. It is important to note that autonomy has two dimensions in education. First, learner autonomy refers to learners' ability to make informed decisions what to study and how to study it, along with their ability to take the responsibility of their own learning. It basically involves the notion of learning to learn. This is quite critical because learning to learn is a giant step towards acquiring any knowledge or set of skills. In current educational landscape, digital technologies and online documentation have helped improve learner autonomy because learners are now able to follow their own course of learning by choosing their own learning materials and by directing their attention to learning to learn. Moreover, these technologies provide learners with more opportunities to use language inauthentic settings and they can work at their own pace whenever and wherever they want (Kuddus, 2018). However, it is not easy for learners to find appropriate materials and to know how to use them for successful language learning. This implies that language learners should receive training on how to be the agents of their own learning and how to make informed decisions about critical pedagogical issues.

Second, just like learners, teachers themselves have to be autonomous learners as well, and they should be guiding figures who promote learner autonomy. Information and communication technologies have a critical role to play regarding teacher autonomy, as well. They enable teachers to learn on their own, to produce their own instructional materials, to make informed decisions about what and how to teach. Digital environments offer teachers not only instructional materials but also information about how to use them for better teaching. In short, technological settings and tools enable both teachers and learners to access information easily and be independent learners.

Critical Thinking

Asking questions and doing research to find answers for them is a worthwhile activity for students in the classroom. During this process, thinking out of the box is a necessary skill that could help transform not only students themselves but also the society, particularly by challenging the status quo in it. This skill, commonly known as critical thinking, entails "polite doubt" (Ennis, 1987) or healthy suspicion about what we observe in the society or read in books. It enables students to inquire, to think deeply, to approach texts like a detective and to read for implied meanings, so that they can recognize prejudice, injustice and abuse of power or similar problems in their prospective lives (Safari, 2017). Critical thinking goes hand in hand with critical inquiry and analysis. Therefore, it broadens one's perspectives about life, the meaning of it and what happens in it. It is through critical thinking that we could recognize the invisible or potentially dangerous aspects of what initially looks useful, good or acceptable. Moreover, a good teacher not only possesses critical thinking skills but also teaches them to his or her students. Therefore, teachers are

expected create room for critical thinking and inquiry in their classrooms (Al-Issa, 2005). In order not to raise students who hardly question, as Al-Issa (2005) recommends, teachers have to create space for exercising critical thinking.

Creativity

One and a half decade ago, in one of his famous speeches on creativity, Robinson (2006) noted that "creativity now is as important in education as literacy, and we should treat it with the same status" (02.46). Today, we obviously need more of it, not only in education but also in competitive marketplaces in which innovation is one of the driving forces. While traditional education (Education 1.0) expected students to provide uniform answers to questions based on memorized facts, formulas and theories, approaches in the 21st century highlight the importance of data diversity and the use of learning strategies for achieving learning objectives in innovative ways (Peredrienko et al., 2020). According to this new conception of education, thinking outside the box or providing uncommon solutions to problems is highly encouraged. In this sense, thinking differently is considered as a visible outcome of higher intellectual capacity and deeper thinking. This implies that educators should welcome different answers to questions, encourage students who question the mainstream and support the efforts of those who want to seek novel solutions to common problems. Creativity can be nurtured when students are encouraged to share their opinions freely and when differences in opinions are considered as wealth, rather than as a source of trouble.

Problem-Solving

A similar skill is problem solving, which refers to identifying problems and offering feasible solutions to them. Problem-solving has its roots in scholarly inquiry, which can be defined as finding a solution to a real-life problem through investigation. Problem-solving operates in a similar way in instructional settings. However, it can also be used as an instructional technique. It involves logical reasoning and splitting the problem into its components (e.g., causes and effects). This skill is closely related with critical thinking, which is an analytical ability that involves clear reasoning. In other words, both teachers and learners need critical thinking to be a problem solver.

Collaboration

Learning is a lifelong process, and teachers and learners are a part of it. Current educational theory promotes collaboration, implying that each student has something to teach his/her peers, and similarly teachers and students could learn from each other. Today's communities depend on relationships that involve collaboration and social networking (Partnership for 21st Century Skills, 2008). During this process, teachers cooperate with their students as co-learners. On the one hand, both teachers and learners are expected to collaborate in the class and outside of it to increase their knowledge and

skills. On the other hand, they have to be competitive to be able to take their place in the global marketplace, which is often described as being highly competitive and driven by knowledge and innovation.

Shifting Roles of Teachers

In language education, the roles of teachers, learners and the learning context are fairly significant in terms of the extent to which learning objectives can be achieved at various proficiency levels. These three elements are critical because, in Briggs' (2014) words, they form the philosophy of teaching in an educational environment. For instance, if the teacher assumes the role of "sage on the stage," it might not be possible to expect a learner-centred instruction or to establish a learner-centred classroom. The teacher has to adapt the role of a facilitator, guide, mentor and collaborator.

Learner-centredness became a buzzword in the late 20th century with the impact of paradigm shifts in language education brought about by philosophes that highlighted learner agency, autonomy, reflection and collaboration. In the 21st century, learner-centeredness in language education reinforced its place with recent advancements in educational technology. Compared to earlier educational settings, the current educational landscape supported by latest educational technologies lends itself well to autonomous learning that places learners at the centre of attention. In this respect, an inevitable match is expected, not only between the teacher roles and student roles but also between how students learn and how the teachers teach. For instance, a teacher-centred learning environment hardly provides room for learner-centredness, autonomous learning or collaboration. As an extension of this line of thinking, if learners learn in ways that were previously not possible or common, then teachers are expected to teach in ways that are different from how they taught in the past. Perhaps the most significant change that has taken place is that teacher dominance is no longer the case. Instead, the teacher adopts such roles as being a facilitator, guide, collaborator, trainer, motivator and so forth. These roles are explained briefly in the following sub-sections.

Facilitator

In the past, teachers were expected to provide their students with information; they functioned as informants. However, in the new century, they are expected to be facilitators. In other words, they have to establish a learning environment that is conducive to learning, inquiry, communication, discovery and so forth. Being a facilitator, language teachers are expected to offer abundant learning opportunities and increase student engagement through guidance and collaboration. Catelly (2012) found that some language teachers used ICT in a way to replace the teacher's function (the humanistic dimension of communication). However, the facilitator role of a language teacher mostly cannot be performed by CALL applications or digital technologies in language education.

A teacher can function as a facilitator of student learning by designing an effective learning context with activities and tasks that integrate appropriate technology with content by using appropriate pedagogy (Duan et al., 2022). Teachers can perform their facilitator role by functioning as a guide or an organizer who negotiates with the students how to plan the learning journey that they set out for. As teachers no longer function as information providers, they need to assume more modern roles.

Collaborator

According to Ping and Jingjin (2012), the use of technology entails cooperation of students and teachers. Teachers are expected to function as a role model who attaches tremendous importance to such skill as inquiry, reflection, creativity, problem solving, collaboration and so on. Teachers' collaboration role necessitates scaffolding the students in their learning journey and gradually removing the support to raise them as independent learners. The collaborator role for teachers also necessitates teamwork with colleagues to improve instructional processes and outcomes. In this respect, it is critical for teachers to use digital technologies guided by pedagogical principles and frameworks to establish communities of practice and to share materials and experience. Moreover, the teacher and students could be a part of a social network of learning in online communities beyond the classroom walls. In practice, many language learners are involved in cooperative learning projects carried out by educators and students from different institutions and educational settings (Moloney, 2013).

Motivator

Once the effective requirements of learning are met, success becomes highly likely. Being an affective requirement for learning, motivation is one of the most critical predictors of success in education. Highly motivated students usually become successful in their educational pursuit. It is then wise for teachers to function as a motivator their students to achieve the instructional objectives and to produce successful outcomes.

Cultural Diplomat

In recent decades, there has been a major shift in the way people from different countries communicate with each other. That is, more and more people are involved in daily intercultural communication, thanks to ubiquitous digital technologies. That is, in a digitalized and globalized world, intercultural encounters are frequent occurrences. Such a shift makes it essential that interlocutors involved in intercultural communication understand how people from different countries communicate and show respect towards cultural ways of thinking and acting, and cultural elements that are a part of everyday communication. This is why Moutinho and Carlos Paes de Almeida Filho (2015) state that language teachers (just like successful diplomats) need to learn about the target culture. They should also invite their students to learn about this new space, particularly how to act

and communicate in it, so that their students who will wander in the space provided by the target language can establish healthy relationships.

In short, as authentic communication between learners and language users take place quite frequently, language teachers need to teach how to be a cultural representative or a diplomat in intercultural communication. This could obviously promote intercultural communicative competence. In line with the "cultural diplomat" role of teachers, students need to develop an understanding of cultural universals, as well as ways of communicating and acting that are specific to people from a particular country. Developing a cross-cultural understanding helps learners avoid cultural stereotypes, regardless of their being positive or negative. Moreover, Ping and Jingjin (2012) think that culture adds variety into the classroom. They have the following to say about this:

> Only when teachers act as introducer of foreign language and its culture can the classroom teaching be more colourful. And only when language teachers do some research on foreign language and its culture does the communication practice in class become meaningful. From this perspective, language teachers act as a "bridge" with one end to the target language and its culture and the other end to his or her native language and native culture (p. 1447).

21st-century language teachers have to assume many more roles than the ones mentioned above. For instance, they are expected to function as a monitor or an assessor. Similarly, they have to provide feedback to tell the student where he/she has come from, where he/she is now and where he/she is heading for in terms of learning. Such information helps the learner to navigate through dangerous realms where lack of knowledge of effective learning could lead to failure. Other teacher roles include, but are not limited to, being an instructional designer, co-communicator, consultant, involver and social worker. To perform these roles successfully, teachers need to receive training on how to learn and teach major 21st century skills.

Teacher Training in the Twenty-First Century
One of the key issues in teacher training is to expose teacher trainees to a variety of learning technologies in teacher training courses. According to Luke and Britten (2007), current and prospective language educators have to aptly integrate technology into their classes in meaningful ways, and such a responsibility forces them to appreciate the functionality and weak/strong sides of technology in instructional contexts. Luke and Britten also emphasize that this could be possible when teacher trainees obtain the necessary knowledge and skills during college training.

Godwin-Jones (2015) cautions that "being knowledgeable about available technology tools and services for language learning does not necessarily translate into teachers being able to make effective use of CALL in their teaching" (p. 14). This means teachers must seek ways of integrating technologies, tools or software into language instruction and

experiment with them in instructional settings. The best way to achieve this could be to offer teacher training courses through the medium of information and communication technologies. When teacher trainees are taught using language learning technologies, there is a good possibility that they could transfer what they practise in teacher training courses into their future classes. This is because teachers tend to teach their students in ways similar to how they were taught throughout their educational lives. This implies that they learn how to teach by observing their own teachers. Therefore, teacher trainees and those who teach at English language teaching programs have the responsibility to initially update themselves in technology use (Duan et al., 2022) and then offer teacher trainees a plethora of methods and digital technologies for learning purposes during pre-service education.

According to Yushuang (2015), digital technologies have secured their places in current language education due to their discernible advantages, but some teachers remain unwilling to use these technologies in teaching and learning, due to lack of knowledge and skills and inherent drawbacks of the computers and related technologies. Yushuang further note that language teachers might even be afraid that computers might replace them. However, it should be noted that new technologies in language learning and the reinforced place of CALL have not undermined the significant role that teachers assume in education. Kuddus (2018) aptly summarizes what the shift means in terms of teacher roles:

So we can rightly say that integration of emerging technologies in education and language learning has not made the teachers obsolete in class or have diminished or subdued the role and importance of teachers in the teaching and learning process. Rather, it has redefined the roles of teachers and has given them an opportunity to change and update themselves with the change in the education system, to become digitally literate and broaden the spectrum of their efficiency in terms of lesson planning so that they integrate these technologies in their lesson to make their class lively, interesting, motivating and engaging. (p. 83)

With the use of computers and digital technologies, teachers are not replaced but they are given a different set of roles and responsibilities while teaching. Therefore, teacher trainees and in-service teachers should be provided education and training on how to implement CALL in their language classes (Kuddus, 2018). Duan et al. (2022) suggest applying the TPACK framework to design syllabuses and training sessions to facilitate the integration of technology by teacher trainees and in service teachers. Drawing attention to a different dimension of the issue, Godwin-Jones (2015) suggests that flexible training programs or CALL courses be offered to fit the needs of teachers with different backgrounds, interests and objectives. Godwin-Jones also highlights the importance and benefits of social constructivist massive online open courses (MOOCs), which provide room for interaction among the participants or students beyond the limitations of the course.

If educators and curriculum designers aim to equip students with 21st century skills, they have to integrate these skills to teacher education programs to enable language teacher

candidates to acquire the essential skills themselves first. This is particularly because "creating an aligned, 21st century public education system that prepares students, workers and citizens to triumph in the global skills race is the central economic competitiveness issue for the next decade" (Partnership for 21st Century Skills, 2008, p. 7). Moreover, Duan et al. (2022) note that "extending learning chances through technology is a vital competency for English educators" (p. 5). If this happens in teacher training programs, technology can be integrated into teacher trainees' educational lives as a natural element (Luke & Britten, 2007). In short, providing theoretical knowledge in teacher training programs is obviously essential, but globally considered, such training should go beyond theory and provide teacher candidates with practical insight.

Conclusion

The latest technological advancements functioned as a major agent of change in the 21st century by deeply altering our lives at home and at work, which are currently deluged by ever-increasing digital innovations and great variety of software programs. The 21st century educational landscape in foreign language instruction is the natural result of the ICT advancements in the society and teachers' reactions to them (Peredrienko et al., 2020). In the past, teachers remained one of the few sources of information; they were the intellectual and administrative authority in the classroom. Now that students can access information with unprecedented speed and ease, there is no point in insisting on information transfer and there is no need for a knowledge authority in the classroom. Technology provides the opportunity to access any information in an instant. What teachers need to do is to teach their students how to access and make sense of information they find on the Internet. It is possible that some students might possess more knowledge about certain topics than their teachers do. What teachers have to do is to use their ability to facilitate communication among students in and out of the classroom. They should guide their students in turning into more autonomous learners who are agents of their own learning. In order to do this, they have to be competent in using latest technologies, and as Zhang (2022) notes, they have to be learners themselves throughout their professional lives to be able to keep up with innovations in education.

Today's educational landscape entails much more than mere adoption of new technologies; both teachers and students must adapt technology for their own needs by using their pedagogical knowledge. This is because, as Kuddus (2018) warns, "technology does not bear any educational value in itself (p. 84). It might fail to provide the desired learning outcomes unless it is used wisely in line with sound pedagogical principles. Technology has to be the means rather than the end in education. Furthermore, supported by their teachers, language learners should have to take risks and get involved in discovery learning to develop their autonomy and responsibility, along with other key 21st century skills, and language teachers are expected to educate their students, so that they can deal with the difficulties and obstacles they might face with.

Therefore, it should also be noted that making informed decisions is critical because, as Dellit (2001, as cited in Catelly, 2012) notes, using computer technology in instruction may not necessarily produce the desired improvement in learning outcomes; without applying some key pedagogical principles, the available instructional time might be wasted. Another significant issue is that the role of the teacher or instruction is just one of the many factors that predict the success of education. Therefore, although the roles assumed by teachers during learning are significant, or perhaps a critical key to success, we should consider other aspects of teaching and learning, including those of the students and the learning environment, to ensure better learning outcomes. At any rate, teachers need to seek ways of involving their learners in the learning process. This implies collaboration (Choudhury, 2011).

All these competencies that teachers should have in the 21st century can be encompassed by the term "teacher 4.0" (Peredrienko et al., 2020), which can be used as an umbrella term to refer to teachers who assume most of the roles mentioned earlier and who not only learn but also help students learn critical 21st century skills. In line with this new label, teachers are not expected to impart knowledge; they are no longer absolute intellectual authority as any information is readily available in an instant. However, as Peredrienko et al. note (2020), this does not imply that teachers are no longer significant but implies that teachers are now expected to assume more critical roles than information transfer. For instance, they are expected to guide their learners to useful sources of information and to teach their students how to make a distinction between useful information and garbage on the Internet. In line with current technological developments, today's students are quite different from those in the past in that they are much more self-confident and multi-talented, along with being more willing to demonstrate their competencies and strong sides to others (Zhai, 2015). Globally considered, supported by new digital technologies and evolving educational theory, current educational landscape is expected to raise highly competent individuals for this new world. Therefore, both teachers and students are expected to assume more complex roles to be successful in the competitive and globalized marketplace that demands more and more competent employees.

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TEACHING THROUGH VIDEOCONFERENCING IN THE NEW ERA

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Before you read, reflect on the following questions:
1. How often do you use videoconferencing?
2. What do you think are some of the affordances or challenges of having classes through videoconferencing in EFL contexts?
3. How do you think teachers can manage the class during videoconferencing sessions?
4. How can you keep the class active while using videoconferencing?

Introduction

The rapid advancement of technology has had a great influence on education all around the world for the last two decades. One of the tools that has been commonly used for many purposes after the outbreak of COVID 19 is videoconferencing. People use this tool because it provides fast and easy communication between interlocutors. Particularly, in foreign language teaching context, it enables students and teachers to communicate online instantly and easily. When the required infrastructure and devices are provided, participants can conduct every activity they need from any location. During the COVID 19 pandemic, which started in 2020 and lasted about for two years, people were not able to meet due to the continued lockdowns held by many countries for the protection of public health. Educational institutions in many countries have had to include online education programs based mostly on video conferencing systems. As language learning can be regarded as a lifelong commitment, it could be conducted via different methods to meet social, work-related and educational requirements, and also individual wants and needs (Kukulska-Hulme et al., 2017). In this period, one of the best ways to carry out effective language learning was videoconferencing. To this end, teachers tried to find solutions to continue their teaching profession, and they consulted what they felt was natural, real-time without much instructional guidance communication and tried to replicate the

classroom in videoconferencing virtual meetings (Correia et al., 2020). Thus, they were introduced to videoconferencing platforms such Zoom, Google Meet, Microsoft Teams, Skype, Adobe Connect, Cisco, etc. to teach. So, videoconferencing tools have gained a great popularity and it has become a crucial need for teachers to develop their technological competencies.

Integration of Videoconferencing into Language Teaching

Technology has undoubtedly influenced the way people work, learn, eat, act and so on all around the world. Especially in education its effects have been experienced rapidly with the mandatory measures taken during pandemic. Face-to-face education have turned into distant education both synchronously and asynchronously.

> The coronavirus pandemic dramatically "changed day-to-day life, as individuals and families lived primarily in isolation while local, state, and national lockdown mandates were enacted, and communication technologies provided a way for individuals to stay connected in a socially distant world" (Massner, 2021, p. 1).

Before the coronavirus pandemic, integrating online or e-learning based activities in language teaching was not so popular for many teachers due to some professional and technological challenges. However, the COVID 19 pandemic radically transformed the way people live and learn (Massner, 2021). Thus, it has become inevitable for foreign language teachers and learner to use technology and internet for educational purposes, which led to increase the influence of Information and Communication technology (ICT) on education.

Figure 1 *Videoconferencing Tools*

Teachers have utilized various ICT based tools to assist their teaching in or out of the class. Videoconferencing platforms have become one of the key assistants for teachers, students, parents and of course educational institutions although videoconferencing technology has existed for about 50 years (Massner, 2021). Especially in 2020, the Covid-19 pandemic mandated a far-reaching surge in the number of videoconference meetings (Bailenson, 2021). It is expected that remote working and online learning will be part of working and educational life with various modifications as many people including learners are accustomed to online learning. In this context, many universities have started to

schedule their programs based on online education and specifically synchronous videoconferencing instead of face-to-face education.

According to Watts (2016), synchronous videoconferencing is regarded as a way to enhance the interaction, communication, teamwork, and attendance in online courses. Most of the videoconferencing activities are carried out synchronously as it is much more interactive and interesting for viewers in comparison to asynchronous teaching. Furthermore, it should be noted that, as Al-Maroof et al. (2021) put forth, students in this era use online technologies to learn both in and out of the classes.

Teaching English through Technology

It is true that it has recently become unavoidable to provide learners with technology based materials and techniques in addition to the existing ones. Advancements in technology contributed to the development of the field of language teaching in variety of ways. One of the ways was introduced with the integration of technology and the Internet, learners have started to learn English through "e-learning". According to Ying et al. (2021), "the term e-learning refers to the use of new technology and the Internet to improve learning quality by making materials and remote interfaces more accessible" (p. 1506). In other words, the aim of e-learning is to facilitate learning with the help of technology integration in online or hybrid classes.

Figure 2 *E-Learning Tools*

There are different types of e-learning tools for specific purposes and videoconferencing is one of the appreciated ones. Videoconferencing, which is used as an e-learning teaching tool, offers a great help for teachers and learners. It is a kind of synchronous learning tool, and can be used as an alternative to face-to-face interaction to offer supplementary out-of-class individual and group based learning for learners (Vurdien, 2019). Adipat (2021) claims that "the adoption of informational and technological systems, such as web conferencing, are beneficial in the field of education. These technological changes change the flow of information, thus allowing access to data and eliminating decision-making delays" (p. 2).

What is Videoconferencing?

Videoconferencing is synchronous audio and video communication through computer and telephone networks between two or more geographically dispersed sites (Lawson et al., 2010). Cameras, monitors and microphones of a computer or mobile device are the main components of a videoconferencing system and participants receive instructions and information on any topic using them at any location (Torrato et al., 2021).

Videoconferencing technology is also defined as a communication medium that allows its users to share visual and audio amenities concurrently, and through this technology learners and instructors participate in web-based discussions from different places (Al-Samarraie, 2019).

According to Dal Bello et al. 2007), videoconferencing refers to a type of education entailing synchronous video and audio communication through a digital system among users from all over the world (Dal Bello et al. 2007). Through video conferencing platforms users can have a virtual meeting and communicate with the participants. It helps to disseminate real-time video content across a wide group (Adipat, 2021). It is a great medium for learners to work both individually and collaboratively with a simple computer or mobile device without moving or travelling to the resource.

Figure 3 *Videoconferencing*

The Role of Videoconferencing in Language Teaching

Generally speaking video based education have some advantages. First of all, it is possible for learners to access to increased amount of educational resources, it is flexible for learners, and it offers valuable global interchange, and equal opportunities for students and teachers regardless of location (Earon, 2020). According to Correia et al. (2020, p. 20), videoconferencing systems:

- offer high reliability in protecting participants' real identity.
- make available touch screen function for desktop computers and mobile devices (e.g., use fingers to write on a whiteboard).

- refocus the central role of audio and video and expand the systems to incorporate social media features.
- maximize the integration of augmented video applications that allow for the use of filters, image manipulation, high-quality still, and animated virtual backgrounds.
- support 3D augmented reality (e.g., support the use of 3D glasses).
- offer swift and reliable customer technical support.

Characteristics of Videoconferencing Learning

It is synchronous "All the participants are present online at the same time and participate through textual, audio-visual, or multimodal communication tools" (Schmitt & Eilderts, 2018, p. 290).

It enhances collaborative learning Collaborative learning can be enhanced through videoconferencing learning as the users are suggested to work internally and externally to accomplish the assigned tasks. Hurst (2020, p.277) states that " the use of web conferencing tools for remote and telecommuting library teams should continue and additional products investigated for increased or improved collaboration and communication opportunities."

It improves communication Through videoconferencing communication between teachers and learners can be improved. As facial expressions, gestures and other visual clues are the integral part of videoconferencing, effective mutual communication occurs.

It is asynchronous It can be used as a flipped learning tool with the help of the videos recorded previously.

It is flexible Students and teachers can participate in the activities at any location anytime.

It is a tool for Professional Development It is a great tool for teachers to develop themselves professionally (Motteram, 2019). Workshops, seminars, presentations, and other activities can easily be carried out through videoconferencing systems.
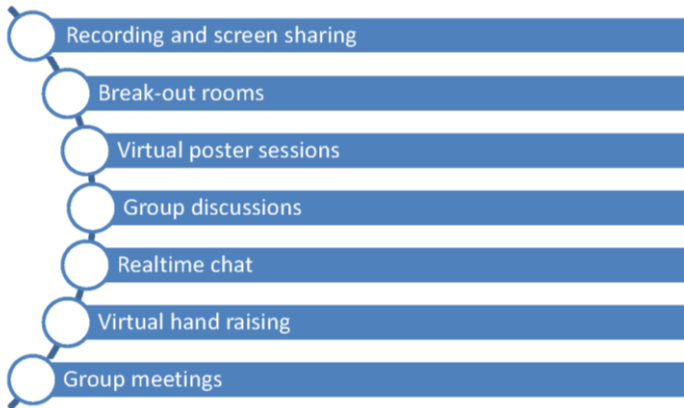

Figure 4 *Videoconferencing Features*

Characteristics of Web Video Conferencing Systems
- Reduces cost of education.
- Requires Internet connection.
- Requires account.
- Allows file sharing.
- Enables presentation.
- Provides public access.
- Provides advanced multimedia support.
- Supports one-to-many interaction.
- Supports many-to-many interaction.
- Supports one-to-one interaction.
- Offers real time communication
- Provides opportunity to communicate in the target language.
- Enhances authentic language use.
  (Al-Samarraie, 2019; Earon, 2020)

Although it is true that teaching through videoconferencing is not always satisfactory for many teachers, it is possible to teach English pleasantly by engaging students during videoconferencing when teachers are prepared and creative in their course design (Massner, 2021; Wiederhold, 2020). To do this, some features pertaining to this program need to be used efficiently and skillfully by the teachers. Following features can be utilized to teach English as a foreign language by teachers and learners. When applied properly, these functionalities will offer many contributions to the users in many aspects.

Recording and screen sharing

Break-out rooms

Virtual poster sessions

Group discussions

Realtime chat

Virtual hand raising

Group meetings

Benefits and Challenges of Videoconferencing
Benefits
Related literature proves that the use of videoconferencing in foreign language learning has a lot of benefits (Adipat, 2021; Al-Samarraie, 2019; Lawson et al., 2010; Vurdien, 2019). As communication takes place in real time, it eliminates the overflow of email messages and extends beyond the walls of classrooms, blends virtual and real classrooms, and

comes over the physical constraints of traditional classrooms, which can improve students' interaction with their surroundings, classmates, and teacher and enhances their learning experience (Adipat, 2021; Wiesemes & Wang, 2010). One of the significant benefits of using these systems is communication. Fundamental benefits that videoconferencing offer can be listed as follows (Adipat, 2021; Earon, 2020; Wiesemes & Wang, 2010):

- It is a cost effective way to train large numbers of people.
- It is more motivating for some students.
- It increases critical thinking and problem solving abilities of learners.
- It enables learners to reach the resources easily.
- It combines web based courses and collaboration software.
- It can increase productivity and efficiency by reducing unproductive travel time.
- It allows more students to complete courses in a shorter period of time.
- It reaches more students in a variety of areas.

Challenges
Despite the benefits videoconferencing systems offer to education, they also have some challenges for the users. As the participants are required to be attentive and concentrated in videoconferencing sessions, some problems such as exhaustion, anxiety, incompatibility and stress are likely to occur (Usta Kara & Ersoy, 2022). Furthermore, excessive use of videoconferencing may lead people to multitask, turn individuals into introverts, require being in the same position all the time, cause body language to be unnatural, create anxiety about appearance, cause physical negativities and discomforts (Bailenson, 2021). When people get exhausted from overusing videoconferencing tools, such cases as Zoom Fatigue can occur (Bailenson, 2021). This term is used for the exhaustion emerged from overusing of all videoconferencing tools. Users get bored with following the activities on the screen and being attentive to the speaker.

Some technical problems such as screen freezing, weak internet connection, hardware and software quality are also the possible challenges that usually occur during videoconferencing sessions. The other main challenge is the lack of training and knowledge of the users about the system. When teachers or learners are not knowledgeable or competent in using the systems or devices it becomes difficult to reach the objectives of the class.

Implications for Language Learning
The purpose of language learning is to use it in a communicative way. As communication is the main concern of language learning there should be interaction between the interlocutors. So, it is highly recommended to keep the interaction between the participants as learning can be most effective in an interactive mode (Caladine, 1999). Activities and materials used during videoconferencing have a great impact on keeping the interaction among the users. With regard to learning theories, the theory of

constructivism and cognitivism promote the integration of videoconferencing systems in language classes. As mentioned previously, in the implications of videoconferencing for educational purposes, the use of collaborative learning tasks, interaction and reflection, and problem-solving conditions are relevant to social constructivism. According to Correia et al. (2020), videoconferencing based activities mostly include interaction between the user and wide range of social and cultural activities happening between the participants from different social and cultural backgrounds.

Figure 5 *Videoconferencing in Education*

As increasing communication is one of the main goals in language teaching, activities used during videoconferencing would offer a great benefit for learner. Thus, it is suggested that teachers can use videoconferencing as an effective tool for instruction and interaction, and thanks to the multimedia features, it allows teachers and learners to communicate with others visually and verbally (Correia et al., 2020).

However, in order to sustain a well-organized videoconferencing program teacher should be knowledgeable. They need to be familiar with the techniques to transmit the knowledge and promote interaction with the students. That is, they should know how to adopt and adapt videoconferencing appropriately in language teaching settings. Considering the fact that teaching with web and videoconference requires new pedagogical practices and technological skills compared to face-to-face instructions, teachers are to adopt the way they teach (Massner, 2021). In this context, Universtiy of Wollonggong (University of Wollongong, n.d.) and Massner (2021) recommend some key points to teachers and learners about using videoconferencing for educational purposes.

Points to Keep in Mind While Using Videoconferencing
- It is important to plan carefully for effective teaching and learning.
- It should be sensibly incorporated into overall pedagogy of an online course.
- It should be prearranged and focused.

- It shouldn't be one-way communication from instructors to students.
- The content should be designed according to course objectives.
- When there is a large amount of content, recorded videos are suggested.
- Materials to be presented should be prepared and uploaded before videoconference starts.
- Increasing student-student communication with the activities should be in the course plan.
- The content should be simple to facilitate concentration.
- Teacher "should not plan to include too many screen switches during a class session; less is more" (Massner, 2021, p.13).
- Teacher should reduce the "content to manageable bits of information and ensure that any screen changes are smooth and necessary to avoid information overload" (Massner, 2021, p.13).
- "The course size needs to be kept manageable" (Massner, 2021, p.13).
- "All participants should be able to be viewed on one screen on the videoconference" (Massner, 2021, p.13).
- A guideline may be prepared for the learners about how to use videoconference and its features in order to manage the presentation sessions effectively and to increase confidence of the users.
- Teachers should be able to create engaging activities that prompt students to discuss and interact with each other and with the teacher.
- When using presentations e.g., PowerPoint slides, teachers should make sure that at least every five to eight minutes there are opportunities for student interaction and discussion.
- For question and answer sessions, some questions can be directed to individual students to emphasize that all students are expected to participate.
- Learners can be suggested to keep an agenda that lists the elements or topic breakdown of the session including items such as the session objectives, student expectations and the learning activities.
- During presentation sessions it is suggested to repeat questions from students before providing a response to ensure all students know the context of your answer.
- Engagement with all connected locations directly to maintain student engagement is essential.
- Engagement of a volunteer meeting host at each location to facilitate discussion from that location can draw the attention of the participants.
- "Videoconferencing can be used as a valuable method for instruction if it is applied in appropriate contexts with proper training and preparation" (Massner, 2021.p 12).
- The staff should be trained and familiar with the application of videoconferencing techniques. Before utilizing it, a detailed preparation is required.
- Large classes can be broken into smaller groups.

- Small groups can engage in the activities with their cameras on.
- Breakout group functions or group project assignments can be useful.
- Teachers should provide guidelines how to use videoconferencing such as participating with microphone unmuted, the use of the chat box and reactions, hand-waving emoji, use of polling and reactions.

Conclusion

The integration of technology in foreign language teaching has undoubtedly changed the way of learning and teaching contexts. Teachers and learners are provided with various types of technology-based tools. One of these tools is videoconferencing, which is now one of the most commonly utilized tools to assist learning and teaching. It is important to know how to use videoconferencing properly keeping in mind the principles listed above. Otherwise, it may become time-consuming for the participants although it has huge benefits for foreign language teaching, and it is likely that it can pose some challenges at any educational institution. In this vein, Massner (2021, p. 12) asserts that "the prevalent use of videoconferencing in higher education resulted in unintended challenges for faculty and students". These challenges need to be addressed by the authorities because it wouldn't be ideal and boring for teachers and learners to rely only on traditional methods and materials.

"Videoconferencing can be used as a valuable method for instruction if it is applied in appropriate contexts with proper training and preparation" (Massner, 2021, p.12). To this end, before implementing the videoconferencing in teaching English, learners and teachers need to be familiarized with the techniques and features of it. Then, a careful planning should be done by the teachers considering the fact that the use of videoconferencing may not always meet the needs of all classes. And it should be regarded as part of online teaching not one way of teaching. It is also important to establish an interactive learning environment during videoconferencing sessions. Therefore, a well-prepared guideline about how to use this tool effectively would be of great help for users. Consequently, it can be stated that videoconferencing systems should be utilized to assist language learning and teaching as it offers real-time interaction, learner-centered and collaborative learning.

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Image Credits

Figure 1. Videoconferencing Tools. https://it.uic.edu/news-stories/choosing-the-right-web-conferencing-tool/

Figure 2. E-learning Tools. https://swordstoday.ie/beginner-guide-to-e-learning-tools/

Figure 3. Videoconferencing. https://blog.techsoup.org/posts/understanding-the-videoconferencing-tools-available-to-your-nonprofit

Figure 4. Videoconferencing Features: https://www.yeoandyeo.com/resource/top-10-video-conferencing-features

Figure 5. Videoconferencing in Education: https://trueconf.com/blog/reviews-comparisons/video-conferencing-in-the-classroom.html

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MOBILE ASSISTED LANGUAGE LEARNING

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Before you read, reflect on the following questions:
1. In what ways do you think mobile technologies can transform the future of language learning?
2. What can be the affordances and challenges of using mobile devices for language learning?
3. Do you use any mobile technology for learning languages? If any, what is your favorite mobile language learning software and what makes it your favorite

Introduction

Mobile Assisted Language Learning (MALL) can be simply defined as the utilization of mobile technologies to enhance language learning. With their portability, connectivity, and multimodal interaction opportunities, mobile technologies can hold a number of affordances for foreign language learners. Thanks to emerging context-sensitive, wearable and artificial intelligence (AI)-powered technologies such as intelligent personal assistants (IPAs), virtual reality (VR) devices, and to a variety of dedicated or non-educational software, MALL is thriving as a promising field of study that can transform the way people learn and teach foreign languages. With regard to transformative potential of MALL, Pegrum (2019, p.2) marks that "we must make the most of the mobility afforded by mobile devices, viewing them less as screens and more as lenses on learning in the world around us, with the capacity to open up pedagogical possibilities going far beyond those we have generally seen explored to date." As Kukulska-Hulme (2009) notes, mobile devices, on account of their ubiquity, are already affecting how languages are learnt. It is evident that such technological advances entail pedagogical transformations to catch up with them as pedagogical change cannot be taken granted for as a result of technological advancements (Pegrum, 2019). The current chapter attempts to propose pedagogical guidelines for EFL learners and practitioners to make the best out of existing cutting-edge mobile

technologies in language learning and teaching. Following a discussion on the emergence and evolution of the term MALL, a taxonomy of MALL technologies and existing frameworks for evaluating mobile apps, which can guide their design and selection, are presented. Later in the chapter, a short overview of MALL research is presented and the affordances and challenges of MALL technologies cited in previous research are discussed. Finally, drawing on a discussion of MALL pedagogy and previous research several pedagogical guidelines for the implementation of MALL in EFL contexts are offered.

Emergence and Various Conceptualizations of the Term MALL

Despite the fact that such obsolete devices as cassette players, MP3 players, etc. also offered mobile learning experiences, introduction of mobile devices such as smartphones and tablets that feature computer functions (Yaman & Ekmekçi, 2016), and burgeoning of mobile apps with the introduction of smartphones allowing downloading of a variety of different software after 2007 (Rosell-Aguilar, 2017) led to the emergence of MALL in its up-to-date fashion. Moreover, ever-pervading wireless Internet connection in particular has expedited wider adaptation of MALL technologies. Some scholars (Yaman & Ekmekçi, 2016) regard MALL as a sub-category of Technology Enhanced Language Learning (TELL) just like Computer Assisted Language Learning (CALL), while some others consider it as a sub-field of CALL (Okumuş Dağdeler et al., 2020). Named after its 'elder sibling' or its 'parent', i.e. CALL, the term MALL, though sounds anachronous (Pegrum, 2019), is still widely used to refer to language learning experiences entailing mobility or the use of mobile technologies.
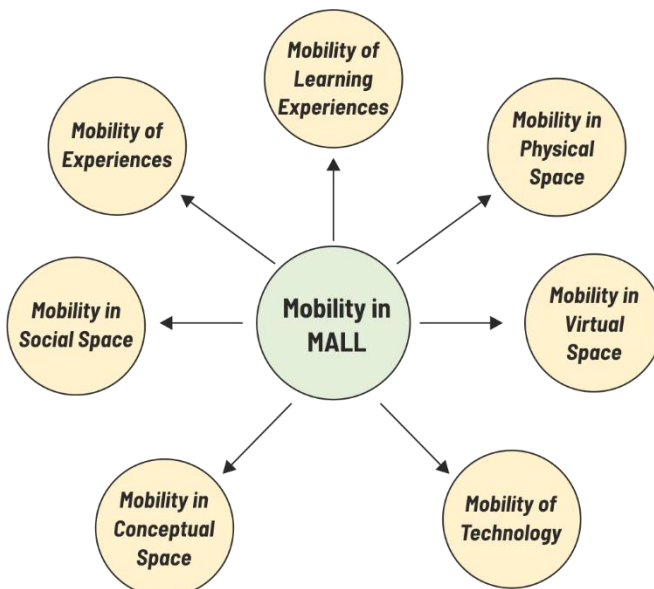
Figure 1 *Conceptualizations of mobility in MALL*

By virtue of its name, MALL emphasizes ***language learning*** rather than teaching and thus promotes a ***learner-centered*** rather than a teacher-centered approach. Although MALL seems to lend itself to an easy definition, a variety of conceptualizations (see Figure 1) with regard to mobility lead to different understandings of the term MALL. On the one hand, Rodríguez-Arancón et al. (2013, p. 1190), who define MALL as "a teaching and learning methodology that uses mobile phones or other handheld devices with some form of wireless connectivity, such as phones, PDAs and tablets, among others", emphasize mobility of devices. On the other hand, O'Malley et al. (2005, p. 6, as cited in Okumuş Dağdeler et al., 2020, p. 490), who refer to it as "any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies" (p. 6), underscore ***mobility of learners*** and ***mobility of learning experiences***. In the same vein, Kukulska-Hulme et al. (2015) state that mobility indicates that learners and language learning experiences are mobile, meaning that they are moving across different settings, connecting in-class learning with real-life environments such as campus, work, home, cinema, etc. and welcoming a variety of cultural contexts, objectives for interaction and people. Emphasizing a more encompassing notion of mobility in MALL, Sharples et al. (2009) refer to "mobility in physical space, mobility of technology, mobility in conceptual space, mobility in social space and learning dispersed over time" (p. 235). Accordingly, ***mobility in physical space*** means learners moving across different environments where they use language. In addition to mobility in physical space, mobility can also take place in virtual space. ***Mobility in virtual space*** refers to learners' moving across a variety of digital settings such as in Second Life, in digital games, and in similar virtual environments. ***Mobility of technology*** refers to the portability of devices and thus technologies for language learning. The concept of learning dispersed over time, which corresponds to mobility of learning experiences, means that learners can learn at any time in formal and informal contexts. While ***mobility in conceptual space*** refers to varying themes or topics rivaling to draw shifting attention of learners, ***mobility in social spaces*** refers to different social groups where learners learn language including classmates, colleagues or family members (Sharples et al., 2009). In sum, it is evident that various scholars hold versatile perceptions about the notion of mobility; therefore, drawing on a more encompassing conceptualization of mobility, in its broadest sense, MALL can refer to the mobility of learners across a variety of physical or digital landscapes, across various social and conceptual contexts and the use of mobile technologies to facilitate language learning and linguistic immersion of learners both in class and particularly beyond the class contexts at any time. However, MALL, in a narrower but a more functional sense, can be defined as the use of mobile technologies for learning languages.

Further, the term MALL can be better conceptualized with regard to how it relates to other pertinent terms of e-learning, TELL and particularly to CALL. While some

researchers (e.g., Nami, 2020) regard mobile learning as a subcategory of e-learning, some other scholars, who argue that e-learning occurs in formal settings unlike MALL extending mostly to informal settings, regard mobile learning as a new type of learning on its own (e.g., Kukulska-Hulme, 2021). Some researchers regard MALL as a subfield of CALL (Okumuş Dağdeler et al., 2020), and others view MALL as a distinct kind of learning (e.g., Kukulska-Hulme & Shield, 2008), because it can offer constant access and interaction unlike CALL, which entails fixedness of space and thus, to some extent, of time. Still others (Ekmekçi & Yaman, 2016) refers it to as another sub-category of TELL in the same position as CALL. The use of portable personal devices in MALL with durable and spontaneous access and interaction across various settings are the features that distinguishes MALL from CALL (Kukulska-Hulme & Shield, 2008). Handy devices such as mobile phones, and tablets can provide rich, real-time, convenient and contextual learning opportunities, which desktop computers cannot provide (Chinnery, 2006). Learning on the go at any time and at any place, even while being engaged in other daily activities, or accessing language learning tools or resources in emerging instantaneous contexts for language learning or use, can be listed among some distinguishing features of MALL as compared to CALL. Further, as compared to CALL, MALL entailing the use of portable devices and technologies has become more of a 'normal' part of our day-to-day tasks. Particularly after the introduction of smart phones and exponential increase in downloadable apps fulfilling a variety of functions, MALL technologies have become an indispensable part of our lives for most of us. Therefore, MALL can be considered to be more normalized according to Bax's concept of normalization (2011). Given to its peculiar characteristics discussed above, MALL, in its broadest sense incorporating a variety of mobilities, can be considered as an extension of mobile learning in language learning. With a narrower conceptualization, it can be and as a sub-field of the umbrella term of TELL just like CALL, but not as a subfield of CALL.

A taxonomy of MALL technologies
Taxonomies are significant and valuable as they can provide a common ground of reference for practitioners, students and scholars to develop concepts and envisage a variety of apps, which can in turn promote their evaluation (Rosell-Aguilar, 2017). In an earlier taxonomy of mobile apps for language learning, Rosell-Aguilar (2017) distinguishes between apps designed for language learning and those that are not. The researcher also refers to a separate third category that involves dictionaries and translators. However, as it is evident that MALL technologies are not limited to apps, and that dictionaries, especially learner dictionaries, are also developed for language learning purposes, there is a need for a more functional and comprehensive categorization of MALL technologies.

Table 1. *A Taxonomy of MALL technologies*

		Educational Technologies	**Non-educational Technologies**
Tutors		• Vocabulary tutors such as digital flashcard software (e.g., Memrise, Quizlet, etc.) • Pronunciation tutors (e.g., ELSA Speak, FluentU, etc.) • More comprehensive tutors (e.g., Rosetta Stone, Babbel, Duolingo)	• Intelligent Personal Assistants (IPAs) as chat bots including Google Assistant, Siri and Google Meena, etc.
(Re)sources	*Consultation Resources*	• E-dictionaries • Collocation dictionaries	• Search engines (e.g., Google Search) • Online corpus (e.g., COCA) • Wikipedia and the like
	Exposure Sources	• Online reading, listening and/or viewing platforms dedicated to language learning (usually with additional exercises, activities, etc.)	• Any online authentic written, audio or audiovisual text
Tools		• Context-sensitive vocabulary learning tools • GPS-powered vocabulary learning tools	• Note-taking tools • Bookmarking tools • Annotation tools (e.g., Diigo)
Environments		• LMSs (e.g., Moodle, Blackboard) • Digital Social Learning Platforms (e.g., Edmodo)	• Social media apps (e.g., Twitter, Instagram, etc.) • Digital games (e.g., Minecraft) • Virtual spaces (e.g., Second Life)

MALL technologies can be broadly categorized as **educational technologies**, which can include digital flashcard software, pronunciation software etc. dedicated to language learning and **non-educational technologies**, which can refer to any type of mobile software agents such as mobile games, mobile note taking software and even mobile entertainment apps not developed for language learning but can be used in a variety of ways depending on the learner and tutors' creativity. These two broad categories can be further categorized as *tutors, resources, tools,* and *environments*. Although taxonomies suggest a hierarchical categorization in particular, the order the categories presented in this taxonomy does not indicate any hierarchy, because MALL technologies can be ordered in terms of their effectiveness in language learning, which is more a matter of pedagogy not technology itself.

Tutors refer to tutor-like, intelligent, mobile technologies including apps dedicated to language learning purposes and thus mostly fall into educational mobile technologies.

While some are committed to specific language areas such as teaching vocabulary (e.g., digital flashcard software), which mostly builds on paired associate and explicit learning (e.g., Memrise, Quizlet and the like) or teaching pronunciation (e.g., ESLA Speak, FluentU, Pronunroid, etc.), others (such as Duolingo, Rosetta Stone, and the like) focus on a more comprehensive range of language skills and areas. MALL technologies in this category are called tutors as they can promote learning and provide instruction via presentation, retrieval and practice modes, immediate feedback, customized learning, monitoring of learner performance, elements of games, and learner analytics. Tutors generally have free "lite" versions and more advanced paid versions, which offer more sophisticated features. Emerging kinds of tutor-like non-educational MALL technologies include Intelligent Personal Assistants (IPAs) such Google Assistant, which thanks to their artificial intelligence-powered, yet limited 'chat' feature hold the potential to be our 'tutors' in our pockets. Learners can engage in limited interactions with chat bots for language practice.

MALL technologies in the category of *(re)sources* can be further divided as *consultation resources*, and *exposure sources*. *Consultation resources* such as e-dictionary apps collocation dictionary apps, etc. can be regarded as *educational consultation resources*, while examples of *non-educational consultation resources* are online encyclopedias like Wikipedia, and search engines, which can be used to consult words, collocations and phrases on the go. *Exposure sources* can include educational or non-educational extensive mobile reading, listening and viewing materials such as online video sharing websites (TedEd), podcasts apps (e.g., Google Podcasts, LearnEnglish Podcasts by British Council) and the like. They are called *(re)sources* as they provide materials for exposure and information about language, but not instruction, interaction and social connection.

MALL technologies in this category are called *tools* as they are technologies that fulfill a specific function like checking grammar, exploring the L2 equivalents for items in a certain surrounding, etc. *Educational tools* include context-sensitive technologies such as GPS-powered software in physical settings to learn words for the things in the surrounding context. For example, a context-aware MALL technology described by Chen and Li (2010) can present a list of context-specific lexical items based on automatic detection of time, place, proficiency level and allocated time for an individual learner. Likewise, Godwin-Jones (2011, as cited in Rosell-Aguilar, 2017) reports an app that can provide context-sensitive word lists using GPS (Global Positioning System). Another example of context-sensitive technology described by Beaudin et al. (2007) involves recognition and auditory presentation of the names for real objects in a home setting. *Non-educational tools* can include such apps as grammar checkers like Grammarly, Gram Check, etc., which can assist writing tasks, and annotation tools such as Diigo, which can facilitate incidental learning of words. Digital translators that can also be regarded as tools to aid real-time communication on the go. Such tools can also be regarded as to be semi-educational as they entail a more marked linguistic aspect and can be more easily adapted for educational purposes when compared MALL technologies classified as non-educational.

Finally, MALL **environments** can refer to digital social learning venues where learners (users) can interact and socially connect with other learners (or users) taking advantage of mobile technologies to learn languages. They are called environments as they create a digital medium for social communication and connection. ***Educational environments*** refer to Learning Management Systems (LMS) such as Moodle, or to social learning platforms such as Edmodo where learners and teachers can make exchange materials, activities, etc. Examples of ***non-educational environments*** include social media apps, blogs, digital games (e.g., Minecraft), videoconferencing media (e.g., Skype, FaceTime, Discord, etc.) and virtual landscapes such as virtual worlds, where learners, thanks to VR software and hardware, can take part in real-life-like interactions.

Research on Various MALL Technologies

Lee (2012, as cited in Kukulska-Hulme et al. 2017) showed that authentic communicative tasks on Skype with some tools for capturing interactions can be used to develop speaking skills of office workers engaged in online talks globally. Teachers can use such video call software, social networks and digital games to promote cross-cultural communicative competence of learners. Dyson (2014) used mobile devices to promote knowledge sharing among college students in a vodcast task. The participants were eager to share accumulating knowledge collaboratively and in versatile ways. Another example of authentic software used for language learning is Evernote, which is a note-taking tool. Lana Haze (2015, as cited in Kukulska-Hulme et al., 2017) describes on her blog how it can be used to design mobile speaking tasks using just a mobile phone.

Game elements in mobile apps such as rewards (badges, points), collaborative tasks, and interactions through social networks (see Chapter 7 by Kefeli Berber & Çaylak Toplu in this book for a detailed discussion of the role of social networks in language learning) can increase learners' intercultural-communicative competence, engagement and motivation. Duolingo is an example of a mobile app with game elements. With over 300 million subscribers worldwide (Shortt et al., 2021), Duolingo is one of the most popular mobile technologies dedicated to language learning, with marked elements of gamification such as rewards, challenges, stages, and rating of learner success. As a free and equitably expedient software, it incorporates digital game-based learning features that can get learners addicted to sustain learning (Loewen et al., 2019). A study on the learning of Turkish as a foreign language by English L1 learners in the US reported a positive, reasonable correlation between the amount of time allocated and variation in motivation and hindrance with materials (Loewen et al., 2019).

Emerging technologies such as Augmented Reality (AR), VR technologies (see Chapter 4 by Çelik et al. in this book), IPAs, online translators and wearable technologies, though not yet incorporated in language learning extensively because they require higher technical knowledge or are expensive, can be used for language learning. Dizon (2021) argues that advances in natural language processing and automatic speech recognition (ASR) have made

IPAs suitable for a variety of purposes including language learning. IPAs, defined as "software agents that can automate and ease many of the daily tasks of their users" (Santos et al., 2016, p. 194, as cited in Dizon, 2021), can also enhance language learning via meaning-focused interaction. Though not free from limitations, interactions with these intelligent chat bots (such as Google Assistant, Siri) on the go in a variety of contexts can increase learners' communicative competence. In line with the Interactionist Theory of SLA (Long, 1996), IPAs, which can replicate human interlocutors to some extent by fulfilling two components of interaction, namely, negotiation of meaning, and attention to linguistic form but not the element of modified input, can provide meaning-focused input and chances for meaning-focused output and thus improve communicative competence. Chat bots featuring conversational AI such as the ones developed for the Alexa Prize, a competition platform for chat bots, and Google Meena, are promising examples of IPA software conducive to MALL (Dizon, 2021). Potential affordances of a variety of MALL technologies and their drawbacks documented in the literature are further discussed in the following section.

Frameworks for Evaluation of MALL Apps

In spite of a variety of apps and research-evidenced affordances of MALL apps, it can be challenging for learners and teachers alike to choose possibly the most effective MALL app for their contexts. Three different prominent frameworks have been developed for the evaluation of language learning apps (Rodríguez-Arancón et al., 2013; Rosell-Aguilar, 2017; Sweeney & Moore, 2012, as cited in Rosell-Aguilar, 2017). On the one hand, Rodríguez-Arancón et al. (2013) proposed a framework consisting of the following criteria for the evaluation of language learning apps: "cognitive value and pedagogic competence, content quality, capacity to generate learning, interactivity and adaptability, motivation, format and layout, usability, accessibility, visibility, and compatibility" (p.1193). On the other hand, Sweeney and Moore (2012, as cited in Rosell-Aguilar, 2017) listed the following criteria for evaluation: permitting personalization, presenting discernable progress displays, including pertinent language, incorporating more than one skill, providing highest amount of exposure to the target language, being compatible with the device (content, activity, interface), and inspiring learning behaviors that tally with common patterns of mobile-assisted activities (taking account of social and gamification perspectives as well). Although their framework houses some overlapping criteria, they provide a rubric for evaluation together with some descriptors, which allows scoring of apps. Pointing out the lack of a learner-friendly evaluation framework, Rosell-Aguilar (2017, p. 252) presented a framework with four primary categories: "technology, user experience, pedagogy, and subject (in this case language learning)". Each of these primary categories also has a set of criteria. Rosell-Aguilar states that the framework does not include detailed descriptors of each criterion to keep it clear and as it is not meant for grading an app. The developer argues that the following criteria can be used both by students, teachers, researchers and designers of apps.

Table 2 *Framework for Language Learning App Evaluation* (Adapted from Rosell-Aguilar, 2017, p. 253)

Language learning	Pedagogy
Reading: Does the app provide texts in the target language? **Listening:** Does the app provide audio in the target language? **Writing:** Does the app offer opportunities to write in the target language? **Speaking:** Does the app offer opportunities to speak in the target language? **Vocabulary:** Does the app offer specific activities for vocabulary acquisition? **Grammar:** Does the app offer specific activities for grammar practice? **Pronunciation and intonation:** Does the app offer specific activities for pronunciation and intonation? **Cultural information:** Does the app include information about customs and traditions in the areas where the language is spoken? **Use of visual content:** Are images and videos stereotypical or stock images? Do they represent the diversity of the areas where the language is spoken? **Language varieties:** Does the app include different regional or national varieties of the language?	**Description:** Does the app store description match what the app does? **Teaching:** Does the app present, explain, or model language or does it just test it? **Progress:** Does the app allow the user to track progress or see previous attempts? **Scaffolding:** Do activities in the app progress in difficulty in a way that supports the learner? **Feedback:** Does the app provide feedback? Is it just right/wrong or with meaningful explanations? **Quality of content:** Does the content have any errors/omissions? **Use of media:** Does the app make use of sound, images, and video in a meaningful way? **Differentiation:** Does the app offer different levels depending on ability? Can these be accessed directly? **Engagement:** Does the app keep the user interested or are activities repetitive?
User experience	Technology
Interaction: Does the app allow users to interact with each other? **Interactivity:** Is engagement with the app content active or passive? **Sharing:** Does the app allow or encourage sharing content? **Badging:** Does the app provide recognition that can be shared on social media? **Price:** Does the user need to pay to download the app? Is there a 'lite' version of the app? Does it offer in-app purchases? **Registration:** Does the app require the user to register? **Advertising:** Does the app include pop-up ads? Are these distracting?	**Interface:** Is the interface clear and uncluttered? **Navigation:** Is the app intuitive to navigate, with clear menus and options? **Instructions:** Does the app offer instructions on how to use it? **Stability:** Does the app freeze or crash? **Gamification:** Does the app have game-like features to increase engagement? **Support:** Does the app have a help section? **Offline work:** Does the app require an internet connection to work?

The above discussed evaluation frameworks can help learners and teachers in the selection of MALL apps and also guide designers. However, as Rosell-Aguilar (2017) duly cautions, while some criteria can have a more pivotal role, asserting that an app should meet all the criteria can make for a distorted approach since apps can fulfill different functions depending on the learning context; the potential of an app can be overlooked just because it does not meet one criterion.

An overview of MALL research

Before a discussion of some research evidenced affordances and challenges of MALL, an overview of research on MALL can be informative. As indicated by annotated bibliography studies, there has been an exponential increase in the number of studies over the last decade– from 575 studies (Burston, 2013; or actually 876 studies as later reported by Burston & Athanasiou, 2020) to 3,436 studies (Burston & Giannakou, 2022). The relatively high number of scoping reviews and meta-analysis studies (n= 58) on MALL vehemently indicated effectiveness of mobile technologies in language learning (Burston & Giannakou, 2022). Meta-analysis research mostly reported large effect sizes. In their meta-analysis study, Lin and Lin (2019) reported an overall large effect size of 1.005 for mobile learning for L2 vocabulary, indicating that MALL is pedagogically conducive to L2 vocabulary learning. Likewise, in another meta-analysis study, Tseng et al. (2022) reported a robust effect size (d = .66) for MALL in learning pronunciation. Taj et al. (2016), who also indicated that MALL facilitated EFL learning, reported an even larger effect size (d = .80). Earlier meta-analysis studies (Burston, 2015; Sung et al., 2015) also indicated effectiveness of MALL. Sung et al. (2015) reported a medium effect size of .53 for achievement and .55 for affective impact (i.e., motivation, attitude, etc.) and also noted that 70.7% of the learners who used MALL outperformed those who did not.

In a qualitative review of research on MALL technologies, Peng et al. (2021) identified types of activities, modality and duration of intervention as three variables that can determine MALL effectiveness. However, in spite of the high number of research studies and meta-analysis research, some studies, particularly the ones in languages other than English and in journals that are not related to language learning, are overlooked. This can have significant bearings on the findings of previous meta-analysis research (Burston, 2021). In line with this, in a more comprehensive and sensitive meta-analysis based on 3,436 studies, Burston and Giannakou (2022), who claimed that previous meta-analysis relied on incomplete database, analyzed 84 of 814 studies, which met the criteria of eight-week or longer treatment periods, at least 30 participants, rigorous methodological designs and statistical analysis. They reported effect sizes of 0.76 and 1.16 for between-group and within-group comparisons in the studies, respectively. Their study revealed that English is by far the most studied language, and vocabulary is the most widely studied language domain. They also pointed out that the vocabulary focus in MALL should shift to other language skills and areas and research, which mostly focused on instructional aspects, not

expand to include sociocultural and communicative benefits of MALL. They also marked that there is a need for more studies on advanced learners, who have the capacity to employ MALL features at their maximum potentials. In sum, although there is still a need for more comprehensive and systematic meta-analysis research, it is beyond dispute that previous research suggests the positive effects of MALL.

Affordances and Challenges of MALL
Affordances of MALL
The affordances and possible challenges of MALL are extensively recognized in previous research. Kukulska-Hulme et al. (2017) argue that MALL offers "uniquely personal tools with the potential to promote exposure to target languages, capture communication difficulties as they occur, prompt ongoing reflection, and enable selection of affordable learning resources to suit an individual's preferences and situation-specific needs**"** (p. 217). The affordances MALL offers, such as exposure, communication, and customization of learning to meet individual and contextual needs, are essential conditions for learning a foreign language. In their review of MALL studies between 2012 and 2016, Kukulska-Hulme and Viberg (2018) marked that MALL offers chances for socialization, peer coaching and timely feedback. Lin and Lin (2019) maintain that MALL can enhance language learning as it leads to authentic, socially connecting, context-sensitive, and personalized mobile-facilitated language learning instances. Given to developing context-sensitive technologies, Stockwell (2016) notes that modern mobile devices can lend themselves to another type of learning–where the learners can interact with their surroundings in order to facilitate meaningful learning. In their review of 13 empirical research studies over the previous decade, Kamasak et al. (2021) reported that MALL led to enhanced L2 learning principally in vocabulary, improved motivation and pleasure in studying language, promotion of learner autonomy, more time spent for language learning and bespoke language learning. Çakır (2016, p.172) states that " Technology, of course, is phenomenon that cannot and shouldn't be neglected as long as it is used effectively at the right time in the right proportion. The content and type of activities need to be chosen meticulously in order to save time and enhance learning."
The camera, voice recording incorporated with MALL devices combined with mobile Internet allow sharing mobile learning experiences (Kukulska-Hulme et al., 2017). Mobile devices can make synchronous or asynchronous social connection smoother and thus can facilitate collaborative/networked learning of languages at any time and place (Sung et al., 2015). It is pertinently argued that the combination of a ubiquitous wireless Internet connection (though not for the whole world but for a significant share of the population on the globe) and hand-held mobile devices transformed digital learning to be ***portable***, ***real-time***, ***cooperative,*** and ***smooth*** (Kukulska-Hulme, 2009; Wong & Looi, 2011). Likewise, Sung et al. (2015) highlighted that with portability, ***context-sensitivity*** and ***easy interaction,*** MALL devices can offer learning opportunities ***without time and***

place limitations. Kukulska-Hulme et al. (2015) pointed out that MALL technologies enable students to take active roles in language in ways that were not possible in the past:

- create and share multimodal texts
- communicate spontaneously with people anywhere in the world
- capture language use outside the classroom
- analyze their own language production and learning needs
- construct artefacts and share them with others
- provide evidence of progress gathered across a range of settings, in a variety of media. (p. 7).

Furthermore, MALL can extend beyond in-class formal learning and thus stimulate a shift from teacher-centered instruction to a more learner-centered learning. Lai (2017) argues that "autonomous language learning with technology beyond the classroom depends on learners' willingness and capacity to engage in such learning, a favorable sociocultural and discursive environment and the availability and accessibility of learning resources to support such an engagement" (p. 137). Learners can find it challenging to develop autonomy without pedagogical guidance, complementary in-class study, and/or an explicit statement of goals and outcomes (Kukulska-Hulme et al., 2017). Thus, practitioners should guide learners to explore their learning goals and provide more customizable learning experiences to address the learning needs of individual learners, thereby promoting self-regulated learning and learning autonomy. MALL apps can provide real-time individualized feedback, and user interfaces can be customized to learners' needs and preferences; thus they can be a perfect match for formative assessment and self-paced learning (Sung et al., 2015).

Kukulska-Hulme et al. (2017) maintain that there are a variety of methods to foster autonomy, such as negotiating tasks, giving learners a chance to choose resources interesting to them and promoting groups of learners to decide on their learning paths. Furthermore, some intelligent tutoring software can also facilitate customization of learning, which can in turn contribute to learner autonomy. ***Automatic formative feedback*** and ***self-paced*** learning in an ***anxiety-free environment*** can also be regarded as affordances of MALL, fostering learner autonomy and also some other affective aspects such as motivation, attitude etc.

Moreover, learners should be informed about their language learning performances, self-assess their own performance and comprehend ways to develop strategies for future learning aims. Customizable features of MALL technologies and learning tracking or learner analytics embedded in such software make it easier for teachers to individualize learning experiences and track learner performance and give feedback. Tracking learner performances and correlating them with course success can provide 'actionable feedback' about the design of MALL technologies and for promotion of self-monitoring and self-

regulated learning skills of learners through tailored and adaptive support (Pegrum, 2019). The duration for daily study, the language area or skill to be focused on, the types of software and learning, and the mode of interaction among tutor and peers should be negotiated with learners to develop more individualized MALL programs that appeal to the needs and preferences of learners. However, this does not necessarily mean that learners should work in isolation without peer or tutor support (Kukulska-Hulme et al., 2017). Learners can find MALL motivating as it ensures individually tailored spaced learning in manageable chunks during a variety of daily activities.

While it is important to promote learner autonomy through MALL, it is also argued that learners can employ self-determined methods, which can be contrary to up-to-date instructional practices (Kukulska-Hulme, 2013). It is also argued that although mobile devices can promote self-directed learning and language learner autonomy, teachers play an equally significant role (Kukulska-Hulme, 2015). In line with this, in a recent meta-analysis study, Lin and Lin (2019) reported that a medium level of task-afforded autonomy, which they defined as the degree learning tasks give learners control over mobile learning practice, led to the highest learning gains for lower proficiency learners. This indicates that at least for lower proficiency learners, task-afforded autonomy should be limited to an extent that they are partially guided by the tasks. The concern echoed by Kukulska-Hulme (2013) and by Lin and Lin's (2019) finding can be addressed by a compromise between guidance and learner autonomy in MALL.

Previous meta-analysis research also suggests that a mixture of informal and formal settings is more conducive to mobile-assisted learning, which is followed by an informal setting only and formal setting (Lin & Lin, 2019). Similarly, in their meta-analysis on MALL, Sung et al. (2015) found that although the differences among effect sizes were not significant, unrestricted settings (mixture of both formal and informal) led to higher levels of learning achievement compared to informal settings, which was followed by formal settings. Thus, it can be argued that a mixture of formal and informal settings can yield better MALL achievement. In brief, with a variety of characteristics, MALL has a number of affordances for EFL but its integration is not free from challenges.

Challenges of MALL

Some limitations MALL bears by its nature added to the pedagogically inappropriate use of MALL and ineffective use of MALL technologies. Stockwell (2016) states that "mobile language learning is a field that brought with it a large amount of expectation and, to some degree, disappointment" (p. 296). Although previous meta-analysis research indicated the pedagogical potential of MALL, research suggests possible challenges and drawbacks. Mobile devices can be regarded as a double-edged sword, which can lead to negative learning effects, for example distraction and presentation of irrelevant materials during study (Gaudreau et al., 2014). Learners can have negative attitudes towards using mobile devices for learning, and, given their relatively small screen sizes,

it is not easy to determine suitable kinds of activities for such devices (Stockwell, 2016). Besides, some learners regard their mobile devices as more of a social communication tool rather than a learning tool (Stockwell, 2010). Burston (2014) remarked that MALL was constrained by problems in accessing technology because of the cost and lack of customary hardware and discordant embedded operating systems. Learners can draw a clear line between using mobile devices for learning and private use of mobile devices and state that they cannot concentrate when studying with mobile devices. In line with this, Liu and Yu (2013) reported that some participants did not accept using their own Facebook account for learning purposes as part of a MALL project and started a separate account for MALL. Likewise, mobile devices can be distracting as learners can be easily diverted by a text or WhatsApp message, ads in free apps or any notification while studying on a mobile phone.

Typical daily tasks or modes of communication learners conduct with their mobile phones or devices can easily interrupt their study as users mostly engaged in MALL study for short periods of time (Rosell-Aguilar, 2017). Furthermore, it is argued that teacher-directed SMS or MMS messages spoil the learner-centered, anytime and anywhere philosophy of MALL (Kukulska-Hulme & Shield, 2008). It is claimed that numerous mobile apps entail practice with little or no presentation and superficial feedback regarding accuracy (Rosell-Aguilar, 2017). Ali and Miraz (2018) point out that some mobile devices with low storage capacity, restricted hardware and software features are not suitable for educational purposes, or those with higher features and capacities are too costly for learners. Small display screens and keyboards can also make mobile hand-held devices less suitable for learning (Stockwell, 2007). Previous research indicates that mobile apps fail to use the full potential of devices, particularly in terms of connection with others; put excessive emphasis on translation; and lack effective navigation and user interface (Burston, 2014; Godwin-Jones, 2011, as cited in Rosell-Aguilar, 2017, p. 244). Furthermore, inequalities in accessing mobile devices and the Internet can increase issues of social justice and deepen technological inequity (Marler, 2018). Klímová (2018) pointed out the dearth of pedagogical rationalizations, high prices of mobile devices and a deficiency of social interaction in MALL. Some researchers also pointed out that mobile phones can cause cyberbullying, technology addiction (Selwyn & Aagaard, 2021) and attention deficit (Beland & Murphy, 2016; Selwyn & Aagaard, 2021). Discussion of the affordances and challenges of MALL in combination with research findings and a variety of types of extant and emerging technologies suggests that the potential of MALL in language learning can only be realized through sound pedagogy.

Pedagogy of MALL in EFL Contexts
As discussed in the previous sections, evidence of the effectiveness of MALL and its affordances far outweighs the challenges of MALL. However, Burston (2014) argues that

MALL has fallen behind the latest pedagogical practices in foreign language teaching. A dearth of previous rigorous research can be to blame for this mismatch between technology and pedagogy in MALL. Despite the copious amount of research (3,436 studies; Burston & Giannakou, 2022) accumulated during the brief history of MALL over the past three decades, most meta-analysis research has included a few dozen studies (Burston, 2021). Besides, 40% of research disproportionally focused on vocabulary learning (Burston & Arispe, 2022). Furthermore, as Levy et al., (2015, p. 5, as cited in Burston, 2021 with the word "affordances" added) remind us:

As the use of technology in language learning has gone more mainstream, teachers, developers, and even researchers increasingly present and publish with little or no awareness that there is a decades-long research base for their endeavors. There is a tendency to jump from digital bandwagon to digital bandwagon with eyes solely on the newest technology "affordances" rather than on what the extant CALL literature might do to ground their efforts.

The same can also be applicable to the case of research in MALL, which was mostly driven by technological advancements without proper consideration of previous research and pedagogy. In support of this, Pegrum (2019) notes that "technology by itself does not lead to pedagogical change" (p. 45). Likewise, Burston (2014) noted that although innovative constructivist, collaborative, learner-centered learning can be supported via MALL, its methodology was predominated by a behaviorist, teacher-centered and transmission model of teaching and that the full potential of MALL has yet to be unleashed, which is more a problem of pedagogy than technology. However, an effective MALL pedagogy does not simply entail incorporation of the latest SLA theories. Kukulska-Hulme et al. (2015) state that "Mobile-assisted language learning is not simply the transfer of current teaching and learning materials and practices to a mobile device, but a complete reconceptualisation of these" (p. 3). Pointing out that CALL is criticized for regarding theory and the role of technology as a side issue in research and its implementation relied on theories not specifically developed for teaching through technology, Stockwell (2016) argues that theories of language learning through technology should acknowledge that technology alters learning environments. Therefore, MALL pedagogy, which can guide the research, design, selection and implementation of MALL technologies, should be driven by state-of-the-art language learning theories and rigorous research while also allowing for transforming the role of technology.

Stockwell (2016) argues that cognitive theory of multimedia learning (CTML) (Mayer, 2009), which can take the role of technology into consideration more, can inform the design of MALL activities. CTML posits that information processing occurs through both visual and auditory channels, and stimuli appealing to both channels concordantly can facilitate learning. In line with this, MALL technologies should be designed to ensure multimodality of congruent input that can reduce cognitive overload and redundancy.

Previous research on MALL also pointed out that it can draw on task-based and communicative teaching approaches (Burston, 2014; Kukulska-Hulme & Viberg, 2018; Shadiev et al., 2020). Lan et al. (2009) referred to a constructivist learning approach as the basis for their MALL research study. Besides, Kukulska-Hulme et al. (2017) point out that lifelong learning can be facilitated through new technologies, particularly through mobile technologies. Furthermore, MALL can promote learner autonomy (Comas-Quinn & Mardomingo, 2012) and self-regulated learning (Pegrum, 2019; Tabuenca et al., 2015). As Burston (2014) reveals, 90% of the MALL research was conducted in out-of-class settings, which means that MALL entails *informal* and *lifelong learning*. Kukulska-Hulme and Viberg (2018) argued that it promotes socio-constructivism and situated language learning. In line with these arguments, Burston (2014) points out that the future of MALL seems to be the utilization of communication and multimedia features of MALL in line with collaborative and task-based learning.

There are a number of ways the abovementioned pedagogical concepts of communication, multimodality, collaboration, task-based learning learner autonomy, etc. are put into practice. MALL technologies should be promoted both in formal and informal settings, which also includes authentic contexts. Shadiev et al. (2020) also suggest that learners mostly used MALL on campus and local settings. They argue that MALL should be situated in other common entertainment settings such as shopping malls, the cinema, etc. where language can be used for more fun and authentic interactions, which can in turn raise learner enthusiasm. These situated, interactive learning opportunities can increase learners' engagement with MALL technologies, which learners can find as a reliable assistance in real communicative contexts where and when the need arises. MALL in EFL contexts does not involve learner mobilities, the mobility of language and meanings across real-life settings where students' L2 is used for genuine communication as in English as a Second Language (ESL) settings. However, MALL technologies can still contribute to learning in EFL contexts, where learners can make use of context-sensitive technologies and use VR software and hardware to meet their immediate learning needs. Furthermore, EFL learners can partially compensate for the lack of authentic L2 settings by using mobile technologies to engage in virtual communication in the L2 in digital and VR landscapes.

MALL technologies can be regarded as opportunities to compensate for an inadequate amount of exposure to the L2 and to open up room for more chances for communicative activities or tasks in the class by extending language-focused study beyond the class and promote lifelong learning. Through providing carefully curated and graded L2 resources, teachers can incorporate extensive mobile reading, listening and viewing outside the classroom to increase the amount of exposure to L2. Using MALL technologies, teachers can carry language-focused study of vocabulary items and grammatical paradigms beyond the classroom setting and allocate limited and precious classroom time to more interactive communicative activities. Furthermore, EFL

teachers can promote the digital mobility of learners, encouraging them to move across a variety of digital social environments such as social media, virtual worlds, and digital games (see Chapter 9 by Kızkapan in this book for a detailed discussion of digital games in language learning), where students can interact using mobile device features and software agents.

In addition to the use of MALL in digital social contexts, teachers should also create a mobile, online **community of practice**. Learners need MALL spaces where they feel the support of the tutor and peer learners (Kukulska-Hulme et al., 2017). Teachers can design MALL tasks and environments where learners can collaborate and compete. While designing learning experiences to promote **collaboration** and **competition**, teachers can make use of **learner analytics**, which allow teachers to track learners' performance and promote competition among learners using elements of gamification such as scoring, rules, collaborative task accomplishment and awards. Collaboration can also be promoted by encouraging groups of learners to share their learning materials with larger groups and to collaboratively create learning materials or through interactions in social media platforms, in digital flashcard software or in digital games. Teachers' **social presence** in MALL environments can also increase learners' engagement with mobile learning communities. Teacher generated digital materials, regular posts, comments, feedback, etc. in mobile learning communities can contribute to the development and sustainability of a mobile learning community. Practitioners should create sociocultural environments in their classes through which MALL is valued, promoted and supported by the teacher and peers. Furthermore, learner awareness about available mobile technologies should be raised through an in-class introduction and tutorials. Regular in-class exchanges and analysis of MALL learners' performances should be arranged based on the learner analytics that most MALL software provides. Teachers should analyze their learners' access to mobile devices, integrate classroom learning with physical communicative learning contexts in new ways with a focus on target grammar paradigms, communicative skills and vocabulary (Kukulska-Hulme et al., 2017), and choose mobile technologies that can cater to different learner needs, styles, etc. Teachers also need to analyze MALL technologies available to their learners in their contexts and introduce the most typical (and the most probably popular) and affordable mobile technologies.

Practitioners can negotiate the amount of language study, language areas, and the number of tasks (e.g., the number of words to study weekly), the type of exercises, etc. with their learners. This can be done through administrating a questionnaire (see Zhang et al., 2021) to learners to discover different groups' preferences. Thanks to interactive video platforms, mobile listening or viewing can be made more interactive, as learners can be prompted to answer questions and add comments at specific points in the video. Learners can be empowered as digital authors for themselves or their peers to customize their learning practices to their own needs and preferences. In addition,

teachers should give students some recommendations about learning spaces that offer fewer distractions (Shadiev et al., 2020) and meet with students' parents to inform them about educational benefits of mobile devices, which some parents tend to prohibit (Wong, 2013).

Teachers' techno-pedagogical knowledge should be increased so that they choose and implement MALL technologies effectively. In spite of a wide range of state-of-the-art technologies such as mobile apps, digital games, virtual reality, metaverse, etc. available for mobile language learning, it can be a challenge for L2 learners and teachers as practitioners to choose the most appropriate technology for a particular language learning context and implement them in pedagogically effective ways, which entails technological and pedagogical knowledge in combination. Godwin-Jones (2015) argues teachers' having technological knowledge does not necessarily mean that they can use technologies effectively. Teachers should receive in-service or pre-service training so that they have an adequate level of technological pedagogical competence to provide guidance in technology use. Although younger generations are referred to as digital natives and are considered to be technology connoisseurs, research indicates that their technological competence relates to daily activities only, which suggests a need for further guidance in academic settings (Bakla, 2019).

Reinders and Hubbard (2013) argue that learner training should be built on **guidance in technology use**, **pedagogical training** and creating a **community** of learning. Thus, teachers should take more active roles in guiding leaners for pedagogical use of technology. Learners' technological literacy can be increased through additional Information and Communication Technology courses in their curricula. Next, language teachers can introduce MALL technologies in class to raise learners' awareness about a variety of mobile technologies by giving them hands-on experience using their own mobile devices in class. Effective use of technology to enhance language learning does not only entail tools, resources or apps designed and/or utilized in line with pedagogically sound principles, but it also entails the introduction and promotion of in-class and out-of-class learner engagement with such technologies. Learner training with MALL and strategies can enhance seamless integration of MALL in formal and informal contexts. Learners should also be given chances to explore different examples of MALL technologies that can meet their learning needs and preferences. Furthermore, learners' learning styles, habits, strengths and weaknesses, and needs and preferences should be examined more systematically for more effective MALL integration that can lead to more effective, sustainable, self-regulated and autonomous language learning. Kukulska-Hulme et al. (2017) proposed a set of skills and competences MALL pedagogy entails (see Figure 2).
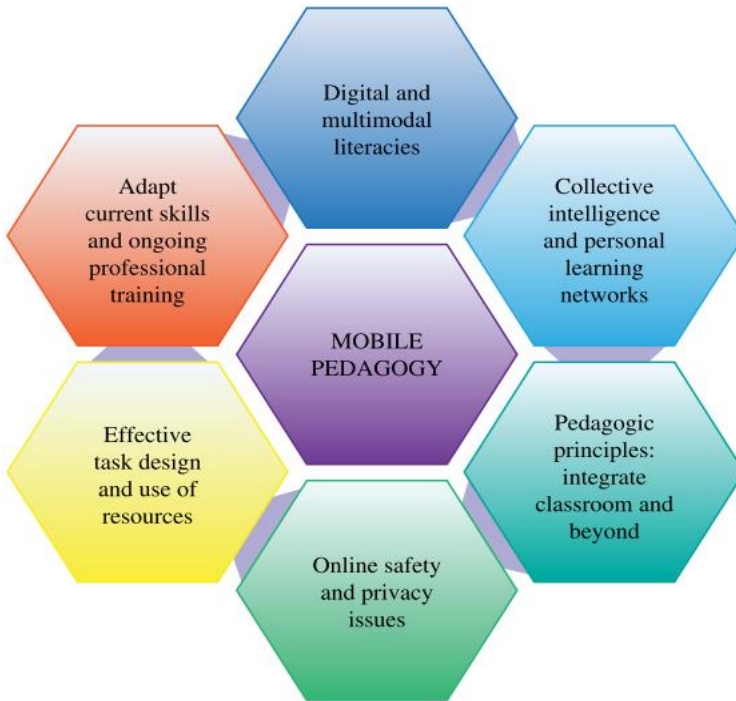
Figure 2 *Pedagogic skills and competencies implied by mobile assisted language learning and teaching* (Adapted from Kukulska-Hulme et al., 2017), (original artwork designed by Helen Lee, 2016, as cited in Kukulska-Hulme et al., 2017).

All these components suggest the need for ongoing professional development of English language teachers to meet the requirements of the emerging and transformative field of MALL and a need for up-to-date pre-service and in-service teacher education programs. Teacher education programs should aim at improving language teacher competencies in designing effective mobile language learning tasks, increasing their digital and multimodal literacies and awareness about digital safety and privacy concerns for a new generation of learners being brought up in increasingly multimodal communication environments. Teachers are encouraged to be a part of a professional network or special interest-groups to keep abreast of MALL technologies. Effective mobile pedagogy entails the enhancement of links between in-class and out-of-class learning by considering the mobility of learning and the learner (Kukulska-Hulme et al., 2017).

As a result of a research project on MALL between 2013 and 2014 at the Open University with ESOL (English for Speakers of Other Languages) students based in the UK, Kukulska-Hulme et al. (2015) proposed a framework for mobile pedagogy in English language learning. They highlighted that mobile learning, focusing on the mobility of learners and learning across different contexts, ignores how teachers can implement in-class mobile pedagogy that can extend and support out-of-class MALL. Based on four dimensions,

namely, **teacher wisdom**, **learner mobilities**, **language dynamics**, and **device features,** and the four linking notions of **learning outcomes, inquiry, rehearsal,** and **reflection**, the framework aims to provide guidance for teachers in adapting teaching practices to mobile learning and to evaluate the effectiveness of a MALL activity in terms of improved linguistic performance and other objectives.

While the teacher wisdom sphere includes teacher experiences, teaching techniques and effective task design, the learner mobilities dimension involves the settings and instances where learning can occur and learner inspirations for out-of-class language learning. Acknowledging the role of emerging technologies in creating new media and ways of communication, the dimension of language dynamics emphasizes the flexibility of language through a relentless state of change and also learner and learning mobility in this sphere. Finally, the domain of device features refers to possibilities of multimodal communication, sharing, collaboration and rehearsal using cameras, voice recording and the Internet connection. While the linking concept of learning outcomes involves teacher, based on his/her wisdom, making projections of what kind of linguistic improvement a MALL activity or task will lead to, the concept of inquiry entails teachers' and students' questioning of language use across emerging social contexts via new modes of communication. The rehearsal concept includes the chances MALL technologies can offer for learners such as language focused study, extensive listening or viewing. The concept of reflection refers to the ways mobile devices can enhance teachers' reflection on the learning experience through such questions as how to design the activity more effectively next time, determine new learning outcomes, etc.

However, as also cautioned by its developers, the effective integration of this model in different contexts of language learning entails careful consideration of language learning contexts. The learning mobilities dimension of their model is constrained by the limited number and variety of contexts EFL learners can engage in for language learning. Most EFL learners lack chances to engage in genuine interaction in authentic environments outside the class and lack motives such as socializing with others, pursuing education, or fulfilling requirements in the workplace. This can be partially compensated for by encouraging learner mobilities in digital spaces such as digital games, social media platforms, and VR environments such as the metaverse. Promotion of 21st century skills such as critical thinking, collaboration, creativity, etc., and increasing learners' digital literacies can facilitate a more effective realization of this model. Learners' and teachers' involvement in reflective practice and building connections between in-class and out-of-class learning can yield pedagogically improved practices. Teachers can also design online communicative tasks requiring transactional and conversational interactions among learners using MALL technologies such as Skype, Microsoft Teams or Google Meet, via creating and encouraging learners to be part of online communities or social networks based on their interests, needs and fields of study. Based on the above discussion of

mobile pedagogy, research and issues in MALL, together with its affordances and challenges, I offer some the following pedagogical guidelines for MALL in EFL settings:

1. Promote learner autonomy and self-regulated learning. Give your learners chances to make their own decisions about language learning by providing pedagogical guidance.

2. Introduce MALL technologies in class and give your learners hands-on-experience trying them out; give learners chances to explore new MALL technologies and present possibly useful ones in class.

3. Establish connections between in-class and out-of-class MALL through exercises, activities or tasks that extend beyond the class to educational or authentically real or digital settings.

4. Encourage using MALL for different skills and language areas to support the four strands in EFL class, namely, meaning-focused input, meaning-focused output, language-focused study and fluency development (Nation & Newton, 2008).

5. Promote multimodal communication, collaboration among peers and the teacher using different new media and channels for communication (e.g., social networks, videoconferencing, digital games etc.).

6. Use learner analytics to receive and give feedback and for formative assessment, self-assessment and reflection.

7. Introduce a variety of MALL technologies and implement them according to your specific context of teaching. Also, tap your learners' creativity for using a variety of educational or non-educational mobile technologies for language learning and let them share them with the class online or face-to-face.

8. Create an online community of practice where you, as the teacher, and learners can share and comment on MALL experiences. Value and acknowledge MALL experiences of your learners and encourage them to share and link their in-class and out-of-class MALL environments through regular comments.

9. Become a member of a professional special interest group or network, as part of continuous professional development, to keep abreast of a variety of emerging MALL technologies and to raise your learners' awareness of available and emerging software agents for language learning.

10. Choose MALL technologies using existing frameworks of evaluation, some of which are discussed above.

Conclusion

Combined with their inherent features such as video and audio recording and their connection to the Internet and educational or non-educational software (e.g., online social networks or apps for other purposes), mobile devices can enhance interaction, offer multiple ways for multimodal communication and collaboration, and support the mobility of learning and learners in a wide range of formal and authentic settings (e.g., cinema,

shopping mall, workplace, etc.). MALL technologies can be an indispensable part of learning a language, as they can provide access to linguistic sources, opportunities for interaction, enable communicative and task-based learning goals, provide context-sensitive linguistic support, be consultation resources, and provide plenty of materials for extensive reading, listening or viewing, and enhanced multimodal input and multisensory interaction possibilities. For effective integration of MALL technologies, teachers should rely on research-evidenced principles and theories, encourage learner autonomy, create a community of practice, connect MALL implementations in formal and informal settings, and introduce a variety of MALL technologies that can lead to the development of the four skills and language areas, (e.g., grammar, vocabulary and pronunciation). Developers of MALL technologies and teachers should always prioritize pedagogy in their designs, selections and implementations of MALL. Thanks to advancements in ground-breaking technologies such as AI, automatic speech recognition, etc., and emerging concepts of the Internet of things (IOT), context-sensitive, artificial-intelligence-powered, wearable technologies, MALL holds the potential to facilitate language learning and transform its future. It can realize this potential provided that it is driven by rigorous research and pedagogy, which will allow for up-to-date theories of language learning and existing and emerging technologies, possible benefits and drawbacks, changing roles of learners and teachers, mobility of learning and learners across both physical settings and digital environments.

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INSTRUCTIONAL DESIGN IN MOBILE ASSISTED LANGUAGE LEARNING AND TEACHING: A FOCUS ON L2 VOCABULARY LEARNING AND TEACHING

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Before you read, reflect on the following questions:
1. What do you think are the features of an effective mobile vocabulary learning app?
2. What do you think are some of the learning theories that should underlie the design of an ideal mobile-assisted vocabulary learning app?
3. How do you think we can use some emerging mobile technologies to teach vocabulary?

Introduction

Using mobile devices for education is increasingly common since they are highly portable and the combination of mobile devices with the internet allows for the expansion of teaching beyond the classroom and the implementation of ubiquitous learning (Wang, 2017). In the same vein, Power (2019), who emphasizes the social, educational and technological interconnectedness in mobile assisted language teaching and learning, states that advancements in mobile technologies have coincided with swift transformations in the ways individuals engage with one another and the community. These transformations have some implications for teaching and learning and offer promising opportunities to advance the ways in which teachers, instructional

designers, and learners themselves approach the process of teaching and learning. In view of such transformations, the focus of mobile assisted language learning (MALL) research has shifted from empirical studies into the usefulness of prevailing mobile applications to design-based inquiries on the development of mobile applications dealing with particular aspects of language learning. When it comes to development aspect, previous research has been inclined to underscore the evaluation of a variety new technologies for example multimedia, virtual reality or augmented reality, chat agents and artificial intelligence (AI)-based systems. However, there is a lack of discussion and research on theoretical aspect as the focus has always been on emerging technologies (Chuah & Kabilan, 2022) and there are still a lot of unaddressed concerns about how to create learning environments and materials that can adapt to changing needs and make the most of newly available resources (Power, 2019).

Scholars are concentrating on a variety of pedagogical and technical challenges that must be resolved in order to successfully integrate mobile technology in the classroom. Power (2019) mentions four important challenges related to content development, technological enhancement, teacher training, and learning engagement. Researchers are faced with the question of developing content for mobile platforms and instructional approaches, and also converting traditional curricula and resources into digital information. Enhancement of communication functionality and interaction, guaranteeing network connectivity stability and security, and safeguarding confidential data and intellectual property (IP) are the problems with regard to technology. It is also important to ensure that teachers can incorporate mobile technologies and approaches into their teaching practices and that learners are engaged with materials rather than sidetracked by other social media apps or games. Mobile assisted language teaching and learning is not free from these challenges given that most advancements are technology-driven but fails to reflect pedagogical and theoretical paradigm shifts and evolving concept of mobility and mobile learning.

One aspect of language teaching mobile technologies can facilitate is vocabulary instruction and mobile assisted vocabulary learning (MAVL) apps also suffer from inadequate incorporation of theories in their design even if it is the most commonly researched area of language in mobile learning (Chuah & Kabilan, 2022). Furthermore, teaching and learning L2 vocabulary particularly in foreign language learning contexts brings about added inherent difficulties as it is a very daunting task given the depth, i.e., multidimensional nature of lexical knowledge (Nation, 2001) and the size, i.e., high numbers of words ranging between 5000-7000 to 8000-9000 word families to be learnt for written and spoken language in L2, respectively (Schmitt, 2008). Previous research suggests that mobile assisted language learning applications can significantly increase vocabulary learning (Chen et al., 2019; Lin & Lin, 2019; Okumuş Dağdeler et al., 2020; Sung et al., 2015). Nonetheless, a thorough analysis of the theories guiding vocabulary learning suggests that a significant number of vocabulary apps do not mention or use

any theory in their design (Lin et al., 2023). Similarly, Khasyyatillah and Osman (2022) revealed in their systematic review of mobile learning applications that most of them neither implement any instructional plans nor state the learning theory. Underscoring the importance of instructional design and learning theories in mobile app design, the researchers state "while instructional design models and instruction strategies provide systematic procedures for developing mobile applications for educational contexts and the organisation of learning activities in mobile applications, learning theory is fundamental to both" (Khasyyatillah & Osman, 2022, p. 457). Therefore, for facilitating vocabulary development, researchers and educators must have a solid understanding of the theoretical underpinnings of vocabulary learning (Yang et al., 2021). It is thus evident that mobile language learning applications fall short when it comes to incorporation of theories in mobile language teaching and learning. In line with the above-mentioned concerns, this chapter seeks to put forth some pedagogical suggestions for the development of mobile assisted L2 vocabulary teaching apps based on reviews of learning theories and empirical research in mobile assisted language teaching and learning.

1. Reviews of Learning Theories and Concepts in MAVL

Learning theories should be the building blocks of how designers design learning apps and teachers teach; i.e. facilitate the learning of L2 vocabulary. Apart from these theories, the design of MAVL apps should also consider the peculiarities of mobile learning. Kukulska-Hulme and Traxler (2013) propose that design for mobile learning are to be based two main remarks: "[a] mobile technologies are ubiquitous, diverse, personal, social and changeable, not uniform, consistent, or institutional ... [and b], learners' expectations about educational uses of mobile technologies may be coming from outside formal or institutional education, as part of experiences driven by curiosity, personal enquiry and individual recreation" (p. 513). Instructional design of MAVL apps should allow for these aspects of mobile learning and evolving definitions of mobile learning. Given to its peculiarity as a kind of learning, previous research has identified some preconditions to conceptualize m-learning: "1) identification of uniqueness of m-learning, 2) determination of amount of learning outcomes outside the class, 3) account of practice e.g. learner-centeredness, knowledge centeredness, assessment centeredness, and community centeredness, and 4) ubiquitous function of personal mobile devices" (Sharples et al., 2007 as cited in Çakmak, 2019, p. 32). These important remarks about the conceptualization of mobile leaning should be taken into consideration when designing MAVL apps.

The creation of mobile learning tools and programs can be a multifaceted procedure including syllabus and instructional designers, software designers, and even the learners themselves in terms of design, production, and testing. The unique advantages mobile technologies offer such as social connectivity, cooperative and collaborative

interaction, access to multimedia resources, general mobility, and the capacity to place learners and learning situations at the ideal time and location, can make these efforts pay off. Students may become motivated and self-directed learners as a result of these qualities. They have the power to boost student efficiency and engagement while also helping with the actual process of learning (Power, 2019).

Previous research has identified several theories used in mobile language learning and they can guide instructional design of vocabulary learning apps. In their analysis of recent studies on MALL (2011-2020), Chuah and Kabilan (2022) reported that 25 of the 39 studies adopted constructivism to design and develop mobile applications. The researchers attributed this finding to the fact that constructivism was extensively promoted in the 21st century and some evolving technologies such as augmented reality and web-based interactive tools. Of these 39 studies, 21 of them were into vocabulary instruction with MALL. Only six of the research studies adopted SLA theories as presented in the table below.

Table 1 *Analysis of underlying theories used in instructional design of MALL (Adapted from Chuah & Kabilan, 2022).*

Behaviorism	Direct instruction
	Programme instruction
Cognitivism	Attribution theory
	Elaboration theory
	Cognitive development
	Condition of learning
	Information processing theory
	Cognitive theory of multimedia learning
Constructivism	Activity theory
	Cognitive apprenticeship
	Contextual learning
	Discovery learning
	Inquiry-based learning
	Problem-based learning
	Situated learning
	Personalized learning
Second Language Acquisition	Connectionism
	Chomsky's Universal Grammar
	Krashen's input hypothesis
	Krashen's monitor model
	Interactionist theory
	Schmidt's noticing hypothesis
	Halliday's systemic functional grammar (SFG)

Hao et al. (2019) demonstrated that vocabulary learning app designed based on cognitive apprenticeship framework facilitated vocabulary learning. Previous research also notes that behaviorism which can be regarded obsolete by some scholars is still used particularly in grammar and vocabulary instruction. In a review of software for teaching vocabulary through MALL, Nakata (2011) has shown that flashcard software which draws on paired-associate learning principle (Nakata,2011) and that fits into language focused study strand (Nation & Newton, 2009) can be regarded as an effective mobile assisted vocabulary learning tool. Paired-associate learning as a part behaviorist learning model actually forms the fundamental learning principle in most mobile assisted vocabulary learning applications and has been demonstrated to be effective by previous research (Fitzpatrick et al., 2008; Nation, 1980; Thorndike, 1908). Likewise, Kukulska-Hulme and Traxler (2013) argue that for design of activities mobile learning can combine elements of behaviorist learning, which requires quick feedback and reinforcement. In the same vein, Deris and Shukor (2019) found that word lists, games, media and test/quiz were among the desired features for learning L2 vocabulary and word lists and flashcard apps were more downloaded than vocabulary contextual learning apps (Çelik, 2018).

According to the principles of cognitivism, instructional design of MAVL should ensure meaningful learning of vocabulary based on a given context and learning of vocabulary can go beyond mere memorization of words in isolation but also simulate a meaningful environment (Lin et al., 2023).

Constructivism argues that people actively interpret and create their own knowledge and understanding by combining new information with what they already know and what they have learned (Sweller, 2003, as cited in Wang & Suwanthep, 2017). Research indicates that constructivist vocabulary instruction can significantly increase vocabulary learning outcomes (Daloğlu et al., 2009; Du, 2013; Lin, 2015, as cited in Wang & Suwanthep, 2017). In the constructivist approach, vocabulary acquisition supported by mobile devices emphasizes learner-centered learning, which will support students' participation in the procedure of creating lexical knowledge. Students are in charge of their language acquisition and proceed at their own speed according to their cognitive abilities. Additionally, students are free to study and go over their vocabulary knowledge as often as they choose (Wang & Suwanthep, 2017). Constructivism entails active involvement of learners in meaning making process of learning, where they use their prior knowledge and new information to construct their own understanding of lexical knowledge. The constructivism based MAVL Wang and Suwanthep (2017) developed included preview and review stages. In the preview stage, learners/users constructs the definition of the target words based on visuals and example sentences given. Then, they are asked to choose the L1 equivalent of the target word among four options. The app also provided immediate

feedback involving L1 meaning, L2 definition, spelling and pronunciation to facilitate knowledge construction. In the review part, there were further receptive and productive vocabulary exercises. Presentation of the target words in linguistic and visual context in the app for meaning construction can facilitate vocabulary learning in line with the **depth of processing** and **task-induced involvement** theories.

MAVL software should also be designed with collaborative learning and individualized learning principles in mind and include elements of gamification. Gamification elements should also be added to promote goal setting and thus **self-regulated learning**. Gamification of learning activities can make it more motivating for learners and increase learner engagement. On the one hand, instructional design is to cater for individual vocabulary learning needs of learners by enabling them to create their own lists. On the other hand, it should provide opportunities for cooperation in closed communities such as a class or in a larger L2 learner community. By making use of context-aware technologies (Wang et al., 2019), a MAVL app with an ideal instructional design can promote learners' engagement with learning and increase their self-efficacy. Another example contextual and situated learning can be someone finding a peculiar bug while wandering, capturing a photo of it, and then quickly requesting assistance from an online community to identify the bug—a regular practice on sites like iSpot (Woods et al., 2015, as cited in Kukulska-Hulme, 2016). Bearing in mind that MALL learning can take place in and outside classroom and in informal context mostly through learner initiation, instructional designers should consider socio-cultural aspects of mobile learning. They should design apps that allow for the promotion of interaction between the learner and the content and context and among learners in closed groups and also larger community of language learners.

Based on a review of ten pertinent frameworks and some instructional design principles, Lin et al. (2023) created an evaluation framework for MAVL apps in order to assess vocabulary learning applications**: (1) learning tasks, (2) goal clarity, (3) feedback, (4) strategy instruction, (5) repetition, and (6) instructional control**. Their framework can also be taken as guidelines for development of MAVL apps. As for goal clarity, learning tasks should be clear whether learners study app-generated or learner-generated lists. Feedback should be given timely and be supportive. An ideal should incorporate cognitive and metacognitive strategy training. Instructional control should be handed over to the learners so that they can choose the content and pace of instruction. It is important that learners can progress at their own speed in a stress-free environment. Palalas and Anderson (2013) proposed Mobile-Enabled Language Learning Eco-System (MELLES) design principles, some of which are also relevant for instructional design for teaching vocabulary:

1. Ensure balanced combination of individual and collaborative (group work) tasks.
2. Integrate learner-generated linguistic artefacts (audio, video, photos, and images).
3. Incorporate game-like real-life communicative tasks.
4. Build in expert facilitation: scaffolding, feedback, and coordination.
5. Include feedback mechanism (immediate and delayed).
6. Incorporate linguistic resources (task-related): relevant vocabulary, dictionaries, pronunciation, clear task directions and explanations, examples of language usage.
7. Support out-of-class learning with in-class (f2f) instruction and practice (a blend of in-class and out-of-class context).

Drawing on a review of relevant research studies, Jamaldeen et al. (2018) have come up with some important design principles for developing mobile learning content. The interface should be appealing and easy-to-navigate allowing for the small screen sizes of mobile devices, particularly hand-held devices. In line with the dual coding theory (Paivio, 1971) and the multimedia principle of the cognitive theory multimedia learning (Mayer, 2001), target words should be presented using congruent verbal and visual information i.e. meaning conveying visuals should accompany verbal definitions to support memory traces. The learners should not be overloaded with redundant or extraneous information and information should be neatly presented to facilitate selection, organization and integration of both modes of information.

Table 2 *Design principles for developing m-learning content (Adopted from Jamaldeen et al., 2018)*

Category	Design Principles	Key points
Technological facets of designing m-learning	Design the interface to compensate small screen	Information needs to be presented in pieces; Usage of zooming and floating panels; Use of audio podcasts.
	Navigational Strategies	Strategies to move back and forth; Minimized scrolling; Usage of zooming and floating panels.
	Consider variety of Elements	Use of multimedia messages; Design elements to assist comprehension and memory; Use mobile friendly and light weighted; In a blended environment the multimedia elements can be related to the e-learning course.
	Spontaneous access of materials	Location independent access; Time independent access; Place the materials in electronic repository.
	Support multiple device types	Use different means of learning such as stable technologies. E.g., Desktop computers and interactive whiteboards.

Pedagogical facets of designing m-learning	Keep the information organized	Present the information in an organized manner; Simplify the information; Chunking and grouping.
	Multiple pedagogy/ activities	Design in a way to accommodate different learning styles and characteristics; Include multiple pedagogical exercises and activities.
Human centered facets of designing m-learning	Design for personalized learning	Comprise the means of personalization; Allow learners to explore and select information to cater to personal needs.
	Incorporate collaborative activities	Development of community of practice, apprenticeships and mentorships; Allow students to work in small groups.

In line with Jamaldeen et al's (2018) principles, Check n click (2022) listed six factors for developing course apps for mobile devices: a) choice of color, b) font choice, c) keeping contrast, d) keeping enough white space, e) using visuals, and f) keeping the content as short as possible. When choosing color, developers should a) be consistent, b) not use more than five primary colors, c) limit the number of secondary colors they use, and d) not use more than eight to nine colors.
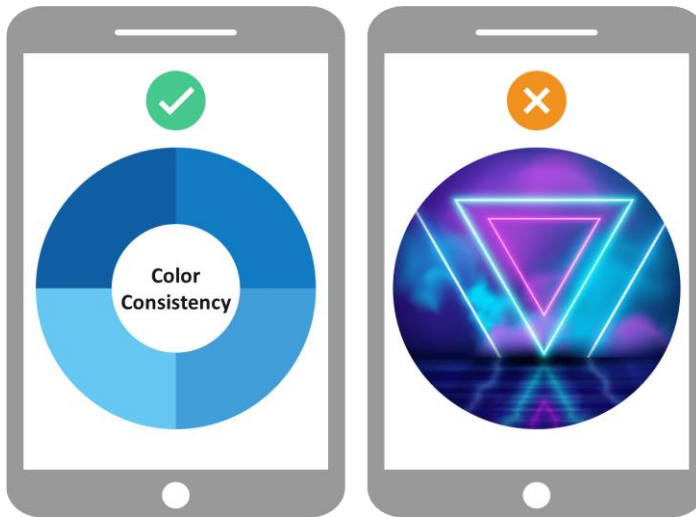

Figure 1 Color Consistency (Adopted from Check n click, 2022)

Font choice includes simple requirements such as using simple to read fonts, using readable fonts, and avoiding those fonts that resemble to handwriting.

To achieve contrast, developers should consider 3:1 contrast ratio between the background and the font color and use high contrast colors since learners might be using the app on bright days or under bright circumstances. Using white spaces will help learners to focus on the content on the screen.
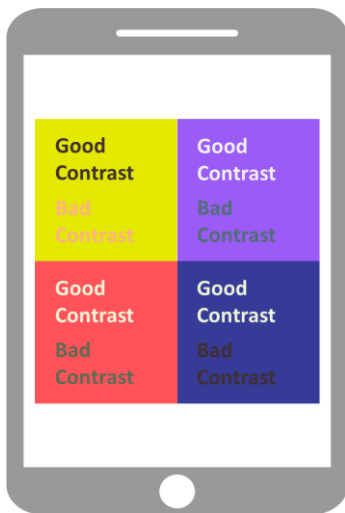
Figure 2 Font Choice (Adopted from Check n click, 2022)
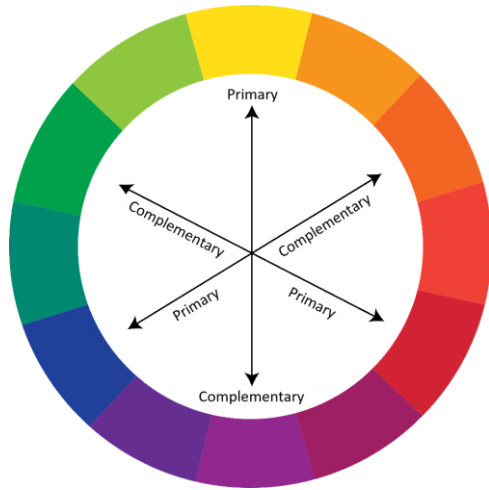
Figure 3 Color Wheel (Adopted from Check n click, 2022)

As for visuals, developers should not overload the screen either with written information or with visuals. They should always keep enough white space on the screen. Further, if they cannot find a suitable visual for the content they are interested in, they should consider presenting it in a simple form, i.e., without visuals. In other words, they should not use visuals just for sake of using them.

Figure 4 Contrast (Adopted from Check n click, 2022)

Developers should keep the information presented as short as possible. In order to do so, developers and/or teachers should divide their courses into smaller units, making

them micro-teachings and "micro-learning modules" for learners. This is also in line with the ***segmenting principle*** of Cognitive Theory of Multimedia Learning (Mayer, 2001).

The reviews and guidelines for pedagogy and interface design can be used to develop more effective MAVL apps. Rather than discussing all the theories underlying

> What kind of user interface features do you think are desirable in MAVL?

mobile language teaching and learning app design as revealed by previous reviews of empirical research, the next section will discuss some designs aspects and make some pedagogical suggestions derived from learning theories and concepts. Drawing on an overview of the above-mentioned theories, research in mobile language learning and particularly vocabulary learning, we argue that learning theories and concepts underscored in previous research can provide pedagogical guidelines for several features and aspects of MAVL app design.

2. Desirable Features of MAVL
Recycling, Reviewing and Expanding Spacing
Research indicates that L2 vocabulary can be learnt provided that learners are exposed to the word several times in context (Kılıçkaya, 2018). Previous studies have shown that these kinds of frequent exposures help learners retain new words (Webb, 2007). For incidental vocabulary learning, research suggested various numbers from 7 to 10 and to 20 as a required frequency of occurrence (Chen & Truscott, 2010; Webb, 2007). Previous research (Waring & Takaki, 2003; Webb, 2007) suggests that a word must be encountered or repeated a certain number of times in order to be recognized in its morphological form. Multiple exposure to lexical items is also desirable in MAVL where learning is mostly explicit and intentional. According to Xue et al. (2010), "repeated study improves memory", identifying the brain mechanism by which repetition advances improved memorization. Multiple occurrences and exposures to the same words in a variety of different context will not just increase the likelihood of increasing memory trace for the word but also provide opportunities for learning different shades of meanings the word can have, and its collocations, associations and grammatical behavior, etc. Majority of new items will eventually be forgotten after only one use; therefore, frequent review is necessary to ensure that words are retained throughout time (Baddeley, 1997; Ellis, 1995; Hulstijn, 2001, as cited in Nakata, 2011). The design of the app should ensure that learners are exposed to the same word multiple times and multidimensional nature of lexical knowledge is practiced in turn. Recycling can ensure that memory traces get stronger and thus enhance automaticity of the retrieval of the words from the memory in real time processing of written or spoken language.

The software can be programmed to present and practice different dimensions of lexical knowledge each time depending on the learner's performance with regard to the target word and with regard to different dimensions of knowledge. This can in turn

ensure personalized and customized spacing of the words and relevant knowledge, which can enhance learner performance. As for repetition, Lin et al.'s (2023) analysis has shown that most apps provided repeated exposures with spaced intervals.

The block size of the word lists can also affect learning outcome. *The spacing effect* favors a larger word list based on the premise that the larger the list, the larger the spaces between the presentation and practice of the words in the list. On the other hand, the *retrieval practice effect,* which is based on the premise that successful retrieval of words will lead to better retention compared to mere presentation, suggests superiority of smaller word lists. In the case of a small list, words are more likely to be successfully retrieved before attrition. Likewise, *list-length effect,* which states that the fewer items there are on the list, the more likely they are to be remembered, is in favor of smaller word lists. Based on the clashing theoretical stances and controversial research findings (e.g., van Bussel, 1994; Kornell, 2009; Pyc & Rawson, 2007, 2009, as cited in Nakata, 2011) on the optimal word list size, Nakata (2011) argues that the length of the word lists should be flexible.

Furthermore, in accordance with the customization of learning to individual learner needs, performance expectations etc., the recycling patterns and word lists sizes can be adjusted automatically by the software based on learner's performance. Mobile technologies are able to monitor student performance and ensure that harder or unknown material is studied more often than easier or known material. A review schedule known as "expanded rehearsal" which gradually lengthens the time between study trials as learning progresses (Nakata, 2011) should be a built-in feature of an ideal MAVL app.

Using a Variety of Activities and Tasks

Word lists and flashcards are the most commonly used types of tasks for MAVL. Word lists can be effective ways of learning new words in L2. Therefore, it is advisable and commonly practiced way of teaching L2 vocabulary through MAVL apps. The words in the lists can be either pre-determined by the designer (teacher) or by the learners themselves. An ideal MAVL design should cater for both options. Analysis of learner preferences in MAVL indicates an inclination towards word lists. Examination of the download counts of contextual vs. literal word learning apps such as flashcards and bilingual word lists revealed that literal learning apps are downloaded more (Çelik, 2018). Learners can study ready-made word lists created and curated by the designer, by other users and/or by the teacher. Ready-made word lists can also be developed based on frequency band of the words such as West's (1953, as cited in Nation & Waring, 1997) General Service List (GSL) or Coxhead's (2000) Academic Word List (AWL).

An ideal MAVL app should focus more on contextual learning and meaningful interactive learning tasks. As a result of their analysis of 30 MAVL apps, Lin et al. (2023) suggested that more learning activities that entail higher-order cognitive tasks like applying,

analyzing, evaluating, and inventing should be incorporated. Particularly, in terms of application, these apps ought to offer tasks where the target words come up in speaking (like creating user-shot videos), writing (like creating sentences or journal entries), listening (like taking audio-based tests), and reading (like reading articles where the target words occur). In terms of analysis, an app might offer quick tests in which users select the definitions of words or word segments that are highlighted. App users may then be required to find the word or bring parts of words together to form entire words in games and brainstorming exercises. The task should promote construction of knowledge and collaboration. Learners can create and share their own word lists, flashcards and exercises and interact with each other to construct lexical knowledge. For example, there can be a closed or open discussion forum where learners can ask and answer questions about words usage, meanings, etc.

Activities that focus both on receptive and productive vocabulary should be given place in an ideal app. Previous research (Nakata, 2011) suggests that optimal flashcard program should offer different exercise types, presentation and retrieval modes, boost retrieval effort, encourage creative use, be flexible with block size, and allow scheduling. Ideally mobile application should have two modes: presentation mode, where students become acquainted with the target words, and retrieval mode, in which they practice finding words they have already encountered. Receptive recall, receptive recognition, productive recall, and productive recognition are the four categories of retrieval practice can be divided. When practicing productive recall, students create the target word form that corresponds to the given meaning, whereas in receptive recall, they are instructed to produce the meaning of target words. Unlike productive recognition, which requires students to select the target word form that matches to the given meaning, receptive recognition asks students to select the meaning for a given target word. Learners must practice both receptive and productive retrieval in order to effectively acquire both receptive and productive vocabulary knowledge. In line with this, an ideal MAVL app should include all these types of retrieval exercises to increase both dimensions of lexical knowledge. The difficulty of the retrieval practice should be increased incrementally; the exercises should be relatively simple at first, like productive or receptive recognition, and then more difficult ones, like receptive recall or productive recall should come (Nakata, 2011). As a result of their analysis of 30 MAVL apps, Lin et al. (2023) reported that learning tasks involve lower-order skills of matching and few of them requiring recoding of pronunciation. While less than half of the apps reviewed promoted word parts analyses, only few incorporated mnemonics as memory enhancers.

Learning tasks offered in an ideal MAVL should aim at increasing not only the size but also depth of lexical knowledge and reflect multi-dimensional nature of lexical knowledge. In line with the multidimensional nature of lexical knowledge, MALL designers should provide opportunities for learning ***the form*** (spelling, pronunciation),

meaning (including multiple meanings and perhaps associations, etc.), and *function* of the target words at receptive and productive dimensions (Nation, 2001). Software is to be programmed to ensure that different knowledge dimensions of the words are presented each time. Every time a word is practiced, a suitable flashcard application should, thus, display the target word employed in various meanings, collocations, inflections, grammatical purposes, or sentence structures (Nakata, 2011). In their review of 80 articles, Yang et al. (2021) reported that while almost half of them focused on form and meaning, only 20 emphasized use. Thus meaning and use dimensions should not be overlooked at the expense of form. Furthermore, in line with *personalization* and customization of the learning to the learners' needs and preferences, and to promote *self-regulated* learning and *learner autonomy*, the design should be flexible to allow learners to choose what dimensions of lexical knowledge they would like to study.

Wu (2015) reported that Chinese learners of English using a mobile app learnt significantly more words compared to the control group. The researcher attributed the success to the simple content of the mobile app which only included spelling, L1 definition and pronunciation of the word, but not 'superfluous' information such as synonyms, antonyms or usage. This claim should be approached with caution because there is no comparison of contents of MAVL apps with 'simple' vs. 'superfluous'. Yet, in line with the redundancy principle of the cognitive theory multimedia learning and given to the small size of the mobile devices, it can be wise to include just limited amount of information for each dimension of a word at one presentation. This does not necessarily mean that learners can study only one dimension of lexical knowledge such as collocation, part of speech, etc. with each different mode of exercises and activities. At each occurrence of the words, learners can be presented and required to practice one or two dimensions of knowledge. While one dimension will be the main focus of the exercise, one or more dimensions of knowledge will also be activated. For example, when learners match the words with their meanings, they will also process written form of the word. Likewise, a gap fill exercise in conversation will require the learners to process not only the meaning but also the context where the word fits, which can include collocation and function of the word beyond the sentence level. Yet another type of exercise can require learners to change the part of speech of the given words and place them in the correct gaps.

Furthermore, in line with the *interactionist theory* and *(socio)-constructivism* by making use of AI-powered technologies such as chatbots (Huang et al., 2022), more meaningful and interactive learning of vocabulary items can be facilitated. In line with situated learning theory, learners can be engaged in tasks in real or virtual spaces to learn words in context. Uz Bilgin and Tokel (2019) demonstrated that by making use of mobile technologies contextual vocabulary learning can be facilitated based on the principles of *situated learning*. Taking advantage of technological advancements in mobile devices such as augmented and virtual reality, context-aware technologies and in line with the evolving definition of multiple mobilities in MALL, real-life tasks which

entail physical and conceptual mobilities of learners in real and virtual worlds should be incorporated. Thereby, productive knowledge of vocabulary can be enhanced as learners construct lexical knowledge through interactions with people, with content and contexts on-the-go in real and virtual worlds.

Self-Regulated Learning

Self-regulated learning principle is particularly important for L2 vocabulary learning through MALL as learning primarily takes place outside class. In the SRL model Zimmerman et al. (1996) devised, they proposed four interconnected learning processes—*self-evaluation* and monitoring, *goal-setting* and strategic planning, *strategy implementation* and monitoring, and *strategy outcome* monitoring. As most mobile learners involve in learning in their idle time, their SRL abilities have a crucial impact on how well they learn English when using a MAVL app on their own. Previous research has evidenced that the SRL can significantly impacts learning attainment (Dabbagh & Kitsantas, 2005; Kumar et al., 2005; Narciss et al., 2007; Schunk & Zimmerman, 1994; Zimmerman & Schunk, 1989, as cited in Chen et al., 2019). Chen et al. (2019), who incorporated SRL principles in the MAVL app they have designed, reported significantly positive result in terms of learning gains and motivation compared to the participants who used MAVL without SRL features. The app designed for the participants in the experimental group featured five important modules, two of which promoted self-regulated learning. Goal setting module enabled the leaners to set the number of the words, token and exercises to be studied daily and the goal reminder module enabled the learners to check to what extent they attained their goals. Such features should be incorporated in the design to promote SRL.

Lin et al. (2023) argued that the three primary components of instructional designs that assist students' self-regulated learning are motivation, metacognition, and cognitive strategy (Butler & Winne, 2016, as cited in Lin et al., 2023), all of which should be promoted in an ideally designed MAVL app. While metacognitive strategies can be promoted with goal setting, adjustment of content and pace, cognitive strategies can be enhanced with spaced repetition, semantic associations such as synonyms, contextual clues to increase depth of knowledge and to create effective memory traces. SRL can be promoted in a number of ways based on the availability of technological capabilities. Automatic notifications, graphics or similar visuals representing the extent of goal achievement should be incorporated to promote SRL in MAVL. Moreover, metacognitive strategies should be promoted by allowing learners to set their own goals, tasks, content and sequencing of activities. Lin et al. (2023) also revealed that nearly half of the apps reviewed achieved goal clarity which can promote metacognitive processes and self-regulated learning skills of the learners. As for strategy instruction dimension, their analysis also revealed that most apps used word lists and flashcards and adopted isolated learning of individual items. Nevertheless, almost two-thirds of the apps used contextual

clues, more than half of them provided semantic associations such as clustering, synonyms, antonyms, etc. They also reported that most apps allowed content and space control and some of them even enabled goal setting, task selection and learning order, which are highly desirable features as they can promote self-regulated learning and learner involvement in MAVL. Besides, some of them provided options for planning self-testing.

Automatic and multimodal feedback can be provided to promote self-regulated learning. Automatic positive or corrective feedback will be useful as learners study on their own without the fear of being ashamed. Multimodal feedback, particularly audio and visual (e.g. speech diagrams for word stress) feedback for pronunciation, can enhance learner uptake and engagement. Further, feedback can be customized to individual needs based on their performance and interaction with the app. Lin et al., (2023) argue that the tasks in vocabulary-learning applications may benefit from more gradual cues, such as definitions, sample sentences, synonyms, antonyms, and roots and affixes, to assist students in fixing their errors and coming up with the correct answers on their own. In this way, feedback will be supportive and help learners to find the correct answer on their own. According to *signaling principle* of the CTML (Mayer, 2001), some contextual and visual cues about lexical items meaning can be provided as corrective feedback.

Multilingual Support

Support for multiple languages is advantageous for three reasons. Firstly, it will enable students to study a variety of non-alphabet languages such Arabic, Thai, Chinese, Japanese. Second, studies have demonstrated that using L1 translations helps particularly lower proficiency students to learn vocabulary. Since multilingual support will allow learners to use L1 translations, it should consequently contribute to enhanced performance. Third, while L2 definitions and synonyms may be difficult for low-level learners to understand, L1 translations provide a more favorable environment for flashcard learning (Nakata, 2011). Depending on the learners' level, support in L1 can be provided but the app should be flexible enough to turn it on or off when desired by the learner or the teacher, which can facilitate personalization of instruction.

Personalization

One of the newest trends gaining popularity worldwide is personalized learning via mobile devices, which can offer new approaches to improving and advancing language learning. Many individuals believe that technology can facilitate personalized learning, and widespread use of mobile phones and mobile devices has led to increased interest into mobile learning. A personalized teaching method must consider how learners' access to traditional media and other forms of personal support related to mobile devices, applications, and content. Learners' interests, preferences, previous

knowledge, competences, motions, and behaviors should all be taken into consideration in personalized learning (Kukulska-Hulme, 2016).

Bearing in mind that cognitive styles of learners can determine their preferences, designers should provide learners choices with regard to their own learning.

Why should learners create their own flashcards and wordlists? What are some advantages?

They should be given chances to choose whether they will be presented L1 or L2 definitions, audio and/or visuals. Furthermore, to promote **personalized learning, learner engagement** and **autonomy**, learners should be able create their own flashcards and wordlists. Learners should be able to enter data about the word's meaning, parts of speech, pronunciation frequency etc. from built-in or external sources (Nakata, 2011). Drawing on the learning memory cycle discovered by vocabulary testing and Item Response Theory, Chen and Chung (2008) generated a bespoke MAVL system. This system lets learners recall forgettable English words in a way that is dependable on the learning memory cycle. The system automatically generates new vocabulary for each learner based on their existing vocabulary proficiencies. The outcomes produced by employing this technique have shown that learners' English vocabulary learning and motivation to learn vocabulary are enhanced. Thus, personalization of learning should be promoted to enhance vocabulary learning with mobile devices.

Multimodality of Presentation

As mentioned in the theory and research review section, among the theories that can lead instructional design for mobile assisted learning and teaching of L2 vocabulary are the dual-coding theory (Paivio, 1971) and its more recent version, namely, the Cognitive Theory of Multimedia Learning (CTML) (Mayer, 2001). The **modality principle** of the CTML posits that combining both visual and verbal information leads to a better understanding of given information. Chun and Plass (1996) reported that learners better recall items presented to them (i.e., vocabulary) in pictorial format rather than verbal format, and also marked that verbal information is better recalled if they are presented with pictorial information. Plass et al. (2003) put forward that better recall takes place when learners can integrate newly learnt verbal and visual information by connecting them. Therefore, verbal and visual information should also be coherent, i.e. complementary to each other and neatly organized. In line with this, earlier research (i.e., Baddeley, 1986; Chun & Plass, 1996; Mayer, 1997, 2001; Paivio, 2007) suggests superiority of multimodal or bimodal glosses that achieve coherence. More recent research (Plass et al., 2003; Yun, 2011) revealed that conduciveness of multimodal or bimodal glosses is also dependent on learner-related factors such as their integrative and cognitive abilities. In line with these theories, the designers should ensure that vocabulary items are presented in **multimodal modes** and that verbal and visual information achieve **contiguity in time and space**, and are congruent. Besides, there should be no **redundant** text or visuals or

extraneous stimuli to achieve **coherence**. Ideally, learners should be given options to choose the modality of input (Çakmak, 2019).

Conclusion

Although vocabulary is the most widely researched area of language in MALL, it is still inadequately informed by learning theories, research and evolving nature of mobility and mobile learning. While research into underlying theories in MAVL suggests that there are a number of theories guiding it (Chuah & Kabilan, 2022), Çelik (2018) revealed that most still rely on paired associate learning paradigm in behaviorism while ignoring (socio)-constructivist, cognitivist learning theories and overlooking what new technologies like virtual reality, context-aware technologies can offer to MAVL. Furthermore, research indicates that learning activities or tasks do not reflect multidimensional nature of lexical knowledge and does not adequately draw on AI technologies to promote customization of learning, which can enhance learner engagement, use of metacognitive strategies, affective aspects such as motivation and self-regulated learning. In sum, to be effective MAVL apps should incorporate and reflect advancements in learning theories and concepts and offer a variety of activities and tasks, promote self-regulated learning, situated learning, interaction, personalization and gamification of learning and make pedagogical use of emerging technologies such as context-aware technologies, AI-powered technologies and virtual reality so as not to fall behind pedagogical and technological advancements.

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DEVELOPING INTERCULTURAL COMMUNICATIVE COMPETENCE THROUGH VIRTUAL REALITY

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Before you read, reflect on the following questions:
1. What does the concept of "cultural competence" mean to you?
2. How do you define "Intercultural Communicative Competence"?
3. How much do you know about the concept of "Virtual Reality"?
4. Do you think that three-dimensional simulations could be utilized to develop ICC? If so, how?
5. Do you think that language teachers could encounter difficulties when they try to integrate virtual reality technologies into culture teaching in Türkiye?

Introduction

The increasingly globalized world characterized by frequent cross-cultural interactions for professional, social, and personal motivations and cultural diversity necessitates equipping new generations with skills to interact and cooperate effectively at the intercultural level (Akdere et al., 2021; Çelik & Erbay-Çetinkaya, 2020; Griffith et al., 2016; Nadeem et al., 2020; Perry & Southwell, 2011; Tutunea, 2021). Thus, in the

internationalized world where "people are ultimately to come together with those whose backgrounds, ways of thinking, communicating, and behaving are significantly different from their own in their efforts to solve the problems that are increasingly global in nature" (Cushner & Chang, 2015, p. 167), intercultural knowledge as well as competence, namely Intercultural Communicative Competence (ICC), are needed to avoid possible misunderstandings and enjoy the exchange of ideas. Particularly for foreign language learning, ICC is set as one of the crucial goals of language learning by the Common European Framework of Reference for Languages. Learning, Teaching, Assessment: Companion Volume (Council of Europe, 2020), which promotes plurilingual and intercultural education. That set of attitudes, skills, behaviors, and understanding is needed to make language learners and users confident in interacting with individuals from different linguistic and cultural backgrounds (Samifanni & Gumanit, 2021), thereby contributing to the concept of global citizenship in a borderless world.

Given that ICC is a vital set of skills to develop in the 21st century, it is necessary to inform the related parties, including preservice and in-service language teachers, of how to prepare their students with all the associated skills and inspire them for (inter)cultural learning for various sorts. Hence, the present chapter first sets the scene with a description of the term ICC and it then briefly discusses potential ways to enhance ICC and international education in language education. Next, it introduces the concept of virtual reality (VR), its use in the field of education in general, and its potential for language education in particular. Then it presents a review of how VR technologies have been exploited for language teaching and ICC development. Finally, the chapter ends with pedagogical implications for those who want to turn their classrooms into international spheres for intercultural encounters at a lower cost.

Conceptualization: Intercultural Communicative Competence (ICC)

Although there is no agreement on the definition of intercultural competence (Acheson & Schneider-Bean, 2019; Deardorff, 2006), the term ICC refers to the relationship between intercultural sensitivity and intercultural competence. While the former should be understood as "the ability to discriminate and experience relevant cultural differences," the latter refers to "the ability to think and act in interculturally appropriate ways" (Hammer et al., 2003, p. 422). Similarly, Mrowa-Hopkins (2022) refers to ICC "as the ability to de-center, relativize one's point of view, negotiate meaning and build relationships in real-time intercultural encounters" (p. 1). Byram (2012) argues that language and culture education from an intercultural perspective needs to be integrated with citizenship education to encourage "social agency to be realized in the here and now" (p. 11). As he puts it, this combination "ensures that the 'here' is not just 'our community and country' but intercultural, and that the focus is on language and culture learning for 'now,' and not just for some future application in the so-called real world" (p. 11). It is thus particularly important to cultivate a classroom environment, through

different mediums, that embraces (inter)cultural engagement and experiences to increase the capacity of learners to have the resources necessary for connecting with remote people and cultures. Only through adequate training in intercultural education or intercultural competence, individuals can fulfill their potential and thrive in society as active citizens promoting successful inclusion, participation, and coexistence with others. According to Cushner and Chang (2015):

> *Interculturally competent individuals are flexible – that is, they are able to adapt their perspective and behavior to the time, the place, and the circumstance in which they find themselves; understand the circumstances in which others experience their lives; have the ability to communicate effectively with others whose language, ways of thinking, and interacting are different from their own; and are willing and able to work with others to solve common problems (pp. 167-168).*

The measurement of this globally essential competence has also been given scholarly attention in the related literature. It has been documented that related parties could measure and assess intercultural sensitivity and competence levels by using various quantitative and qualitative methods. To illustrate, Chen and Starosta (2000) devised the *Intercultural Sensitivity Scale* with 24 items categorized under five factors: Interaction engagement, respect for cultural differences, interaction confidence, interaction enjoyment, and interaction attentiveness. Another tool to evaluate individuals' engagement with cultural diversity is the 50-item *Developmental Model of Intercultural Sensitivity* (Bennett, 2018; Hammer et al., 2003), covering six stages that move from ethnocentricism to ethnorelativism: Denial, defense, minimization, acceptance, adaptation, and integration.

Ways to Enhance ICC and International Education
There are various ways to enhance ICC in either home environment or abroad: instructional materials and activities based on (inter)cultural contexts such as songs and literary texts; in-class activities such as role-plays and critical reflection; education abroad experience; co-curricular study programs; international (virtual) team projects/collaborations, exchanges and telecollaboration such as eTwinning; videoconferencing; software such as Skype; social networking sites, and coursework (Akdere et al., 2021; Alcaraz Mármol, 2020; Çelik & Erbay-Çetinkaya, 2020; Feng, 2016; Godwin-Jones, 2019; Höß et al., 2019; Mrowa-Hopkins, 2022; Perry & Southwell, 2011; Roarty & Hagley, 2021; Root & Ngampornchai, 2013; Samifanni & Gumanit, 2021; Swartz et al., 2020; Tutunea, 2021; Worawong et al., 2017). To illustrate, a study abroad experience could increase (inter)cultural knowledge and awareness, increase motivation to explore their own and other cultures, help learners identify cultural differences, improve language skills and non-verbal communication, encourage learners to use language learning strategies, improve their survival skills, improve awareness and

appreciation of different perspectives, develop critical thinking skills, and teach learners to feel comfortable in unpredictable situations (e.g., Czerwionka et al., 2015; Goode, 2008; Ramirez, 2016). Similarly, international virtual team projects/collaborations where teachers and students use technology tools to interact with each other and share products could help students meet diverse cultural products and procedures, gain knowledge, use various resources, enhance their cultural understanding, appreciate cultural differences, decrease their interaction fears, stay away from ethnocentrism and stereotypes, and understand the difficulties of cross-cultural interaction. However, these means to enhance ICC and international education have been documented to present some drawbacks. To illustrate, team projects are not free from challenges such as time restrictions (time zones and the need for much time to establish good relations), motivation and assurance of constant engagement, and tasks with unclear steps, milestones, assignments that could lead to misunderstandings in management education, and increased level of dislike for cross-cultural interactions (see, for instance, Höß et al., 2019; Swartz et al., 2020). Besides, the (inter)cultural content of textbooks as teaching materials are generally found inadequate in that they may have a hierarchical cultural representation to cover mostly the European cultures, or home cultural elements may dominate the content (see, for instance, Çelik & Erbay, 2013).

Similarly, study-abroad experiences have been reported to show some limitations such as high financial costs, teaching staff with a limited understanding of both the nature of ICC and ways to develop it as well as formal training to do so, challenges in global travel in crisis times such as COVID-19 pandemic, low student engagement, and participation, unattractive ICC training, teacher reluctance, unsystematic programs, much focus on ICC-related cognitive development rather than experiential learning to ensure behavioral and attitudinal changes (Akdere et al., 2021; Goode, 2008; Li et al., 2020; Mendenhall et al., 2004). However, as proposed by Samifanni and Gumanit (2021), as "digitalization boosts" (p. 152) ICC, nowadays, there are innovative learning platforms utilized to enhance these competences. Virtual Reality (VR) technology, as one of those platforms, is regarded as a "balance between good pedagogy and scalable curriculum, especially in times of limited mobility and face-to-face contact" (Akdere et al., 2021, p. 110), as it has the potential to compensate for the weaknesses of those documented ways to enhance intercultural learning as it engages learners in both cognitive and affective domains (DeWitt et al., 2022).

Virtual Reality Technology in Education

The word "virtual" is defined by the Turkish Language Association (2022) as something "designed in the mind that has no place in reality." VR technology, on the other hand, is described as environments that allow a real-world event or situation to be created as a three-dimensional simulation in a computer environment (Ausburn & Ausburn, 2004) and provide the opportunity to live and experience physically difficult situations (Freina

& Ott, 2015). VR environments can be defined as systems where users can interact with the special devices they wear in this environment and perceive the environment emotionally (Neguţ et al., 2016). Users in VR environments can interact with other users and the environment at a high level by using their avatars, and communication and content creation tools (Girvan, 2018).

Key concepts in VR are the sense of presence, sense of reality, immersion, and perception. The sense of presence can be conceptualized as the experience of being somewhere. The sense of reality in VR environments is the feeling of being in a different world, very close to reality, through external hardware and software. Immersion is the condition where users are surrounded by virtual technologies and equipment which create a cognitive, affective, and psycho-motor effect on users with a sense of reality (Wu et al., 2015). Finally, perception is the provision of awareness of the environment through the physical senses.

VR technologies are categorized into two types as *Cave* Automatic Virtual Environments (CAVEs) and Head-mounted Displays (HMDs). CAVE-type VR environments are essentially cube-shaped empty virtual rooms where users can interact with the images reflected by the projectors and mirrors placed all over, and appeal to more sense organs. HMD-type environments, on the other hand, are the most common VR settings and correspond to virtual spaces where users can navigate and interact in the virtual world through head-mounted glasses or display devices worn on the head or as part of a helmet (Mihelj et al., 2014). The new generation of head-mounted VR displays provides users with a higher level of interaction and immersion experience. According to another classification made in terms of factors such as real-world perception and experience indicators, VR environments are classified into three categories as fully-immersive systems, semi-immersive systems, and non-immersive systems (Gutiérrez et al., 2008). Fully immersive systems are environments that completely surround the field of view of the users, where head-mounted glasses are often used, and where the sense of hearing is closed to the real world through real or virtual sounds. Semi-immersive systems are environments that use physical interfaces, where users can partially see their physical assets and offer an experience where users are not completely in the virtual world. These environments are usually created by projecting onto a large screen and are used in driving training and ship captain and pilot training simulations. Non-immersive systems, on the other hand, are desktop application-based environments that do not have the immersion feature. Desktop VR applications can be given as an example of this type.

CAVE   HMD
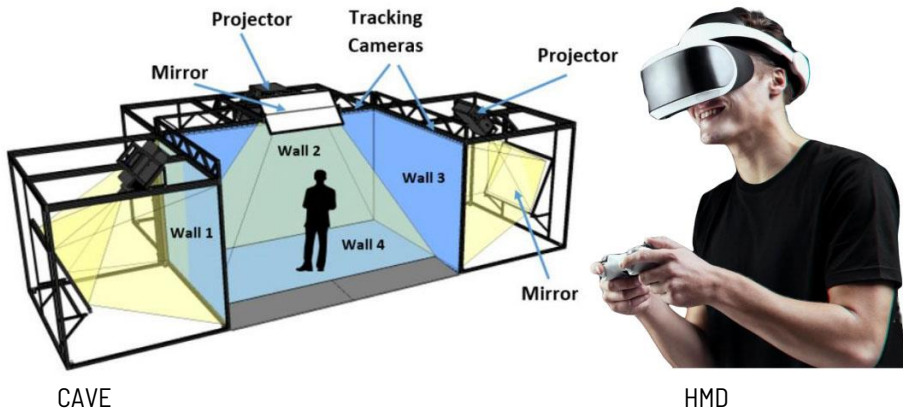
Figures 1 and 2 *Examples of CAVE and HMD*

There are many advantages that VR technology offers to users. User interaction levels can be increased in VR environments. In addition, it can be ensured that they experience the sense of presence or sense of telepresence in the environment more through their senses with which the objects and events in the environment are related. One of the most important contributions of VR is that it provides users with authentic environments where they can interact with virtual objects to simulate a real-world interaction experience. VR environments give users the sense of presence and feeling of being in authentic contexts where they cannot physically be in real life. Therefore, users can safely be in disaster environments such as fire or flood, which would normally be challenging and dangerous and cause physical harm to experience. Events from history, such as wars, can be simulated in a VR environment for individuals who want to learn by experiencing those war conditions (Bos et al., 2022; Calvert & Abadia, 2020). VR technology can contribute to the design of high-reality virtual spaces and experiences for telemedicine applications, such as remote diagnosis, treatment, and surgery (Hsu, 2017; Morsy et al., 2022). In addition, VR can enable the creation of alternative environments for the education of individuals with special needs. For instance, a study by Lan, Hsiao, et al. (2018) has found that students with delayed language development in L1 due to inherent disabilities, such as mild autism spectrum disorder, attention-deficit hyperactivity disorder, or mild mental retardation, have benefited greatly from a game-based 3D VR platform, even in a short period such as three months, and showed progress in learning vocabulary and sentence structures.

VR technology makes important contributions to various educational fields (Philippe et al., 2020). In many studies in education, meaningful results have been obtained in terms of improving learning performance and providing effective learning experiences with applications carried out in VR environments. According to the comprehensive systematic review study conducted by Özeren et al. (2021), a significant part of the studies on VR covers education/training and related fields. The results of the articles

reviewed in the study provide important evidence that VR experiences have a notable effect on learning outcomes. The use of VR applications in education contributes significantly to the development of the cognitive, affective, and psycho-motor skills of students by supporting experiential and contextual learning (Jensen & Konradsen, 2018). One of the education and training areas in which VR can make an impact is foreign language teaching. VR can help create immersive environments to allow students to interact in an authentic learning context (Huang et al., 2010). In that way, VR technology facilitates foreign language learning by offering learning opportunities without limits of time and space, creating game environments based on scenarios, and improving language performance (Lan, 2015). Foreign language courses taking advantage of VR technology can improve students' motivation, participation, and creativity, as VR provides ample opportunities for interaction in truly authentic contexts (Chen, 2016). In a literature review study on VR in foreign language teaching (Li et al., 2021), features of VR such as immersion, interaction, and imagination were found to increase the interest, motivation, and participation of foreign language learners in the new learning environment, especially in speaking, listening and cultural practice. It was concluded that the use of VR made a positive contribution to language instruction, yet there still seems to be a need for further research on the role of VR in promoting the development of social and practical skills in the language classroom.

The Use of Virtual Reality Technology in English Learning and the Development of ICC
Virtual environments are described as immersive cultural learning environments that help individuals' (inter)cultural cognitive development and offer chances for interpersonal interaction (Lane & Ogan, 2009). Six examples that could help intercultural education, development track, and summative evaluation include Croquelandia, Adaptive Thinking and Leadership System (ATL), Second China, Tactical Language and Culture Training Systems (TLCTS), BiLAT, and Virtual Environment Cultural Training for Operational Readiness (VECTOR). These environments offer simulated cultural interactions in Spanish, Chinese, Iraqi, Dari, Pashto, and French cultures. Utilizing immersive technologies, they make learners play games where they are situated in a foreign context and are required to interact and collaborate with people from different linguistic and cultural backgrounds. These role-playing environments encourage learners to make difficult decisions, use communication and negotiation skills, learn more about diverse cultures, collaborate, and show tolerance and understanding towards cultural differences. In this way, students' cultural knowledge, skills, and attitudes could be positively changed (Lane & Ogan, 2009).
The following table summarizes some of the related field studies where various immersive VR environments and open social spaces were used to see whether there is a relationship between such technological attempts and language learning and ICC development.

Researcher(s)	VR Technology Used	Positive Outcomes	Negative Outcomes
Koopmans (2022)	the VW OpenSim on the island of Chatterdale	*Increased critical awareness of home cultural norms *Improved ICC skill areas: Cultural knowledge, critical cultural awareness, interpreting and relating competence, positive attitudes and openness towards differences, and skills of discovery and interaction *Fun and engagement *Participation *Enriched authentic interactions *Secure cross-cultural encounters	*Learners unable to explain cultural phenomena and differences in a detailed way *Dependent on teacher mediation *Some assertive learners
DeWitt et al. (2022)	an interactive VR environment using the Google Tour Creator	*Increased ICC in all four domains: Knowledge, skills, attitudes, and awareness *Experiential learning *Improved language skills (Mandarin) *Motivated learners *Time-saving learning	*Required high-speed Internet connection *Unclear visibility *Health problems such as eye strain and dizziness
Akdere et al. (2021)	VR simulations to offer an international experience in an immersive VR platform	*Better realistic self-assessment of ICC level *Increased cultural knowledge *Increased ICC competence *Personalized intercultural learning experiences * A "customizable, safe, and cost-effective learning environment" (p. 117)	None
Canto Gutierrez (2020)	Telecollaboration via the virtual world of Second Life and video communication tools	*Dynamic communication exchanges *Motivation to collaborate to explore virtual worlds *Enhanced intercultural negotiations of meaning *Increased awareness of cross-cultural differences and similarities as well as misunderstandings *Enhanced oral communication skills *Motivated students *Developed imagination and creativity *Cheap internationalization *Authentic interactions	*Participant silence *Technical problems *Time management issues *Availability of technological equipment *Difficulty in finding partner schools * Teacher training
Shadiev et al. (2020)	Gear VR	*Authentic learning environment *Vivid learning content *Authentic learning content *Learner enthusiasm	*High learner expectations

		*Increased motivation and engagement *Convenience *Stimulated curiosity toward other cultures *ICC development in all four dimensions	
Liaw (2019)	vTime, a virtual reality social networking platform	*Physical and social affordances *Chance to meet different cultures *Relaxed to have cross-cultural conversations *Increased curiosity about other cultures *Tolerance towards diversity *Enhanced skills of discovery and interaction *Increased learning engagement *A safe environment to learn and use English behind avatars *Authentic communication *Independent learning *Increased communication *Visuals offering an immersive experience	*Incompatibility with some of the students' learning styles *Excessive time needed to get familiar with the software *Discomfort in wearing VR goggles
Li et al. (2020)	Immersive virtual reality environment: Head-mounted Display (HMD)	*Enhanced interaction engagement, confidence, and attentiveness *Increased learner motivation and enjoyment	*No change in respect for cultural differences and interaction enjoyment
Carino (2018)	Social interactions in Warframe	*Promoted cultural sensitivity, tolerance, and empathy *Safe intercultural encounters *Positive interactions	*Limited interactions due to superficial cultural knowledge *Disconnection between in-game interactions and learner intercultural empathy *Superficial sharing limited to macro and group-levels *Perspective changes at surface level *Short-lived interactions
Lan, Fang, et al. (2018)	Kinect and Second Life	*Helpful embodied motions for vocabulary and listening improvement	None

As seen in the comparative table above, VR empirical research has shown that the use of various immersive VR environments and open social spaces has the potential to contribute to the enhancement of ICC. Particularly, the affective benefits of such integration have been commonly emphasized in the documented works, indicating that the fun and engagement offered by VR technologies seemed to have increased student motivation and encouraged them to interact more. Besides, authentic communication appeared to have boosted students' engagement and inner motivation to explore different perspectives and deal with cultural differences. Furthermore, convenience and safety were frequently underlined to justify that those immersive technologies presented secure, enriched, and cost-effective intercultural experiences, which could contribute to the enhancement of ICC savoirs. However, every innovation has limitations, and VR is no exception. Despite several positive outcomes, the documented studies highlighted that VR entailed challenges, including some technical requirements as well as problems, rare perspective or attitude changes despite having fun during the experience, the need for teacher training, and time management issues, all of which could result in teacher uncertainty regarding whether to integrate it into language and culture teaching.

Conclusion

Intercultural communicative competence is no longer a choice for citizens to thrive in the world, and language teachers today should put more time and effort than ever before to go beyond the focus on cognitive objectives and linguistic outcomes in their classroom/in their instructional planning and practice. Particularly in monolingual/monocultural societies, where intercultural encounters are rare, teachers should make informed choices and be resourceful to offer their students, alongside the content knowledge, ample opportunities for cultural learning and experiences through authentic encounters with other cultures in foreign language classrooms. Only then these language learners will be open to different cultures and use their linguistics skills effectively to successfully communicate with people from diverse backgrounds on a global scale.

However, integrating intercultural encounters, and ICC content and goals into the classroom is not always straightforward and effortless. Due to several potential setbacks such as paucity of authentic tools and materials, deficiencies of textbooks in terms of appropriate (inter)cultural content, and lack of expertise or motivation to employ/exploit suitable/proper/fitting methods and techniques, teachers may find it challenging to enhance their students' ICC.

In this context, VR can be a powerful means of bringing reality into the language classroom in the absence of an intercultural perspective and helping learners engage with the authentic target language and culture in ways that are not possible through the use of other technologies or media. Immersion in a foreign language environment through VR has the potential to keep students more attentive and active over long periods, contributing to the likelihood of their (inter)cultural interactions, and thereby

developing their ICC alongside their language skills in the learning process. Finally, considering the time and energy needed to plan and introduce opportunities for students for intercultural learning, the use of VR technology in foreign language classrooms will allow more students to feel a sense of involvement in intercultural dialogue and benefit from intercultural training. It should be noted, however, that not all immersive experiences offered through VR should strictly include culture-related topics and themes, as even contents that are not culture-related may further advance students' various skills such as interaction, collaboration, problem-solving, all of which are necessary for effective intercultural communication and ICC.

The documented literature has shown that VR has a lot to offer for the development of ICC; however, the integration of non-immersive, semi-immersive, or fully-immersive VR systems may still not ensure a significant enhancement in ICC development on all counts. Here, learners' attitudes and teachers' readiness should be given careful attention. Learners' awareness about what VR could grant them regarding the development of culture-related and other 21st-century skills, how to exploit any VR-based benefits, and what conceivable limitations VR could present, should be increased. Besides, teachers should be supported during their both pre- and in-service teacher education on the integration of these technologies into language classes. Revising the pre-service language teacher education curriculum to integrate such awareness-raising and practice-oriented courses could be a starting step. Despite the inherent advantages of VR technologies regarding language skills enhancement, motivation, engagement, interaction, and (inter)cultural learning and experience, teachers should still be supported about how to integrate virtual experiences into language skills with a focus on ICC. Here, teachers' attempts to set professional communities, i.e., community of practice, to share good practices, would facilitate peer support at both academic and affective levels.

It should be kept in mind that such immersive environments should not be integrated into classes just for the sake of using technology at any rate (Bonner & Reinders, 2018). Accordingly, language teachers should carefully consider and decide what they want to offer and achieve through this integration, and then choose an appropriate app or platform based on factors such as accessibility, and devise applicable ICC-oriented activities and tasks to accompany it. As noted by Bonner and Reinders (2018), not all students have access to such technologies; therefore, teachers should look for free VR social spaces, or they could simply utilize a projector, smart board, or television, for "casting their own VR experience" (p. 50) as a more accessible way out for equal opportunities. Finally, for this integration to be considered feasible, further classroom research is needed, and the results of such investigations, along with their practical implementations, should be systematically made accessible to teachers. In this way, practitioners will be more likely to see the relevance of VR for ICC and how the two can be brought together in the language classroom in a realistic way.

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Image Credits

Figure 1. GRUVE lab annotated diagram [Diagram]. GRUVE (Glenn Reconfigurable User-interface and Virtual Reality Exploration) Lab. https://www1.grc.nasa.gov/facilities/gvis/gruve-lab/#applications-of-immersive-3d-environments

Figure 2. Man playing game with vr headset virtual reality experience [Photograph]. Freepik.com. https://www.freepik.com/free-photo/man-playing-game-with-vr-headset-virtual-reality-experience_15609232.htm

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USING TEXT-TO-SPEECH SOFTWARE IN THE SOUND SCRIPTING METHOD BASED ON TONIC STRESS

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Before you read, reflect on the following questions:
1. How important do you think for English teachers to have a native-like pronunciation?
2. Can reading paragraphs aloud improve pronunciation skills of EFL learners?
3. How can we use text-to-speech software for pronunciation instruction?

Introduction

Advances in speech recording, recognition and text-to-speech software and artificial intelligence-based training software offer a plethora of affordances for pronunciation training, particularly for foreign language learners. A recent meta-analysis research (Tseng et al., 2022) has indicated the effectiveness of Computer Assisted Pronunciation Teaching and there are now a number of software dedicated to pronunciation training or can be simply used for this purpose even if they are not primarily developed for this aim. In this chapter, I propose a model called the **Sound Scripting Method Based on Tonic Stress**, which can be implemented for the improvement of pronunciation in combination with text-to-speech software. I start with the description of the Sound Scripting Method and discuss some important issues in English pronunciation such as primary stress phoneme, sentence stress, mobility of primary stress in utterances. Pointing out the deficiency in the Sound Scripting Method, I put forward the Sound Scripting Method Based on Tonic Stress. Finally, I present the application of the model with text-to-speech software and discuss how it can be used for enhancing pronunciation instruction together with shadow reading.

The Sound Scripting Method

"The Sound Scripting Method" has been proposed by Powell (2002) in a book titled *Presenting in English: How to Give Successful Presentations*. The Sound Scripting Method

essentially involves highlighting the place of stress in paragraphs by bolding key content words and CAPITALIZING the most important words. In the book, there are paragraphs with simple sentences and then it gradually presents texts that get more complicated to improve learners pronunciation in presentations. As the building block of the method, a paragraph can be defined as "…a group of sentences about a topic" (Zemach & Rumisek, 2005, p. 11). Each paragraph has a single topic sentence which is supported by the flow of following sentences that all recount closely to the topic sentence. Each of the sentences of a paragraph carries at least a primary stress on one of its words, which drives the attention to what is being meant by the writer. Of course, if the speaker wants, s/he can put the primary stress on more than one word in the structure of the sentence. Using stress properly in presentations can make speech clearer and more intelligible. Further, the main idea in a paragraph can be marked with primary stress. This method can be used to teach stress in English pronunciation. Although there are some rules for it, learning stress in English can be difficult for non-native speakers. Therefore, before I move on to the discussion of the sound script method with an example paragraph and presenting my own model, I will present a discussion of some issues related to stress in English pronunciation.

Sentence Stress in English

The term *sentence stress* signals the upper degree of emphasis that is bestowed with respect to other words on certain words in utterances. In general, stress is placed in the stronger syllables of content words. "Stressed syllables fall at regular intervals throughout an utterance" (Crystal, 2003, p. 245). In other words, English is a stress-timed language in which roughly the same extent of time takes place between stressed syllables in a sentence to generate a natural rhythm, which are also regarded as the "beats" of a sentence.

Sentence stress has a typical connection to intonation. As it is stated by Lane and Brown (2010, p. 85):

> *Intonation, the meaningful use of the pitch on a word or phrases, contributes to the interpretation of discourse meaning, grammatical meaning, and affective meaning. In discourse, intonation identifies important information for the listener, shows how different pieces of information relate to each other, establish a level of engagement between the speaker and listener, and manages conversational turns. In grammar, particular intonation patter are common with particular structures, helping to distinguish statements from questions (….) in its affective functions, intonation reflect the attitudes and emotions of speakers.*

Sentence stress helps the listener focus on important parts and understand the speaker's intended meaning. Correct location of primary stress in a sentence assists the listener to understand the speaker's speech. Primary stress is crucial, since it can change the meaning of words with the same spelling. Even though a word is slightly mispronounced,

the correct placement of the primary stress phoneme enables correct understanding of the meaning of the communication.

The Primary Stress Phoneme and Tonic Stress in Paragraphs

A paragraph is composed of content and function words, phrases, clauses, and sentences, and each of these elements can bear at least one primary stress to convey the semantics of what the author or speaker means. English stress and connected speech are primarily based on making a distinction between **content words,** which include verbs, nouns, adjectives, and adverbs, and **function words such as articles, prepositions, etc**. Generally speaking, content words carry the emphasis via the primary stress phoneme because they bear the most of the meaning when we speak and write, while function words are unstressed because they carry very little meaning. However, there are exceptions to this rule. Although model verbs, which are fixed and employed to express a relationship between other *main* verbs, are also regarded as function words, they can also receive primary stress as they can alter the meaning of a sentence when needed. Modal verbs are employed in the syntactical building of mood, aspect and tense, and express modality some of which are declaring or refuting possibility, begging, probability, aptitude, cursing, approval, compulsion or future. In addition, negative morphemes such as *not* or *never* also get stressed since they produce an impact on the meaning of the sentence. It must be noted that the time between stressed words is always the same. In an English sentence, the content words will every time have at least one stressed syllable, thus when a content word only has one syllable, it is always stressed. Multi-syllabic content words can even have more emphasis placed on the syllable that receives the primary stress.

As mentioned before, a paragraph structurally carries 6 to 12 sentences, each one of these sentences in the paragraph carries a sentence stress, also called prosodic stress and refers to the stress placed on definite words in a sentence. There may be more than one or more content words in each sentence in a paragraph; therefore, each of the content word has the possibility of bearing a primary stress, whose perception can be problematic for non-native students and teachers of English language. The primary stress in a sentence, frequently placed on the last word stressed, is referred to as the nuclear stress or as the tonic stress. As Demirezen (2016) states:

> *Tonic stress refers to the syllable in a word that receives the primary stress in an intonation unit, like phrases and clauses. The tonic syllable is the most prominent, with primary stressed syllables in a word or word groups. A tonic syllable is always centered on a full primary-stressed vowel (p. 538).*

Mobility of the Primary Stress in Utterances

A syllable is the smallest unit of a word that usually includes one vowel and one or more consonants in it. The primary stress falls on the vowel of a content word of a syllable by making the syllable longer, louder, and higher in pitch with the strongest emphasis. The

phoneme that receives the primary stress in English syllables and words varies from word to word. The term lexical stress is used to refer to the opposition of stressed and unstressed syllables within single words and is necessarily exhibited in only polysyllabic words (Arciuli & Cupples, 2006, p. 919; Demirezen, 2012, p. 311). English is a stress-timed language, and thus distribution of primary stress on lexical items is not exceptional since it is mobile across syllables, by shifting back and forth by the addition of prefixes and suffixes, make differences in the meaning of words and sentences as well. The location of primary stress is highly mobile in English because English is stress-timed language. The place of the primary stress location may change, especially in connected speech, by what the speaker or author wants to mean. Mobility of stress aids the reader or speaker in understanding the intended message of the text, as heard in the following examples:

> *PiCASso created a completely new style of painting. (It was Picasso, no anybody else)*
> *Picasso CREATEd a completely new style of painting. (Picasso created, not copied)*
> *Picasso created a compLEtely new style of painting. (Completely, not partially)*
> *Picasso created a completely NEW style of painting. (A new one, not an old one)*
> *Picasso created a completely new STYLE of painting. (A style, not a method)*
> *Picasso created a completely new style of PAINTing. (It is painting, not cooking, or...)*

An Example Using the Sound Scripting Method
The Sound Scripting of the paragraph below by Beare (2019) can be demonstrated as an example of the Sound Scripting Method to indicate the place of the primary stress phoneme in the sentences of a paragraph.

Paragraph:
> *"Our school is the best in town. The teachers are friendly, and very knowledgeable about English. I've studied at the school for two years and my English is becoming very good. I hope you will visit our school and try an English class. Maybe we can become friends, too!"*

When the above given paragraph is recorded via the Audacity Program (2.0.3), the loud components of sentences come up as follows with the sound scripting markup. This markup takes place along the exact voice recording of the speaker:

> *Our **school** is the **BEST** in **town**. The **teachers** are **friendly**, and **VERY**
> **KNOWLEDGEABLE** about **English**. I've **studied** at the **school** for **two**
> **years** and my **English** is **becoming VERY GOOD**. I **hope** you will visit
> our **school** and **try** an **English class**. **MAYBE** we can **become FRIENDS**!*

However, the way sound scripting markup is presented here is very confusing, distracting and misleading. There are many boldfaced words whose stress types and locations are not indicated. There are more than one word that carry the primary stress

phoneme, which are not shown and overlooked in the paragraph. For example, the words *two years*, *hope*, and *try* bear the primary stress in the native speaker's speech, but they are not indicated in the text of the paragraph given by Beare (2019). These are serious handicaps. Moreover, in polysyllabic words, the primary stress falls only on one of the syllables. Also, the word **KNOWLEDGEABLE is capitalized in all its syllables, which must be marked up as KNÓWledgeable in the Sound Scripting Method Based on Tonic Stress.** In the Sound Scripting Method, capitalization of the word **KNOWLEDGEABLE, then,** is a very confusing indication to many learners of English language because which syllable bears the primary stress is not denoted.

The Sound Scripting Method Based on Tonic Stress Model

To remove abovementioned complications, I propose the Sound Scripting Method Based on Tonic Stress, which can be used with text-to-speech software. The above-given paragraph can be recorded in the voice of a native speaker via text-to-speech software such as the Audacity Program (using any version including 2.0.3, 2.4.2, 2.4.1, 2.4.0). Audacity can be used to record live audio via a microphone or mixer, or create digital forms of recordings from other media, such as Text-to-Speech where the speaking robots do the reading. In the meantime, the students follow the lines of the paragraph through shadow listening following the line by their eyes and involve in listening and pronunciation practice and pay attention to the punctuation marks and their duration. Audacity is an extraordinary open source digital text-to-speech, audio recorder and editor software. It offers users to make their own recordings, combine and cut the utterances, add unique effects, get rid of unwanted noise, and use much more practical functions. As a free and open-source software, the utilization of the Audacity Program is very common in education. It encourages its developers to make the user interface easier for students and teachers. Another example of a program that can be used in this way for pronunciation training is ELSA Speak, which uses artificial intelligence-powered technology based on voice data from people with different English accents. ELSA Speak also features voice recognition technology. As a preliminary application, learners can try ELSA Speak, which is a good application to practice, along with other accents, American English pronunciation. They can hear the location of primary stress phoneme in utterances. ELSA Speak is one of the effective applications for learning North American English pronunciation and intonation. It serves to capture the correct location of the primary stress in the utterances so as to improve the non-native speakers' reading and speaking skills in general (Sama, 2021).

Learners can record their words, phrases, clauses sentences using the software, and it will show them whether the place of the primary stress phoneme is wrong or correct in their utterances. When students are not sure if they are pronouncing a word or sentence correctly, they can consult ELSA SPEAK, and it will show them their errors. It addresses errors or mistakes in a learner-friendly way. ELSA listens to learners' voices,

and then seeks to match their utterances with accurate pronunciation in American English. The words on the screen are colored red, yellow and green to indicate the accuracy of pronunciation or lack thereof. It has many lessons and practice exercises that show you how to perfect your pronunciation pertaining to intonation (Go Natural English, 2021).

As a revisited case, the Sound Scripting Method is renamed in this study as "the Sound Scripting Method Based on Tonic Stress" due to the following applications:

1. The Sound Scripting Method Based on Tonic Stress clearly indicates the words that bear the primary stress phoneme.

2. The Sound Scripting Method Based on Tonic Stress noticeably demonstrates the location of the primary stress phoneme in polysyllabic words.

3. The Sound Scripting Method Based on Tonic Stress works very well with the pausing in relation to punctuation marks. The Sound Scripting Method Based on Tonic Stress developed in this study employs software to show the audio graph of sentences, and in this way the pauses that take place in the sentences can be traceable. This situation is very apparent in the audio graphs given below, which were created via Audacity program (2.0.3) recorded in 44100 project rate**.** The paragraph is converted into an oral text via Audacity 2.0.3 VAW Microsoft, Mono 44100Hz 32-bit float mute in audio tract. Students can listen to the paragraphs in the native speaker's voice. In the Sound Scripting Method Based on Tonic Stress, a sample paragraph like the following can be submitted to the software as a text indication:

Our school is the **BÉST** in town. The teachers are friendly, and **VÉRY KNÓW**ledgeable about English. I've studied at the school for **TWÓ YÉAR**s and my **ÉNG**lish is becoming **VÉRY GÓOD**. I **HÓPE** you will visit visit our school and **TRÝ** an English class. **MÁY**be we can become **FRÍEND**s!

You can be witness of how the Sound Scripting Method Based on Tonic Stress could automatize speech perception and also help internalization of new items. Writing the *audio script* for your online presentations and recording them is a great *way* to ensure you produce quality content in your teaching practice in class. If you hand them over after the class, it will be very instructive for your students.

Here are the examples, which will touch upon some of the basics that demonstrate punctuation marks and pausing condition in utterances via audio graphs. It must be borne in mind that pauses in the sentence given below have specific acoustic features that indicate what a speaker is doing when speaking:
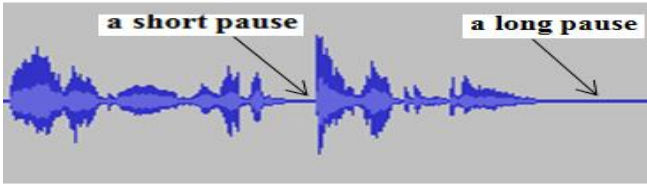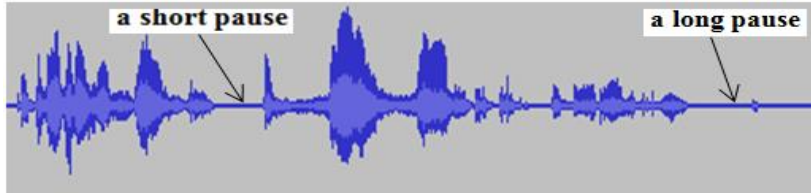
Our school is the **BÉST** in town.

The **teachers** are **friendly**, and **VÉRY KNÓWledgeable** about **ÉNGlish.**
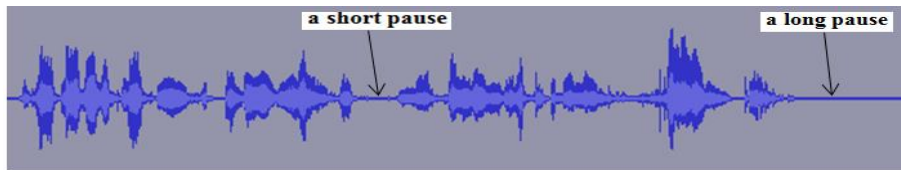
I've studied at the school for **TWÓ YÉAR**s and my **ÉNG**lish is becoming **VÉRY GÓOD**.
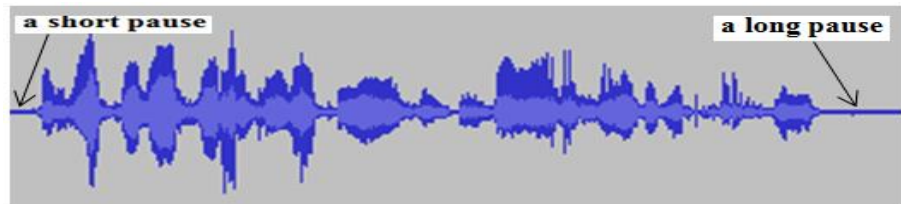
I **HÓPE** you will visit our school and **TRÝ** an English class.
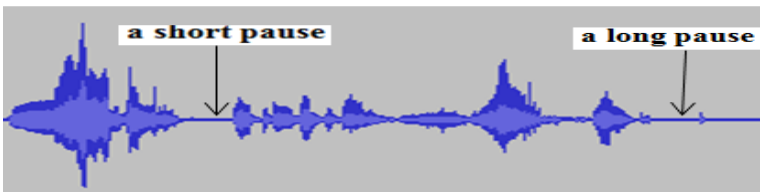
MÁYbe we can **become FRÍENDs!**

As these sentences are played, the learners must speak out loud the material that they are listening to and then must practice what they hear through shadow reading. The pauses may be in the middle of a sentence or at the end of it. Commas, semicolon, colon, dashes, or ellipses are used to cue different types of pauses. The most common of the punctuation marks is comma, and the length of a comma pause about ¼ - ½ second in general.

Punctuation marks, functioning like traffic lights, trigger the motions of reading. In addition, they give clues to the listener to make decisions based on acoustic information. Pauses serve for engagement of the audience to get the intended meaning of the speaker. Thus, improving learners' ability to hear L2 pronunciation can enhance their pronunciation and intonation by means of rehearsing the utterances in forms of words, phrases, clauses and sentences. Then, using the Sound Scripting Method Based on Tonic Stress in teacher training will make the English majors and teachers-on-job more conversational, natural sounding, and at least near native-like.

Using such audio graphs of words, grouping together to form an intonation phrase (tone unit), clauses and sentences accompanied with authentic sound effect, will definitely convert the paragraphs into more natural and conversational audio explanation/narration scripts which become eloquent and error-free prose, centering specifically on correct punctuation and intonation connection. The intonation of phrases can coincide with breath groups, but they do not have to. Without intonation of words, phrases, clauses and sentences, it is almost impossible to perceive the thoughts and feelings that go with them. Therefore, shifts in the intonation of them can carry delicate evidence about the speaker's attitude, mood, emotions and nature.

The Basics of How to Read Paragraphs

Intonation is an integral part of listening and reading, one of the crucial and most influential activities for acquiring at least a near native-like accent in any language. Like any other teaching and learning skills, effective paragraph reading is a mission bestowed upon reflective foreign language teachers as a professional skill to be acquired. Actual reading is a very intensive process. Experienced foreign language teachers, English majors, or readers must not read the texts blindly, but purposely. Readers must adapt a student friendly speed; this is not a speed reading. Keeping a normal speed for the listeners will attract their willingness to perceive what is being spoken for them. The serenity of the surroundings is important for the listeners. For a purposeful skilled reading (Paul & Elder, 2018), it is necessary to naturally locate the primary stress phoneme on syllable or word because you are also reading ideas with underlying concepts, not just words.

Close Connection between Punctuation and Speech

The close connection of punctuation to speech is undeniable. Punctuation fills the writing activity with silent intonation. Good punctuation both directs and follows the tempo and rhythms of speech. Well-located punctuation marks guide the reader or speaker to make pauses at the right points in the flow of speech and written-text. They logically organize the flow of information in the text and pave the way to reading activity. Overall, accurate punctuation improves clarity and precision to writing skill; it guides the writer to stop, pause,

hesitate, continue, or give emphasis to certain parts of the sentence. It must be noted that some marks can entirely change the intended meaning. Overall, you must ensure that you neither overuse nor underuse various kinds of punctuation marks in relation to pauses and intonation. That is to say, even though many readers benefit from reading aloud commas as pauses in the act of reading, a comma does not always represent a pause in a spoken sentence.

Scull and Mackenzie (2018, p. 91) point out that punctuation "provides the conventional framework for sentence structure to aid in meaning making as required in the authorial element of writing which includes text organization, generation of sentences, grammar and vocabulary choices". So, to be able to *use punctuation marks* correctly is essential for anyone learning not only native but also a foreign language.

Shadow Reading Applications in the Sound Scripting Method Based on Tonic Stress

Shadowing "can be easily and frequently practiced in any activity that has text" (Arthurson, 2019, p. 209). Shadowing in reading and listening is a technique that improves listening, speaking and possibly reading skills of language learners concurrently since the learner echoes the text the moment they hear it said by a speaker or from an audio soundtrack (Hamada, 2009; Nakanishi & Ueda, 2011). Shadowing happens to be an advanced language speaking pronunciation and intonation learning technique. It can be used by learners independently to improve their pronunciation and intonation in terms of accuracy and intelligibility. It is a simple procedure: the student just listens to a model sentence, which may be in a video clip or audio of someone speaking, a native speaker, and s/he repeats what is said by the native speakers by speaking along at as close to the same time as s/he can. This will help the learner to capture insights about how to improve his/her speaking skills.

The Sound Scripting Method Based on Tonic Stress must be backed up by shadow reading. In shadow-reading in its classical form, learners are paired to play the roles of reader and shadower. While the reader reads the text, the shadower listens to it with aim to reproducing it in various ways such as repeating totally or parts, interposing interactive remarks, making a summary verbally or in writing. Since stress and intonation connection is clearly indicated in the Sound Scripting Method Based on Tonic Stress, implementing shadow reading in teacher training is highly necessary, and using it in EFL lessons is a way to improve their speaking and reading skills in English.

Because of the immediacy of shadowing which means that as soon as the verbal sequence is heard it must be articulated, shadowing the technique gets to be challenging for many non-native learners of English. Therefore, the shadowing technique is highly effective. Shadowing is great for developing speaking fluency, accuracy as well as intelligibility in learning English (Nakanishi & Ueda, 2011; Omar & Umehara, 2010). Shadowing is especially helpful to grasp the muscular aspects of

speech such as pronunciation, tones of phrases, chunks of intonation, rhythm, tempo, and prosody (Farrell, 2015). Thus, Omar and Umehara (2010, p. 204) emphasize that "shadowing is a highly cognitive action rather than a mere automatic memory action or parroting". Several studies have shown that it can be an effective way to improve speaking skills. Shadowing is very indispensable in teacher education (Farrell, 2015).

The model paragraph and its sentences can be played and listened to again and again by the students. This procedure is challenging and motivating, and can be used at any level of teaching English. It will improve listening and speaking skills both at the sentence level and paragraph context. Also, the application of this procedure works well after some exposure to the rules of pronunciation, stress and intonation relationship as well as connected speech.

Application of the Sound Scripting Method Based on Tonic Stress

Here are the basic principles of the application of the Sound Scripting Method Based on Tonic Stress. By following these principles, you can get much better at reading the paragraphs effectively in English. They will be helpful no matter what your English proficiency level is. Especially when you get to more challenging, longer paragraphs, these steps will be a big help.

1. Choose a suitable paragraph for the learners. A suitable paragraph is a printed copy of a text or dialogue with sentences in the target language, spoken by one or more native speakers. Longer paragraphs are more tiring and burdensome to read. You must check and anticipate the unknown words by the students. You can use the dictionary to check what the difficult words really mean.

2. Record the paragraph via Audacity Program 2.0.3 in normal speed, or any other recording program you have.

3. Discover and mark up the words that bear the primary stress phoneme in the paragraph. Discovering, marking up, and mimicking the words bearing the primary stress is an enhanced reading strategy. All of these acts begin with listening attentively to the text. You can play the recorded audio usually by your computer, smartphone, or mp3-mp4 player.

4. Pay attention to punctuation marks. When sentences are spoken by the native speaker aloud naturally, they often include a number of pauses signaled by punctuation marks, where the speaker pauses for a moment as natural breakpoints in terms of sustained juncture and then continue on. Different kinds of punctuation signal different kinds and lengths of pauses. Some of these pauses are manifested with punctuation marks showing the borders of chunks; some may not be marked. At this juncture, the convenience of the speaker is at work. Each chunk of a word, phrase, clause, or sentence will usually end with a change in pitch, shifting from a low tone unit to a high tone unit, or a high tone unit to a low tone one. You must be careful because you may have difficulty hearing changes in pitch.

5. Read out the paragraph by paying special attention to stressed words and junctures. You can play the audio and go along the text with your eyes as the native speaker reads words aloud. Next, in the second stage of listening or reading, you can detect these pauses between chunks, and put a mark on relevant places in the text. The pauses allow the listener's brain to analyze complex multipart and compound-complex sentences into smaller, more smoothly utterable pieces.

6. Listen to the text again and again so as to get the reinforcement of the text. You must be careful because you may have trouble in hearing changes in the pitch between or among the tones of units.

Please note that speakers are free to stress the words they want to and make pauses at any junction that they prefer. Pauses help sharpen reading comprehension skill to promote fair-minded critically reading prospective teachers. Also it must be noted that speakers do not obey the rules, especially in connected speech. So, no two reading of the paragraph can be the same. Once again, it must be born in mind that each foreign language teacher, English majors, or readers has a different mindset, which leads them to read any substantive text in different manners in different situations for diverse purposes.

Application (1):

In the paragraph given below, the following signs indicate specific pausing situations:

/ // / shows the boundary between tone units (words, phrases, clauses, and sentences, signaling full stop, comma, colon, semi-colon)

/ ⌐ / stands for a rising juncture in which the voice goes up, (signaling a question form, WH-question, exclamation, emphatic expression, raising the pitch of voice)

/ ⌐ / indicates a falling juncture phoneme in which the tone of voice goes down, as heard in the application of a full stop, lowering the pitch of voice to an extinction. It indicates a speaker has finished the utterance.

Here is the paragraph given by Powell (2002) in revisited form via the application of the principles of the Sound Scripting Method Based on Tonic Stress:

> Our school is the **BÉST** in town ⌐. The teachers are friendly// ⌐, and **VÉRY KNÓW**ledgeable about English ⌐. I've studied at the school for **TWÓ YÉAR**s // ⌐ and my **ÉNG**lish is becoming **VÉRY GÓOD** ⌐. I **HÓPE** you will visit our school and **TRÝ** an English class ⌐. **MÁY**be we can become **FRÍEND**s ⌐!

Application (2):

The following paragraph is recorded via Audacity program (2.0.3) at 44100 project rate. The paragraph is converted into an oral text by via Audacity 2.0.3 VAW Microsoft, Mono 44100Hz 32-bit float mute in audio tract. The application of the principles of the Sound Scripting Method Based on Tonic Stress yields the following paragraph script:

Text: A paragraph (Adapted from ghananewstoday, 2022).

> *According to World Health Organization, pears have the effect of clearing away heat and removing fire, which can help lower body temperature and relieve symptoms of fever. Pears are rich in vitamin **A**, vitamin B, vitamin **C**, vitamin D and vitamin E. Eating more pears when you have a fever and supplementing with enough vitamins can significantly enhance the immune **syst**em. At the same time, pears contain about 85% water. Eating more pears can also add some water and speed up blood circulation. Overall, eating pears will lower body temperature, and eliminate viruses and bacteria.*

In terms of traditional phonetic speech description, due to regional, social, style, age, educational level and professional variation of speakers, the circles of waves are different from each other. These wave circles house all of the characteristics of the speakers, just like the fingerprints do. It has been discovered that "age has a significant effect only on speech rate, articulation rate, and frequency of pauses" (Bóna, 2014, p. 161). The waves of speech in the above-given audio graphs contain important information that listeners use to make inferences about speakers, such as age, height, and weight (Krauss et al., 2002).

Example 1: Female speaker; speech speed is 85.

> According to World Health Organi ↗**ZÁ**tion //, **PÉARS** have the effect of clearing away heat ↗ and removing fire // ↗, which can help lower **BÓDY** temperature // and relieve symptoms of F**É** ↘ver. **PÉAR**s are rich in vitamin **Á** ↗; vitamin **Ḃ** ↗; vitamin **Ċ** ↗, vitamin **Ḋ** ↗ and vitamin **É** ↘. Eating **MÓRE PÉAR**s when you have a **FÉ** ↗ver and supplementing with enough vitamins can significantly enhance the immune **syst**em ↘. At the same **TÍME** ↘ //, **PÉAR**s contain about 85% water ↘. Eating more **PÉAR**s can also **ÁDD** some water and speed up blood circulation ↘. Over**ÁLL** ↘//, eating pears will lower **BÓDY** temperature // ↘, and eliminate viruses and ac**TE** ↘ria.

The audio graphs given below are recorded by Audacity 2.0.3. They are measured in the following shapes. The form and the length of the sound waves, and the length of the pauses are all unique to the speaker. Each of us has a physical feature that is unique; therefore, each person's voice is as unique as a fingerprint, just like the unique features of a person's iris. In other words, our vocal cords are as unique as our fingerprint; so, no two people have exactly the same set of vocal cords and their sound waves. This means that our voice uniquely belongs to us because actual shape and size of our vocal cords are solely based on the size and shape of our speech organs, and thus can never be duplicated. Thus, the distance from the mouth to throat in the oral cavity is about 17 centimeters. This is the structural uniqueness of our vocal apparatus. Our mouth, tongue and throat in the oral cavity along with our nose the nasal cavity are what give our voice the rest of its sound volumes, pitches, and resonance. All of these articulators and cavities determine how a person's voice physically and acoustically is formed. All in all, frequency

of a usual adult male voiced speech essentially ranges between 85 and 155 Hz, and that of a typical adult female varies between 165 and 255 Hz. Each person has a unique physiology and voice timber; therefore, the sound graphs are also unique to each of us.
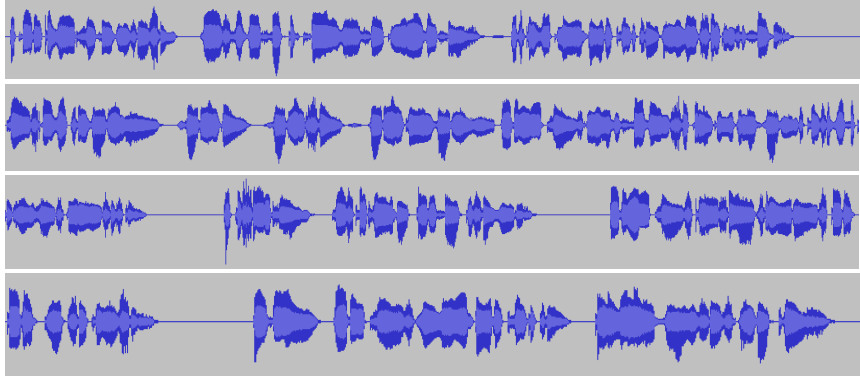
(Azure, 2019)

Example 2: Male speaker; speech speed is 85.

According to World Health Organi ↘**ZÁ**tion //, **PÉARS** have the effect of clearing away heat and removing **FÍRE** //↗, which can help lower **BÓDY** temperature // and re**LÍEVE** symptoms of F**É** ↘ver. **PÉAR**s are rich in vitamin Á ↘//, vitamin **Ḃ** ↘//, vitamin **Ć** ↘//, vitamin **Ḋ** ↘// and vitamin **É** ↘. Eating more pears when you have a **FÉ**↗ver and **SÚPP**lementing with enough **VÍ**tamins can sig**NÍ**ficantly enhance the im**MÚNE** system ↘. At the same **TÍME** ↘//, pears contain about **ÉIGHTY-**five% **WÁ**ter ↘. Eating more pears can also add some **WÁ**ter and speed up **BLÓOD** circu**LÁ**tion ↘. Over**ÁLL** ↘//, eating pears will lower **BÓDY** temperature //↘, and e**LÍ**minate viruses and bac**TÉ** ↘ria.
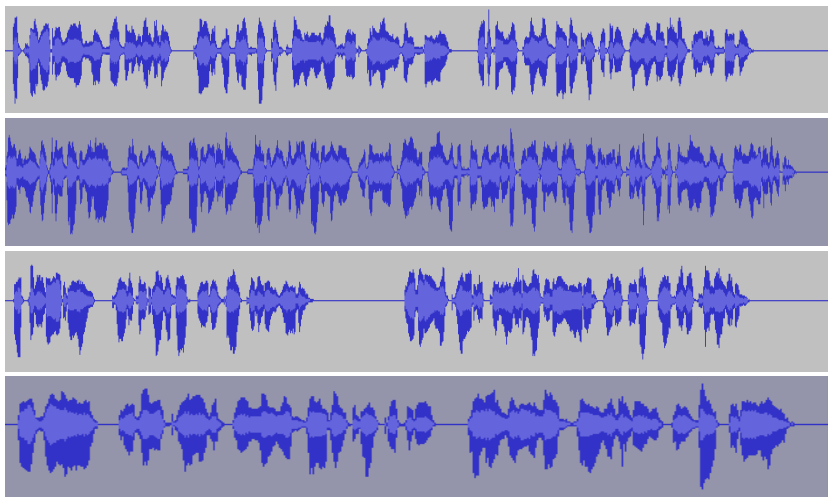
(Azure, 2019)

With the required listening and reading practice, you basically learn to record and transform audible form of spoken language into a straightforwardly readable paragraph. This will be the intonation of a paragraph as oral expression.

As a general inclination, if all of the phonetically based technical signs in the above-given graphs are seen as boring, only the words carrying tonic-based primary stress and pauses can be jointly put forward for practice as follows:

> According to World Health Organi **ZÁ**tion //, **PÉARS** have the effect of clearing away heat and removing fire //, which can help lower **BÓDY** temperature // and relieve symptoms of F**É**ver. **PÉAR**s are rich in vitamin **Á**, vitamin **Ḃ**, vitamin **Ć**, vitamin **Ḋ** and vitamin **É**. Eating **MÓRE PÉAR**s when you have a **FÉ**ver and supplementing with enough vitamins can significantly enhance the immune **syst**em. At the same **TÍME**//, **PÉAR**s contain about 85% water. Eating more **PÉAR**s can also **ÁDD** some water and speed up blood circulation. Over**ÁLL**//, eating pears will lower **BÓDY** temperature //, and eliminate viruses and bac**TE**ria.

Conclusion

The poor and faulty pronunciation skills and accented speech of non-native of teachers of English and teaching staff at the departments of English language education cannot be defended. In the training of prospective teachers, the most compelling reason for practicing lexical stress or tonic stress is that when it is faulty it disturbs the students, the speaker, and the listener. Pronunciation and intonation skills are the most difficult skills to master by many non-native speakers because English words and sentences look nothing like how they are pronounced. Utterances with correct sentence stress and intonation can also have a huge effect on the clarity of one's pronunciation.

The Sound Scripting Method Based on Tonic Stress, which can sharpen reading and pronunciation skills, is also helpful to develop a natural rate of speech through comprehension involvement. It enables non-native learners to increase their pronunciation and intonation knowledge in a short period of time by drawing attention to every single word of an utterance. A major benefit of the Sound Scripting Method Based on Tonic Stress is that it contributes to the enhancement of reading paragraphs, short compositions, and essays. It can play important role in the classroom and may develop a positive attitude toward reading in the target language. The joint use of shadow reading, the Sound Scripting Method Based on Tonic Stress, and paragraph reading practice can improve students' intonation by making it more native-like. Another benefit of the Sound Scripting Method Based on Tonic Stress is that tonic-based sound scripting hand in hand with shadowing can also help learners boost their self-confidence in foreign or second-language usage thanks to improvements in pronunciation and also in skills of listening, speaking, reading and even writing.

It is hoped that the application of the Sound Scripting Method Based on Tonic Stress will increase non-native speakers' overall confidence in reading paragraphs and further in also

presenting in English with professional pronunciation and intonation. As seen in the application of the Sound Scripting Method Based on Tonic Stress proposed in this chapter, text-to-speech software can be used to enhance pronunciation instruction. Thus, English language teachers should not overlook open-source text-to-speech, voice recording and editing software such as Audacity, which enables visualization of pronunciation as sound waves for a variety of different speakers, as pronunciation training software.

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TEACHING VOCABULARY THROUGH TECHNOLOGY

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Before you read, reflect on the following questions:
1. Do you think all students have equal levels of access to computer and mobile phone technologies?
2. How do you think language teachers guide their learners' vocabulary learning through technology?
3. Is it possible to teach academic vocabulary through technology?
4. What aspects of vocabulary knowledge can technology use enhance?

Introduction

The term 'technology' has turned out to be an indispensable feature of foreign language teaching, as in any other branch of education, thanks to pervasive influence of never-ending technological developments. Foreign language teachers are strongly encouraged to find ways of embracing technology to enhance their teaching quality (Chun et al., 2016). This encouragement is particularly meaningful when we consider the fact that the rate of students who are digital natives is increasing each and every year in classrooms (Anshari et al., 2017). Along with other language skills, technology use in vocabulary teaching has produced a substantial body of research that has ramified into different directions as vocabulary learning requires considerable effort by learners. This chapter aims to provide an overview of the recent research into technology in vocabulary teaching in relation to computer and mobile technologies. Moreover, some pedagogical guidelines based on research on issues ranging from the age of learners to the type of the technology to be used will be offered for language teachers.

Teaching Vocabulary through Technology

Vocabulary knowledge is key to general language proficiency as vocabulary is essential for the development of both productive and receptive skills (Barclay & Schmitt, 2019). To evaluate the place of technology in teaching vocabulary, we need to first define what we mean by technology as technology and language relationship can be stretched back to the

invention of writing 5000 years ago (Chun et al., 2016). What is currently referred to by technology use in teaching vocabulary is the employment of modern technologies either in the form of computer-assisted language learning (CALL) (Stockwell, 2007) or mobile-assisted language learning (MALL) (Yang et al., 2021). Though they can be treated separately, CALL can be also considered to encompass all kind of growing technologies including MALL (Stockwell, 2007). Still, in order to refer to the use of technology in vocabulary teaching, technology-mediated vocabulary development (TMVD) can also be used as a more comprehensive term (Elgort, 2018). The theoretical ground of TMVD is twofold. First, TMVD is thought to strengthen the associations made in the memory by presenting multimedia input by combining different forms from the options of 'text, images, audio, animation and caption/subtitles' (Zhang & Zou, 2021, p. 2) for a target vocabulary item. Consolidating the associations made in the memory via both audio and visual channels is in line with the premises of dual coding theory (Hao et al., 2021) and multimedia learning theory (Mayer, 2014). Though the employment of multimedia input dates back to 1600s where illustrations accompanied instructions in books, the use of multimedia input for educational purposes is accepted to be in its third developmental phase where they are abundantly used in computer-based environments (Mayer, 2014). The appealing side of using computer-based multimedia content is that language teachers not only enrich the input via forms of visual and auditory information but also allow learners to 'actively select relevant information, organize it into coherent representations, and integrate it with other knowledge' (Mayer & Moreno, 2002, p. 111). Second, TMVD can be aptly used to create interaction opportunities for learners during vocabulary training, which enhances vocabulary learning by leading learners to negotiate meaning with each other in a natural manner (Hao et al., 2021; Yang et al., 2021). Considering the benefits of technology, the area of vocabulary teaching has been quite enriched with the research reporting a wide array of studies coming particularly from CALL and MALL.

Types of Technology Used for Enhancing L2 Learners' Vocabulary
Though with differing degrees, technology use has been widely associated with positive influence on vocabulary learning (Hao et al., 2021) and thus it deserves to be treated as a useful tool in second language teaching. As such, an important task for language teachers is to ponder what technologies can be conducive to better language learning experiences for their students (Chun et al., 2016). Two main types of technological resources that are accessible by many teachers and learners are desktop computers and mobile devices such as smart phones, table computers, which have been the topic of much recent research.

Computer-Assisted Vocabulary Learning
Parallel to the infusion of technology into each aspect of our daily lives, the integration of technology into language education finds wider and wider acceptance in language

education under the term of CALL, which simply refers to the use of computer technologies in the language classroom (Chapelle, 2008). As the name suggests, computer-assisted vocabulary learning (CAVL) is a domain-specific variety of CALL and encompasses all kinds of technology-bound affordances for teaching and/or learning vocabulary (López, 2018). As for the conventional approaches to vocabulary learning, CAVL practises build on two main vocabulary learning paradigms, namely implicit and explicit learning (Ma & Kelly, 2006).

Implicit learning practices are based on enhancing learners' L2 vocabulary development via comprehensible input, i.e. through reading or listening, where learners get repeated exposure to the same vocabulary items and learn the vocabulary incidentally via referring to the strategy of guessing from the context and teachers may opt for computer programs in which reading passages are added hypertext glosses (Ma & Kelly, 2006). Hypertext glosses are on-screen annotations that allow learners to reach the definition of a word along with supplementary information such as visuals, videos and audio (Cooledge, 2004; Yun, 2011). The use of hypertext glosses has found a wide application via the employment of CALL approach (Chen, 2016; Khezrlou et al., 2017; Poole, 2012; Teng & Zhang, 2021; Zandieh & Jafarigohar, 2012). Shahrokni (2009), who compared the impact of three types of hypertext glosses on elementary Iranian EFL learners' (N=90) word recognition, showed the positive influence of hypertext glosses on incidental vocabulary learning. The researcher reported that in the word recognition tests given immediately after reading with hypertext glosses, the participants who read texts with multimodal (i.e. visual and textual information) hypertext glosses achieved significantly higher incidental vocabulary gains than the participants who had access to either only images or only textual information via hypertext glosses. This study provides us with the insight that enriching the content of hypertext glosses with images and audio along with the textual information is conducive to better vocabulary acquisition for second language learners.

The influence of enriched input via computers on incidental vocabulary acquisition was also confirmed by another study that employed videos. In a study conducted by Lin (2010), a group of high-proficient EFL learners (N=44) was compared to a group of low-proficient EFL learners (N=39) with regard to their incidental vocabulary learning through viewing video clips. The researcher utilized a computer laboratory in the school for the learners to access the video clips. The participants were free to have Chinese subtitles and definitions as they watched the video clips. As a result of the study where all participants improved their vocabulary knowledge, Lin (2010) concluded that thanks to visual contents, videos can serve as pedagogical tools that significantly increase second language learners' incidental vocabulary acquisition regardless of their proficiency level.

Yet, CALL is not only useful for implicit vocabulary instruction but also for explicit vocabulary instruction, which has been confirmed by a bunch of studies. In their study, Khezrlou et al. (2017) examined the effects of hypertext glosses with upper-intermediate EFL learners (N=99) by employing both incidental and intentional vocabulary learning

approaches. While the learners in the explicit learning group were instructed to check each hyper-text link, which provided multimedia glosses, the learners in the incidental learning group were not directed to do so, which meant they checked those links if they wanted to do so. Moreover, there was another group of learners who were given explicit instruction with L1 definitions of the target vocabulary items before they were told to check each hypertext in the given reading passages. Though each learner group was found to increase their vocabulary knowledge, the learners who took both explicit instruction and were told to check each hypertext link achieved significantly higher vocabulary gains in the long term than the learners in the incidental learning group and the ones who took explicit instruction and L1 definitions of the target words. Asllani and Paçarizi (2021) also reported similar findings in their research with upper-intermediate EFL learners (N=109), who were assigned to one control group and three different experimental conditions of multimedia annotation. While the control-group participants took only traditional education without using computers, the other three groups took a reading exercise on computer. The first experimental groups was given only L1 definition for the unknown words, the second experimental group was given L2 definition and audio pronunciation for the unknown vocabulary items. Finally the third experimental group accessed both L1 translation and L2 definition plus image in hypertext glosses. The results indicate that the third experimental group significantly outperformed the students in other three groups. Uzun et al. (2013) also reported positive influence of computer games on explicit vocabulary learning by EFL learners at a university. In their study the researchers used a vocabulary game that they developed and applied to the experimental group one hour weekly during the class time over six-weeks. The researchers reported significantly more vocabulary learning by the participants who played the game in comparison to the control group who did not play the game. Moreover, the participants in the experimental group expressed greater satisfaction from the course.

As the aforementioned research suggests, language teachers can aptly use computers for assisting language learners' vocabulary acquisition. They may give their learners access to these programs by using computer laboratories in their schools, if any, or via encouraging learners to install target applications on their personal desktops, laptops, or tablets. Language teachers may plan CALL programs as a part of their in-class activities if they have regular access to computer laboratories.

Moreover, language teachers may also integrate virtual reality games into their teaching program as a type of extracurricular activities. They may guide learners to virtual reality settings that may help them to practice vocabulary outside the classroom. In their study, Berns et al. (2013) designed a five-level supermarket game on a platform called VirtUAM, which allowed the researchers to design the levels of the game in line with their pedagogical goals. The participants needed to collaborate with their team members to accomplish given tasks. All of the participants (N=85) were beginner level adult Russian EFL learners. The researchers reported significant increase in the participants' language

proficiency not only for vocabulary but also for writing skill, which was a finding the researchers attributed to the interactive and motivating nature of the game that they created. Similar results were obtained by Alfadil (2020), who also researched the influence of a specific virtual reality game called House of Languages, on intermediate, K-12 EFL learners' vocabulary acquisition. Along with higher vocabulary gains, Alfadil also reported that the participants were highly motivated to use the target program. These studies imply that as long as language teachers design computer games around well-defined pedagogical outcomes, CALL can be of immense use for learners to increase their lexical stock and can extend their in-class training beyond the classroom (Berns, et al., 2013).

Mobile-Assisted Vocabulary Learning

In addition to computers, language teachers may also opt for mobile technologies to increase their learners' vocabulary knowledge. Smart phones have turned to be an indispensable tool for the youth in all types of environments including educational settings (Radesky et al., 2015; Thulin & Vilhelmson, 2007). Though the use of mobile phones in classrooms is severely criticised for being the source of cyberbullying, technology addiction (Selwyn & Aagaard, 2021) and concentration deficiency (Beland & Murphy, 2016; Selwyn & Aagaard, 2021), there are also advocates of using mobile phones for learning as it may be of immense benefit to learners as long as it is pedagogically used (Anshari et al., 2017; Kuznekoff et al., 2015). Mobile phones have been welcomed in second language classroom as there are alternative ways of using them for different language skills (Collins, 2005; Reinders, 2010; Zhou & Wei, 2018). Previous research also suggests the positive effects of mobile phones on learners' vocabulary learning.

As in the case of CALL, MALL can be fine-tuned to address incidental or intentional vocabulary learning. In their study, Wu and Huang (2017) adopted the intentional learning view and developed a mobile vocabulary game which allowed the participants in the experimental group (N=32) to practice the target vocabulary in the procedure of a block-clearing game. The participants were all freshmen at a Taiwanese private university. The researchers allocated regular periods for in-class practice with the mobile game they modified in line with the target vocabulary list. They concluded that the integration of mobile games into vocabulary learning leads to the longer-term retention of the target vocabulary as well as significantly higher levels of satisfaction.

Mobile phones are also available beyond the physical school setting. Shadiev et al. (2020) reported out-of-the-classroom use of MALL for vocabulary acquisition. The researchers created a mobile application that allowed the participants to take photos that match with target vocabulary items. The participants, who were elementary school students (N=20), were instructed to create labels for these items on the photos and then to use the same application for telling their experience using the photos they took. This study is particularly significant in that it shows how MALL can be extended beyond classroom and connect in-class learning and real life experiences. Additionally, the system developed by the

researchers was based on an image recognition system and the system provided the label and definition of any item through links to other web pages if the participants needed to check. The researchers highlighted significantly higher achievement for these learners both in the post-test and delayed-test in comparison to the control group (N=20), who only completed conventional paper-based activities. In the light of this study, it is conceivable that providing learners with enriched input on mobile phones and with individualized learning opportunities can make learning meaningful for them and increases language learners' vocabulary acquisition. Additionally, the input can result in better learning when the mobile system in use requires an interesting and authentic output format from learners as in the study of Kurt and Bensen (2017), who expected the participants (N=16 EFL learners at the tertiary level) to shoot 6-second video clips to illustrate the target words from the units studied in the classroom. The researchers utilized a free mobile-phone application and the participants created the videos via that free-to-download application as a kind of extracurricular activities for the regular in-class practice. The participants in the experimental group not only achieved higher vocabulary performance but also reported greater motivation and pleasure from the process where they shared all the videos they created on an online platform with their peers and guessed the target word described in each video shot by the other participants.

Still, one needs to be cautious to claim that any kind of technology inclusion yields significant gains for language learners' vocabulary acquisition. In order to extend the in-class vocabulary learning outside of the classroom, Wang et al. (2020) took a collaborative approach to the use of mobile phones with a group of EFL learners. By using a mobile phone application, the researchers formed a chat group with all the participants (N=28), who were freshmen at a Chinese state university. The participants were expected to first design an individual illustration depicting the words' meanings in the target vocabulary list and to share these illustrations in the group chat. The participants were expected to post a second illustration for the very same vocabulary in the same week and this process was repeated for 2 weeks. Though the participants in the experimental group outperformed the other participants whose instruction was limited to in-class learning in the post-tests, this difference was not observed in the long term. The researchers attributed this finding to the fact that the participants were tested only for their receptive vocabulary knowledge. Moreover, the experimental group participants did not report a higher motivation for learning than the control group at the end of the study, which was attributed to the short duration of the study. Thus, it indicates that when language teachers integrate mobile learning applications into their vocabulary teaching, lengthened exposure may prove more useful for learners rather than one or two-week short term use (Alfadil, 2020). Additionally, the output expected from learners should be designed in line with learners' interests while designing studies.

Regardless of the type of technology, i.e. CALL or MALL, research also suggests that TMVD can be aptly used for all proficiency levels and mostly yields greater learner engagement in learning experience. Based on their review of studies conducted on young language

learners from beginner level, Yang et al. (2021) draw the conclusion that successful integration of technology is promising for enhancing autonomous learning process. Little (2007) contends that learner involvement is essential for successful language learning and it should be supported by language teachers by gradually leading learners to take decisions from the early start of learning experience. Thus, it is plausible to claim that one of the subsidiary aims of using technology can be to create chance for beginner learners to experience some decision-making on different points such as incorporation of digital materials into their learning process and extending language learning experience beyond the classroom. Regarding more proficient learners, technology integration is reported to be highly motivating and fruitful especially when that particular technology has game-like features allowing learners to customise the setting for their online vocabulary learning and also when it involves problem solving in a collaborative manner outside the classroom as well (Abrams & Walsh, 2014).

Designing a TMVD process for second language learners

The implementation of technology is getting more and more intertwined into the language teaching practice and it is the herald of a transformation of the pedagogical approach employed by educators. Still, deciding on what educational technology to offer to learners is not an easy task for language teachers (Kessler, 2018) as there is a wide range of alternatives (Yu & Trainin, 2022) and learners' needs change in line with learner profiles (Ma, 2017). In order to choose the best technological practice for their learners, teachers both need to understand factors influencing vocabulary learning (Ma, 2017) and they need to improve their understanding of how pedagogical technologies can be used effectively (Anshari et al., 2017). Cope and Kalantzis (2017) mention seven affordances of these new educational technologies as shown in Figure 1.

Figure 1 *e-learning affordances* (Adapted from Cope & Kalantzis, 2017).

All these elements signal an important shift from what we traditionally do in the classroom. They point at the removal of the time and space barriers existent in traditional classroom and they indicate ground breaking changes in the roles attributed to learners and teachers along with sources of information and types of assessment. In addition to the features of new educational technologies, language teachers need to be knowledgeable about the essentials of vocabulary learning. Hatch and Brown (2000) summarize the vocabulary learning process in five essential steps that are illustrated in Figure 2:
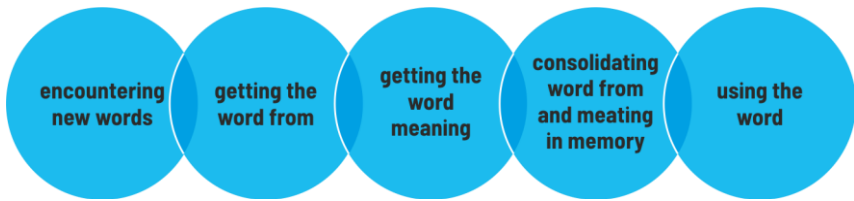
Figure 2 *Five essential steps to learning new words* (Adopted from Hatch & Brown, 2000).

When language teachers consider integrating technology into vocabulary teaching, they need to attend both the affordances of new educational technologies and the essentials of vocabulary learning as each of these elements is of immense importance for achieving pedagogical goals. In the light of these essential stages in vocabulary learning and research on TMVD, several pedagogical guidelines can be proposed for learning vocabulary through technology:

1)   Pedagogical technologies are known to be motivating for learners from all ages, especially for young generations (Campbell, 2006). While planning a technological intervention, language teachers should consider the age-specific features of their learners. For the effective use of technology with young learners, Whyte and Schmid (2019) list three principles of designing a classroom process, which should be also considered as basic premises of TMVD for adults. Accordingly, young learners should be given the opportunity to produce their own linguistic sources in order to complete the assigned tasks rather than relying on ready-made chunks, which will increase learner centredness of the technological application at hand. Next, authentic real-world tasks will prove to be more useful for language learners to improve their language skills.

2)   Pedagogical technology should allow learners to monitor their own learning process to produce language output in such a way that learners will notice and need to complete the gaps in their interlanguage (Whyte & Schmid, 2019).

3)   Self-directed learning can be harnessed via TMVD if language learners are allowed to have their personal choices in the applications (Ciampa, 2014) such as designing their own avatars or page layout. In a study where the adult participants (N=46) were trained with different amounts of technological interventions, Fuhrman et al. (2021)

reported that the highest amount of vocabulary learning was achieved by the participants who manipulated the movement of their avatars as they practiced the target vocabulary in comparison to other groups who could not manipulate their avatars, which proves that the more learners get involved in the task, the better they consolidate the target vocabulary.

4) The target words in CALL and MALL applications should be determined by language teachers and also by learners in line with pedagogical outcomes. Teachers can determine which target words learners will encounter through educational technologies. Course books can be of great use for teachers on deciding what words to practise (Hatch & Brown, 2000). Moreover, language teachers can opt for using tools where learners are autonomous to practice their own preferred vocabulary items. In a recent study conducted by Korlu and Mede (2018), young-adult EFL learners (N=40) practiced target vocabulary items via the free version of Quizlet, a mobile application for vocabulary learning. The study lasted for eight weeks and the participants were free to practice the additional vocabulary items they wanted to learn together with the target ones. Along with learning target vocabulary items in an effective manner, the participants stated that they used Quizlet to create flashcards for the other vocabulary items of their own choice. Additionally, the fact that they could reach Quizlet out of the class on their own will made their learning experience more autonomous and also ubiquitous, going beyond the spatial and temporal borders of formal learning. Thus, this study displays a successful employment of the ubiquitous learning principle of educational technologies, as suggested by Cope and Kalantzis (2017).

5) Applications are more likely to yield long-term retention if the tasks have appropriate cognitive challenge. In order to decide the cognitive load, age should be considered among the decisive factors. Yu and Trainin (2022) mention that language teachers should choose topics appropriate to learners' age and interests. Additionally, they state that technologies developed for adults should have more functions than those for young learners.

6) Pedagogical technologies should promote collaborative learning. They are considered to be more motivating depending on the amount of collaboration with peers they entail (Ciampa, 2014; Korlu & Mede, 2018; Tseng et al., 2020). In a study conducted by Tseng et al. (2020), young EFL learners (N=90) practiced the target vocabulary list in a virtual environment and the ones who studied with a peer showed higher long-term retention in comparison to their peers who studied alone under the very same circumstances. Tseng et al. (2020) reported that the collaborative tasks may provide incentive for learners to aid each other for reaching their common goal and thus building a mutual trust. Moreover, cooperative learning can increase the negotiation among learners as they exchange ideas about the strategies for optimal

use of the technology at hand (Ciampa, 2014). Language teachers may use this collaboration for leading learners to use the target words in a productive way.

7) The type of vocabulary knowledge to be improved via technology integration should ideally be both receptive and productive vocabulary (Hao et al., 2021; Yu & Trainin, 2022). Most of the TMVD studies covered in this chapter are mainly targeting receptive vocabulary. As Schmitt (2000) states, the basic knowledge about a target vocabulary item is comprised of knowing its meaning and form and this corresponds to receptive vocabulary, which is quite a limited part of vocabulary knowledge. The TMVD studies can extend the scope of vocabulary teaching to include productive vocabulary by creating contexts for learners' written and spoken productions. CALL and MALL are conducive to better learning if learners are given chances to use words more productively in a way appealing to their interests. Still, it is recommended to be cautious about making claims about the productive vocabulary gains of learners because, as Schmitt (2000) puts it, what they produce in one context is limited to that environment and it is questionable whether they can take that word into other contexts.

8) Pedagogical technologies deployed for vocabulary teaching lead to better learning performance if the input provided is enriched with pictorial representations and audio (Yu & Trainin, 2022). This claim is in line with the multimodal meaning principle of Cope and Kalantzis (2017) and theory of multimedia instruction by Mayer (2014), which are also linked to Dual Coding Theory (DCT) (Clark & Paivio, 1991). In the basic sense, DCT posits that a vocabulary item has both verbal representations in the form of speech and writing and nonverbal representations in our minds. Nonverbal representations are the mental imagery of a given word that can be formed via visual displays such as self-generated imagery, illustrations or pictorials (Sadoski, 2005).

Conclusion

As technological developments continue in a non-stop fashion, technology-mediated vocabulary teaching is getting more inviting since most of the studies are reporting positive outcomes for learners' vocabulary retention (Klimova, 2018). For sure, bringing technology into language classroom is a multi-dimensional task that requires careful planning in every detail.

When emerging technologies are employed, learners should be given orientation for the effective use of target applications or programs (Lai, 2015). Language teachers should also monitor the use of these applications throughout the term. In order to provide this kind of support, teachers themselves should have technology literacy as teachers' technology competency is important in the successful deployment of mobile technologies in the classroom (Ozdamli & Uzunboylu, 2015). Next, even though it is beneficial when learners have access to the programs on their own choice, language teachers may consider treating these programs as an element of their teaching procedures to ensure systematic

and optimal use. One way of achieving it can be to integrate the use of these programs into the grading system. The integration of emerging technologies is not necessarily a new alternative to traditional forms of teaching, but rather they may be treated as supplementary tools for enriching vocabulary learning experience.

Finally, it is important to keep in mind that technology integration in language teaching is not an easy task and there may be some challenges. To name few, educational technologies are growing to have wider functions in a fast manner and language teachers need to choose the most appropriate among these recent technologies for a better learning experience for their students, who are also improving their relationship with technology day by day (Kennedy & Levy, 2009). In order to keep the track of these never-ending technological developments, teachers need a well-established digital literacy. However, language teachers report lack of confidence in using new technologies (Lin et al., 2014; Salehi & Salehi, 2012) as still many language teacher training programs fail to equip pre-service language teachers with required levels of digital literacy (Kessler, 2018). Similarly, in-service language teachers also do not have needed educational background on technology (Hashemi & Kew, 2021) and it is highly normal that they feel concerned about using technology for teaching language skills and areas, including vocabulary. One way to overcome this barrier is to create contexts for language teachers to investigate new technological facilities and share their technology experience (Kessler, 2018) in vocabulary teaching, as for other skills and areas. Along with teachers' readiness, school administrators should also be supportive and give manageable workload to language teachers regarding that technology integration requires careful planning and monitoring time, which means additional workload for language teachers (Amro & Borup, 2019). To conclude, using technology for vocabulary teaching has the potential of being a highly useful experience both for language learners and teachers as long as the process is well-planned and effectively managed.

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About the Auhtor

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USING ONLINE SOCIAL NETWORKS IN FOREIGN LANGUAGE TEACHING

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Before you read, reflect on the following questions:
1. What could be the factors behind social networks' becoming an important part of our lives?
2. Can the popularity of social networks among learners be used to increase the effectiveness of foreign language education?
3. In particular, which features of social networks could be associated with the target skills in foreign language learning?
4. How does the role of teachers change with the use of social networks in educational environments?

Introduction

Internet has been an important channel of communication and social connection for today's global society since internet-based social networking tools and applications have remarkable growth and became significant part of daily life. Hundreds of millions of people in developed and developing countries around the globe reach and use these social networking services. With the increase in the number of users of mobile devices and also mobile social networks, it has been predicted that social networking sites will have 3.96 billion users in 2022 (Statista, 2022).

Before the advent of social networks, communication was mostly one-to-one, which was achieved with the usage of different communication technologies such as phones. However, social network services have created new ways for social interaction. Thereafter, with the help of the development of mobile devices and applications, multiple connections with others at any time or any place have become possible. In this way, there has been a "shift from place-to-place communication to person-to-person communication" (Merchant, 2016, p. 16). Today's networked world has created fundamental change in the ways we communicate, deliver information and exchange knowledge. This new transformation force us to rethink the relationship between globalized communication and the methods of conveying information, and to head towards using faster, safer and more effective forms (Horban et al., 2021) for daily life as well as for education. As a result of this new movement, social networks have made valuable contributions to educational practices. In this chapter, the phenomenon of social networks will be discussed in the contexts of teaching and learning English as a foreign language. In accordance with this purpose, definition and history of social networks, integration of social networks to facilitate foreign language teaching and learning, most popular and effective social networks used in language classrooms, possible affordances and also some drawbacks and considerations of the social media platforms will be discussed.

What Is a Social Network?

In the literature there are a number of terms used in a similar sense to refer to a variety of websites and services regarding to social networks. Therefore, clarification of the concepts related to social network can lay sound foundations for our discussion. Among these terms, the ones to be used in this chapter are network, social network, social network sites (SNS), and social networking sites and social media.

A social network site is a platform where participants
1) have uniquely identifiable profiles
2) can openly express connections that can be seen and pass through by others
3) can consume, produce, and/or interact with streams of user-generated content generated by their contacts on the platform

A network was simply defined as connections between people, groups, systems, nodes and entities which serve to create an integrated whole (Siemens, 2004). A network refers to not only simple social connections, but also the existence and repetition of multiple kinds of relations that sustain a network (Merchant, 2016). Although, in general, social network is used to emphasize the communication or information sharing between any two or more entities, in this day and time, when people hear the term social networking, they automatically think of websites and web-based services because of the internet which is used as a popular channel to ensure the interaction among online community of users. In this context, social network may be defined as services which "allow users to create links

between their online presence such as a webpage or a collection of photos through joining online groups or by assigning direct links to other users through lists of 'friends' or contacts" (Green & Hannon, 2007, p. 13). Social networks permeate geographic, economic, and political borders. In social network environments individuals send private or public messages, post on public wall, use instant messaging and update their status to socialize with other users (Bower, 2017).

Other terms that are frequently mentioned in the literature and used interchangeably are *social network site* and *social networking site*. In 2007, Boyd and Ellison stated that they chose to use the term 'social network site' instead of 'social networking site' on the grounds that the term 'networking' point up the beginning of a relationship between people who do not know each other while this is not the distinguishing feature of the social network sites as well as the term "network" involve the relationship maintenance. From this perspective, they offered the earliest and most widely accepted definition of social network sites by building upon the concept of real worlds' social networks. According to their definition, social network sites (SNSs) are web-based services and there are three core features of SNSs, which makes them unique. The first feature allows users to create a public or semi-public profile within the site. The second feature allows users to create and have the list of other users they are connected to. Finally, users can view and explore their own and others' list of connections. According to another definition, social network sites (SNSs) are internet-based websites in which individuals come together to build new relationships; discuss their ideas with others; share interests and activities; talk; gossip and more (Crane, 2012). After almost six years after their initial definition, Ellison and Boyd (2013), as a result of the evolution of social network sites, revised their definition as follows:

> A social network site is a networked communication platform in which participants 1) have uniquely identifiable profiles that consist of user-supplied content, content provided by other users, and/or system-level data; 2) can publicly articulate connections that can be viewed and traversed by others; and 3) can consume, produce, and/or interact with streams of user-generated content provided by their connections on the site (p. 9).

Another term, which is frequently confused with other social network related terms, is *social media*. Social media is highly popular term used in the research studies throughout the world. Social media is defined as web-based applications that support the production and publication of user-generated content, which is based on the conceptual and technological foundations of Web 2.0 (Kaplan, & Haenlein, 2010). Carr and Hayes (2015, p. 49) defined social media as "internet-based, disentrained, and persistent channels of masspersonal communication facilitating perceptions of interactions among users, deriving value primarily from user-generated content". Although the terms social media, social networking and social network/networking sites were often used interchangeably (Stockdale et al., 2012), they are not the same. Social media is defined as any web-based

application or technology using digital networking to link users by their participation, creation and sharing of the digital media resources and practices (Reinhardt, 2020). Scholars comparing social networking and social media asserted that the social media is a framework which acts as a supporter and facilitator of social networking (Carr & Hayes, 2015; Kaplan & Haenlein, 2010). On the other hand, *social network/networking sites* are identified as one of the most significant genre of social media.

Online social networks are the environments which focus on the development and support of the interpersonal relationships and social interaction. Nevertheless, sometimes it is difficult to exemplify the concepts mentioned above since today, users are able to list connections with others in most of the platforms such as "media-sharing websites, gaming sites and locative media" and this makes it difficult to distinguish between the social network sites and other genres of social media (Ellison & Boyd, 2013, p. 2). Thus, it will be helpful to distinguish environments that are specifically developed to promote friendship and social connection from environments that are specifically developed to promote social networking for a specific activity. For example, although some features, such as friend lists and followers are the main characteristics of social network sites, they are supported by other environments (such as YouTube, Blogger etc.) which do not mainly aim to promote these features (Merchant, 2016). There is no precise division among genres of social media and boundaries between online and offline social networking. Due to the lack of sharp boundaries between the features of the tools, the term social network is preferred to be used in its broadest sense to refer to all online and offline social media platforms, applications, services, and social network sites throughout this chapter.

A Brief History of Social Networks

There is general agreement on that the origins of the social networking were based on the Usenet groups and bulletin boards which are largely used between interest groups of computer programmers and enthusiasts to share information on technology and computer science. These websites frequently provide an online chat that is, sending and receiving messages in real time. They served as the foundation for the early social networking sites (SNSs). Afterwards, they were improved with the inclusion of new features which made personal on-line networks visible to other users. Between 1995 and 2001, various early networking tools were developed. Some examples of these early networking services included Classmates, founded in 1995 to reconnect people from the same schools; Six Degrees of Separation, founded in 1997, and Live Journal, founded in 1999 based on the idea of listing friends for others viewing. After 1999, there has been great development in the Web and its social dimension had come to the fore, beyond being technical. After the closure of the Friendster, popularity of MySpace had increased among young people. However, this success persisted until it was purchased by News Corporation in 2005 and this new development influenced the popularity of the Facebook positively. At this point, it is useful to draw attention to the different nature and nomenclature of

connections on these social networks. Some of the popular terms used to label connections between users are friends, contacts and fans. These new types of connections introduced new concepts into our lives such as "'friending' (making an online connection), 'following' (looking at someone's updates), to 'tagging' (or labelling) and 'tagging in' (including someone in an update or post)" (Merchant, 2016, p.13).

Figure 1 *Timeline of Social Media Tools*

Today many different social network sites, applications and services are accessible. Their popularity has changed from one population to another. The well-known examples of social networks now include Facebook, Twitter, Instagram, Blogs, Edmode, My Space, SchoolTube and Snapchat (Crane, 2012). These social network services are often free of charge. Today, considering the number of monthly active users, the most popular social networks are Facebook (2.910 billion users), YouTube (2,562 million users), WhatsApp (2,000 million users), Instagram (1,478 million users), Weixin/WeChat (1,263 million users), TikTok (one billion) and Facebook Messenger (988 million users) respectively (Statista, 2022).

Language Teaching and Social Networks

Social networking tools and applications are widely used by people of all ages and demographics (Statista, 2022). As a result of the evaluation of earlier internet technologies to Web 2.0, the ways of communication have revolutionized not only personal but also educational contexts. Social networking phenomenon has dramatically changed traditional class structure and create a new space that provides fascinating opportunities for learners and educators (Solmaz, 2018). They enrich the learning environment by offering new features that were not available previously and that dissolve time and space borders.

Educational use of social networking is growing among all education levels as an effective tool and their features are of interest to students as well as teachers. They have become an integral part of the training process by fostering interactions between teachers and students, enhancing learning for students, supporting professional development of educators and providing new opportunities for content sharing (Solomon & Schrum, 2010). Blogs, Wikis, Youtube and social network sites such as Facebook and Twitter are popular tools used in learning environments (İstifci & Dogan Ucar, 2021; Marwan, 2015; Solmaz,

2018; Viáfara González's, 2020). Educational use of them simply includes organizing classes, sharing different kinds of course materials such as photos and videos, posting comments, labeling or tagging each other and messaging (Bower, 2017).

Figure 2 *Educational Use of Social Networks*

Students of today are digital learners who use social networking tools and services both in their social and academic life. Therefore, designing new learning experiences in accordance with the interests of the students is a new responsibility for the educators in the digital age. This new situation makes it more important to focus on how to utilize social networking sites and applications in education.

The use of social networks in language teaching is a quite common practice (Perumal, 2022). Learning a language means much more than memorizing words and their definitions and knowing some grammar rules (Nesrallah Khalaf & Zangana, 2020), so English teachers can never be completely unaffected by their influences. Social networking influences language instruction by providing various opportunities for language teaching and learning. Social networking sites form of the social media, videoconferencing platforms, wikis, blogs and forums are often used in language teaching (İstifci & Dogan Ucar, 2021). Social networks such as Facebook, Twitter, WhatsApp, Instagram, TikTok, Telegram, blogs and other similar sites and applications play an important role in language acquisition (Solmaz, 2018). Besides, there are some social networking sites and applications specifically developed for language learning such as Busuu and Livemocha (İstifci & Dogan Ucar, 2021).

Examples of Social Networking Tools Used in Education

Computer science innovations "change and enrich human interaction, communication and social transactions" (Mystakidis, 2022, p. 486). As online classes have become more popular, technological tools, social media sites, which provide attractive and enjoyable learning environment, have gained importance in education. Social networking sites that help with developing effective communication with the students beyond lessons are regarded as necessary as web conferencing tools. Social networking sites provide teachers and students with platforms that allows for sharing any kind of writing, discussion, setting and reminding assignments, group works, etc. Social networking can also create opportunities for students to communicate with English speakers around the world and native speakers. Moreover, social media sites provide teachers with a huge platform where they can "share resources, connect, and collaborate with a bigger pool of colleagues" (Willet & Carpenter, 2020, p. 217). Several social networking sites are available that can be well used in language education and new ones are being developed every day. Regarding this, some of the popular ones are introduced below.

Figure 3 *Social Networking Services*

Social Networks

Facebook is still one of the most popular options for teachers to share class updates, assignments and discussion. Through Facebook groups teachers can also communicate with students and their parents easily. Parents can follow some of the class events such as discussions, assignments or updates and support their children if they would like. It helps teachers to motivate students and enhance their confidence to communicate in English (Kabilan, et al., 2010).

Google+ also allows creating of social circles and sharing photo albums, status updates, videos, links and events. Teachers can form circles for their classes and invite students to join it. So teachers can share classroom materials and class updates with the students attending that particular lesson. Similarly, it allows for posting private and public

messages. Different from some other social networking sites (Facebook, Twitter, Pinterest etc.) teachers can benefit from video chats and video conference in Google+ for free.

Twitter is another option for teachers to post class updates, assignments and discussion. Like Facebook, teachers can use Twitter to share useful links, quizzes or reminders with the students. Enabling chats on a specific hashtag created by the students and teachers and imposing character limit on the twits, Twitter can make the discussions vivacious and dynamic, and help students to develop effective and concise communicative skills. Teachers might need to use more than one social networking site in order to reach more students effectively. In this respect, tools like *Sprout Social* can help teachers create consistent content across different networks and manage their accounts in multiple accounts in several social networking sites.

Media Sharing Networks

Students enjoy using *Instagram* in learning languages (Brebera, 2018; Gonulal, 2019; Yeh & Mitric, 2019). Students use it as a personal language learning tool as well (Gonulal, 2019; Putri, 2022). Like other social networking sites, Instagram enhance student-teacher interactions and interactions among students. It encourages students to be actively engaged in the authentic use of a foreign language through sharing a new post or commenting on peers' posts. Instagram, which is designed for sharing photos and videos, can be used to engage students in digital storytelling (Yeh & Mitric, 2019), vocabulary learning (Agustin & Ayu, 2021; Putri, 2022) and listening (Agustin & Ayu, 2021).

Snapchat is another digital tool that can be used to make students engaged effectively. It allows for reminding assignments or projects, asking questions before or during class to add some color and fun to the lessons. Snapchat can be used in several ways to introduce or consolidate vocabulary or grammar through pictures, real-world examples and videos in an amusing way (Miller, 2017). The content uploaded in Snapchat is deleted after 24 hours which makes it more attractive and fun for users (Stalin & Tan, 2020).

YouTube is a video sharing website that allows for several kinds of videos including user-generated videos. Various kinds of information is presented in YouTube so it is used as a medium of learning almost any subject or interest. Teachers should encourage students to create their own videos. Students like video projects because they are meaningful and relevant to their life (Kelsen, 2009; Marwan, 2015).

Vimeo is another video sharing website that users can only watch and upload user-generated videos. This site encourages professional works so it requires high quality videos. Therefore, it should not be the first choice for vlogging.

Social Bookmarking and Content Curation

Teachers can use *Pinterest* to organize resources, lesson plans and worksheets through creating boards consistent with class or course, and create sub-topic boards for units or

subjects. Teachers and students can create digital bibliographies for lessons or assignments. It also allows for grouping all resources such as websites, books or videos regarding a single topic into one board which looks quite neat and tidy, and accessible easily when needed.

Flipboard is a social bookmarking website enabling its users to bookmark and share web pages like Pinterest.

Diigo is a similar tool that save and tag online resources, and organize them on topics. There are hundreds of education groups in Diigo from all grades. It provides free account for teachers. Different from other social bookmarking websites, it allows web pages to be annotated. Users can highlight the important parts of a web page and attach sticky notes on highlighted parts. Furthermore, they can read and comment on others' sticky notes. In this respect, annotation encourages students to read attentively.

Social Tagging

Tags are used to organize bookmarks. Social tags are the keywords generated by users to categorize ideas on web pages or the content of a web page. It helps users to manage and access to large quantity of information easily (Lavoué, 2011). Tag based systems can be used in education to encourage collaborative learning processes (Lavoué, 2011) and reflection activities (Glahn et al., 2008).

For example, in an activity the teacher groups the students, at least three students for each. The teacher chooses a web page or pages and ask students to use at least one tag to express the main idea of the content. Through this process, students approach the content critically and attentively and they also make synthesis to assign a tag related to the content. Moreover, they need to carry out the process collaboratively. The collaborative nature of the task makes the students more engaged in the activity (Lavoué, 2011).

Consumer Review Networks

Consumer review networks, categorized under social networking, can also be used for language learning purposes. Concerning the course subject, students write reviews or read the reviews and write a recommendation letter to the firms that are evaluated by the consumers.

Discussion Forums

Reddit provides users with a discussion board to share photos, videos, links and text-based posts. This site also has categories and communities concerning the content. Users can share posts and comment on others' posts. Several communities/subreddits on language learning that provide advice and resources for language learners can be found on Reddit. Moreover, like many other forums, Reddit hosts several groups that discuss language education-related topics (Reddit Inc., 2020). Regarding this, teachers benefit

from this site through interacting with peers, collecting and sharing curriculum materials, finding or suggesting practical solutions to the common concerns. Anonymity of the users in Reddit allows teachers to discuss matters freely (free from school politics) on a safe board (Willet & Carpenter, 2020).

Quora is a social media site that works like a search engine. Answers to the questions of the users are created by the users of the website, meaning the content is created by the users like many other social media sites. Language learners are also among the regular visitors of Quora. Learners benefit from the site through asking questions about anything related to learning a language, from meaning of a word or a difficulty they experience in a skill. Teachers can use Quora to ask questions or make students to ask questions and start an interaction around a specific topic, or a word.

Digg allows users to submit news stories and vote on the news posted on the site. Digg also hosts language learners. Students upload their work and read and comment on the others' works. Meaning that "students can find their own shortcomings, and correct them" and feel more motivated to try hard to receive high votes and nicer comments (Xing, 2013, p. 10). The data provided by Digg through votes and reviews are valuable for teachers in order to identify the difficulties and weaknesses of the students and to focus on these points. Similarly, teachers can use this site to upload their works and teaching practices for other teachers to review and comment.

Microblogs

Microblogging, as "a type of content distribution which prioritizes short-form content on social networks" (Ward, 2022, p. 1), is called "the next generation of blogging" (Jackson, 2010, p. 19). Twitter, Facebook, Instagram, Pinterest, Tumblr, LinkedIn and TikTok are the popular examples of microblogging. Text-content is limited in microblogs, up to 280 words (Hansen et al., 2011). In some of the microblogging sites, videos or images are the primary content, text is secondary (Ward, 2022).

Podcasts and Vodcasts

Several educational sites, such as British Council, BBC, tandem.net, give place to repositories for podcasts (audio-only files) and vodcasts (video files) that can be downloaded to mobile devices and listened or viewed offline at any time and from anywhere. Apart from educational sites, podcasts and vodcasts can be shared on social networking sites (Youtube, Vimeo) and applications, like Google podcasts, Apple podcasts and Spotify.

Instant Messaging

Instant messaging apps ensure easy communication between teachers, students and parents. These apps also increase participation, interaction and motivation of students and parents (Kartal, 2019; Sivabalan & Ali, 2019; Tang & Hew, 2022). Although schools use learning management systems, like Canvas, Blackboard, Moodle, which allow parents to

track their children's progress and contact teachers, instant messaging apps make this communication easier, faster and more personalized. Core features common to almost all of them include sharing files, links and several kinds of resources. Among these, WhatssApp allows users to communicate with other WhatsApp users and with WhatsApp groups. Teachers create their own groups and communicate with their classes easier and faster. Enabling scheduling teacher-parent conferencing, creating to-do-list items, sharing videos, pictures and reminders, some applications have been created especially for teacher-parent communication such as Bloomz, ParentSquare, Seesaw, Classtag, ClassDojo and SimplyCircle.

Some of the apps are more suitable for the communication between teachers and students:

ClassPager allows teachers to send reminders and create polls.

Remind provides communication between users without publicizing personal contact information and also translation option in more than 70 languages.

Teachers.io is an online agenda that allows teachers to share their plans with their students. Similarly, *BookWidgets* is a kind of agenda with the function of task tracker. When students have completed the tasks assigned by the teacher, they tick it off.

Virtual Environments

Virtual environments are "computer generated" (Witmer & Singer, 1998, p. 225), "highly interactive three dimensional (3D) spatial environments that represent real or non-real situations" (Mikropoulos & Natsis, 2011, p. 769). Huang et al. (2021) indicated in their systematic review study on augmented reality and virtual reality, that virtual environment technologies enhanced and enriched interaction. Virtual environments provides learners with the opportunity to communicate and collaborate different learners and speakers of English from all around the world without time and space limitations (Huang et al., 2021). Besides interaction, which plays an important role in successful language learning (Safar et al., 2016), through avatars virtual environments, they create authentic and emotionally comfortable and less stressful environment for learners. Avatars help learners to hide their identity and thus they consider making mistakes less stressful. Therefore, reduced anxiety and comfortable learning environment make the learning process more productive. Currently, several 3D virtual spaces are used for educational purposes, such as Second Life and Metaverse Second Life allows users to create an avatar for themselves and interact with the places and other avatars, to participate several activities such as shopping, building and trading. In this sense, Second Life is widely used as a digital tool in EFL. It removes time and space limitations in teaching and learning.

Reisoğlu et al. (2017) analyzed 167 empirical studies on 3D virtual learning environments and according to the results, Second Life was found to be the most popular 3D learning platform. Baker et al. (2009) indicate that Second Life is also the most widely used virtual environment used in higher education for educational purposes. In USA, more than 100

universities use Second Life for holding online classes, hosting music performances and exhibiting artworks, and even for sharing resources like books (Baker et al., 2009). Similarly, several universities around the world have created their virtual campuses to enhance authentic and self-directed learning, encourage collaboration and cross-cultural interaction among the students.

Teachers can hold some of the lessons in Second Life. Before entering into Second Life, teachers should set an objective; "otherwise, it is like walking aimlessly into an everyday park" (Ocasio, 2016, p. 6). Attending classes or activities and doing assignments in a virtual environment using avatars can be more motivating for students (Baker et al., 2009). Students might attend an event in the virtual world and then write a summary or discuss the event. Students can do the activities and assignments in groups, which can be more motivating. There are several opportunities for role-playing, such as ordering a meal in a cafe, checking into a hotel, asking and giving directions. There are classrooms, conference rooms, theatres, museums etc. in Second Life and these places can be used for educational purposes like holding lessons, performing music or attending to a concert. Moreover, teachers should seek opportunities to join other educational groups using Second Life and collaborate with them in order to make students to communicate different learners and speakers. First of all, teachers should create their avatars and jump into this world and explore it.

Examples of social networking tools used in education
a. Social Networks *Facebook*, *Google+* , *Twitter*
b. Media Sharing Networks *Instagram*, *Snapchat*, *YouTube*, *Vimeo*
c. Social Bookmarking & Content Curation *Flipboard*, *Diigo*
d. Social Tagging
e. Consumer Review Networks
f. Discussion Forums *Reddit*, *Quora*, *Digg*
g. Microblogs *Twitter*, *Facebook*, *Instagram*, *Pinterest*, *Tumblr*, *LinkedIn*, *TikTok*
h. Podcasts/vodcasts
i. Instant messaging *WhatssApp*, *Bloomz*, *ParentSquare*, *Seesaw*, *Classtag*, *IassDojo*, *SimplyCircle*, *ClassPager*, *Remind*, *Teachers.io*
j. Virtual environments *Second Life*, *Metaverse*, *Immerse*, *Mondly*, *ENGAGE*, *AltspaceVR*, *Duolingo on Roblox*, *Google ClassVR*, *LayarAR*
k. Co-creating *Google Drive*, *MyBlogU*

Metaverse is another 3D virtual environment that provides several platforms for users, like Minecraft, Roblox, Fortnite where users create their avatars and then explore and/or build the virtual world. Similar to Second Life, teachers can use Metaverse for education. There are also a number of virtual environments that are specifically designed for language learning; Immerse, Mondly, ENGAGE, AltspaceVR, Duolingo on Roblox, Google ClassVR, LayarAR (see Chapter 4 for an extended discussion of Virtual Reality in foreign language learning).

Co-creating

There are collaborative sites, namely wikis, which allow users to learn as a team through adding, editing or removing the content. Co-creating provides users with more diverse, rich and in-depth content. In this sense, Google Drive, MyBlogU and Medium can be used in writing activities as well as adding and saving files online as a team.

Potentials of Social Networks in Foreign Language Teaching

Potentials of social networks as an educational tool in the context of language teaching and learning can be listed as follows:

Increased Interaction

Social networks are used as educational tools to facilitate foreign language learning through presenting opportunities for teacher-student and student-student interaction. In this way, students could socialize, improve their communication skills, and learn from their classmates. Additionally increased communication channels facilitate collaboration-based tasks for students (Solmaz, 2018).

Attractiveness

Since students in our classrooms who have grown up in a world surrounded by digital tools and they always interact with social networking sites and applications to text message, attend online meetings and engage in non-linear interactions with the world, they find using these tools in education increasingly attractive (Solomon & Schrum, 2010). This view was supported with different research studies conducted on different social networks. For example, blogs are reported to be considered as motivational, enjoyable and encouraging by young learners (Yunus et al., 2013). Similarly, students have positive perceptions towards using instant messaging applications; they find them fun, useful and comfortable (Zou et al., 2018).

Providing New Ways for Accessing and Sharing Information

Web 2.0 and 3.0 technologies hav made difference in the ways students access knowledge and learn (Loureiro et al., 2012). They can easily access any information when they need. They also have the opportunity to create knowledge and present the results to a real audience (Solomon & Schrum, 2010). The potential of social networking environments as educational tools, lies in main characteristics of them. These environments enable students to share their thoughts, actions and events that favor the active participation of individual students or groups of students (Susnea, 2017).

Informal and Lifelong Learning

Learning can take place in different ways and informal education has become an important part of learners' learning experience besides formal education (Dede, 2016). In

the classroom environment, students have limited resources to develop their second language and this hinders their learning process. Hence, utilizing different learning resources that are now available is essential if teachers want to develop students' language skills (Perumal, 2022). Thus, social networks have become a part of L2 learning in and outside the school, as well as of formal and informal L2 learning (Reinhardt, 2020). Considering this, social media is increasingly being used by people of all ages and this makes social media a powerful tool for any form of learning. With the usage of social networking, learning has become more autonomous and therefore a continual process. In this sense, social networking enable individuals and even organizations to become learning organisms (Dede, 2016).

Helping Students to Build a Sense of Belonging and Community

Several studies mentioned the positive impact of online communities on language learning and teaching (e.g., De Back et al., 2021; Lomicka & Lord, 2012; Rospigliosi, 2022; Yunus et al., 2013; Zou et al., 2018). Fostering strong interaction between users, social network services have sparked the interest of researchers on the investigation of online communities in second language learning context (Donath & Boyd, 2004). Especially social networking sites (SNSs) serve the purpose of developing and maintaining an authentic community. Community construction in SNSs provide a sense of belonging. For example, Groups option on Facebook provides a private and safe space for learners (Blattner & Fiori, 2011). Twitter is another SNS encouraging community building and interpersonal trust through interactive means (Lomicka & Lord, 2012). Some of the general user behaviors in SNS communities are identified as posting event information, asking about schedules of other members, commenting about events, and sharing event pictures and videos as a method of social interaction and information exchange (Ota, 2011).

Offering Possibilities for Collaborative Learning Activities

Collaborative learning activities such as collaborative writing, are beneficial in motivating students to be active on the language learning tasks. Likewise, providing peer feedback and correction, wikis are useful for collaborative writing. There is huge amount of research studies on affordances of social networks and collaboration in second language learning that has been carried out to provide insights into wikis as educational tools. Similarly, Google Site was another effective platform used for the purpose of "wiki-based collaborative writing" through allowing online peer feedback settings (Ma, 2020). While wikis seem to have been studied in terms of writing instruction, they can also be integrated into reading classes in a way to enhance self-regulated collaborative learning. On the other hand, ease of use, discussion and history functions that enable the learners to work on projects collaboratively are the advantages of Twitter (İstifci & Dogan Ucar, 2021). It also supports learner-learner interaction (Hsu, 2019). As an example of another social network tool, Skype is also used for collaborative language learning. It allows users

to interact each other through video call. It can be used for setting cooperative relationship between native and non-native speakers as partners, which plays a role in the development of positive self-perceptions of learners (Viáfara González, 2020).

Improving Writing Skills

Writing is one of the most difficult English skills to master and online social networks are frequently used environments in the development of this skill (Dizon, 2016; Mabuan, 2018). Improving writing skills of students might be linked to raising people's awareness of the real impacts of their products, such as audience awareness (DePew, 2011). Examples of tools used for this purpose in particular are Blogs and Facebook. Blogs are frequently investigated regarding second language teaching and learning because of their positive contribution to the writing fluency of the learners. Blogs help language learners express themselves in English more frequently and in more flexible ways (Mabuan, 2018). Reflective blogs are tools provide online communication channels regardless of time and place. Thus and so, they motivate students to write in English on their own due to the features that allow bloggers and readers to interact (Suadah, 2014). In this sense, integrating blogging into traditional ESL classrooms foster social interaction among students (Perumal, 2022). Blogging is effective in increasing students' writing abilities as well as creative thinking skills. Posting comments on blogs were found to play an important role in the development of the creative writing skills (Perumal, 2022).

Another popular social networking environment used to improve second language writing skills and writing fluency is Facebook (Dizon, 2016). E-dialogue journal writing is an example of its use for this purpose (Rodliyah, 2016). Research study showed that using Facebook in advanced writing class helps students to improve their English language skills, particularly in writing, and feel confident in communication (Fithriani et al., 2019).

Potentials of social networks in foreign language teaching

- Increased interaction.
- Attractiveness.
- Providing new ways for accessing and sharing information.
- Informal and lifelong learning.
- Helping students to build a sense of belonging and community.
- Offering possibilities for collaborative learning activities
- Improving writing skills.
- Memorizing new vocabularies.
- Supporting intercultural communication.
- Provides rich source of authentic language. Social
- Improving pronunciation skills.

Memorizing New Vocabularies

Vocabulary is the important aspect of the communication and of the other components of language skills. Difficulty in remembering necessary words prevents the person from saying what they want to say while communicating. Besides receptive vocabulary, social networking sites offer several opportunities for users to develop their grammar and vocabulary through writing and speaking (Perumal, 2022). Using these environments help students to improve their vocabulary through communication with other users through writing or speaking (Rodliyah, 2016). Similarly, forums are also social media platforms that enhance vocabulary teaching through reading and writing. They can be useful in a variety of ways for language teaching and learning (see İstifci & Dogan Ucar, 2021).

Supporting Intercultural Communication

From a sociocultural standpoint, social networking environments afford the development of intercultural and socio-pragmatic skills. L2 learners can make observations on the target culture, target language and their elements. Besides, they can react to one another's posts in these socio-interactive environments (Solmaz, 2018). In these environments, helping students to develop their audience awareness, that is, making them consider their audience while sharing, posting or making any comment will support second language learners sociocultural and pragmatic awareness (Reinhardt, 2020).

For intercultural communication, Facebook, as one of the most widely used tool, should be considered initially. Using Facebook discussion groups to facilitate intercultural instruction, instead of in-class discussion, help EFL students to improve their intercultural communication competence (Özdemir, 2017). Similarly, Facebook can be used in project based learning to provide opportunities for interaction in the target language to assist the development of the intercultural competence (Jin, 2015). For a similar purpose, videoconferencing tools such as Skype can be used to improve intercultural competence (Tian & Wang, 2010).

Pragmatic skills are fundamental aspects of language learning (Mills, 2011). Social networking services seen as pragmatic sources since they provide L2 learners with authentic experiences for socio-pragmatically appropriate participation in L2 communities. These tools, such as Facebook Groups, are effective ways for learners to develop socio-pragmatic competence in their second language particularly in cases where textbooks are weak in terms of socio-pragmatic communication.

Provides Rich Source of Authentic Language

Social networks serve as a new way of student-centered authentic language learning (Blattner & Fiori, 2011) through interaction with native speakers to increase language proficiency of L2 learners beyond socially limited potential of the traditional classrooms. While traditional classroom activities offer limited opportunities for the participation in cultural and intercultural practices, social network environments provide exposure to

authentic input and help students to observe, learn the elements of the target language (Mitchell, 2012; Solmaz, 2018). By this means, students can observe the ways native and expert speakers interact and socialize in their daily lives. Social interaction with the native speakers in a more natural manner increases the authentic language use by learners (Ota, 2011). Facebook is an effective tool used from this perspective as it enables interaction with native speakers all over the world regardless of geographical location (Jin, 2015). In this sense, learners benefit from the opportunity of receiving immediate feedback from the native speakers, which plays an important role in the acquisition of the language (Pikhart & Botezat, 2021).

Improving Pronunciation Skills
Social networks facilitate the improvement of the students' pronunciation skills through speaking. Moreover, tutoring materials also contribute to developing good pronunciation. For instance, previous research suggests that Twitter can be conducive to pronunciation instruction. Learners can improve pronunciation through tweets about the pronunciation of the some words and particularly pronunciation of the commonly mispronounced words (İstifci & Dogan Ucar, 2021).

Some Considerations in the Use of Social Networks for Foreign Language Teaching
Although wide range of opportunities that social networks offer in terms of language education were mentioned in the literature, there are some points to consider when using social networks because of the backwards and limitations in the adaption of them to language classes. Some of these issues can be summarized as below:

- Previous experiences, expectations and pedagogical beliefs of the educators plays an important role in the teaching practices with social networks. Despite the positive attitude towards the educational use of social networks, the number of educators who use or plan to use social networks might be limited due to some negative beliefs such as perceived usefulness and compatibility with current practices, gender and age.
- Teacher competence in utilizing social networks in language education is essential to facilitate language acquisition.
- The interaction between teacher and student facilitate foreign language learning. Therefore, it is important language teachers to maintain teacher-student communication while using social networks.
- Choosing more concrete tasks and specific goals for social network tasks could be effective in language learning.
- Media literacy skills are essential to use social media in classes in productive and creative ways but gaining these competencies may not be easy in a second language learning context.
- Rapid developments in social network services requires practitioners to develop new literacy skills.

- Multimedia and hyperlinks are organized non-linearly in internet-based resources. Working with these new resources requires the use of certain digital literacy skills. Thus, it has become the essential responsibility of the educators to promote and develop digital literacy skills of their students.
- Students should be encouraged to produce and share contents for social networks. This will help them to be more motivated and self- confident towards using social networks for learning a foreign language.
- Educators should search and evaluate social network sites and applications by focusing on their usability and value for second language learners.
- There is evidence in the literature about that social network may distract the students from the teaching and learning process.
- Students may spend too much time in completing simple tasks because of the lack of knowledge regarding the used sites and services.
- Students sometimes may feel bored to use social networks for the academic purposes although they are pleased to use them.
- Educators should be encouraged to engage in professional learning networks to connect with other educators in order to adopt social networks into learning environment.

Conclusion

Social networks, which are widely used today, have also found a place in the field of education. Based on the findings of related literature, it is clear that social networks also offer great potential for second language learners and teachers. Acquiring a language is a social process which needs interaction and communication in social context, and traditional classroom environments have limited opportunities to provide this authentic language learning environment to learners to improve their language skills in the target language. Today, social networks, which appear in many different forms, provide several opportunities for foreign language learners such as recognizing the target culture, providing autonomy in learning, being a part of a group, and facilitating vocabulary learning. These platforms help learners to foster autonomy and motivation in their personal and informal language learning process. Without having a real tutor or a classroom environment, learners can organize their own learning process, joining a wider classroom through interacting with other learners and native speakers around the world. Apart from providing digital ways for accessing and sharing information for digital learners, social networking tools help learners to build a sense of belonging and community, and offer opportunities of collaborative learning activities.

Social media platforms have become indispensable tools for teachers as well in designing the classes according to the needs and interests of digital learners. Social media serve teachers through providing new opportunities for organizing classes, sharing content, fostering professional development and interacting with colleagues and parents. These

platforms can be used to design several different activities for introducing and practicing any subject as well as developing any language skill. Social media is like an ocean that embodies countless keys for the treasure, any teacher or learner who jumps into that ocean and explore it can find one. Therefore, the best way to learn about how to use these tools in language learning is to sign up and discover them as a learner or a teacher of English language.

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Figure 1. Timeline of Social Media. https://www.booksaresocial.com/timeline-of-social-media-2021/#lightbox/0/

Figure 2. Educational Use of Social Networks. https://www.istockphoto.com/tr/fotoğraf/teknoloji-ve-fotoğraf-gm1166957949-321649901

Figure 3. Social Networking Services. https://www.pexels.com/tr-tr/fotograf/akilli-telefon-simgelerinin-yakin-cekim-fotografciligi-267350/

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DIGITAL GAMES IN LANGUAGE LEARNING

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Before you read, reflect on the following questions:

1. How do you think that digital games lead to second language acquisition? Please give examples from your experiences, if any.
2. What do you think about the link between the task-based language teaching and digital games?
3. Do you think that digital games designed for learning purposes are better than those designed for entertainment purposes in the path leading to second language acquisition?

Introduction

Advancements in and integration of technology into language classes has yielded changes in the way languages are learnt. In line with increasing research interest into the role of digital environments in learning languages, digital games have also been regarded as conducive to second language learning (Peterson et al., 2021). In addition, research into computer-assisted language learning (CALL) has also highlighted the importance of and increased interest into digital games (e.g., Hung et al., 2018; Peterson et al., 2020; Reinhardt, 2017; Xu et al., 2020). Earlier research into the use of games focused on developing simulations (e.g., Coleman, 1990) and the utilization of digital games in language classes (e.g., Meskill, 1990). More recent research also highlights the growing interest into digital games in language learning (Peterson et al., 2021). Both games and simulations have been considered as beneficial sources in language teaching and learning since they trigger learner experience with the target language (Reinders, 2017). With the increasing research interest into digital games in language learning, and as the nature of digital games supports "ubiquitous presence" (Dixon et al., 2022), and also the availability of authentic language in digital games, the use and the integration of digital games as

"consequential, and widely applicable L2 learning sources" have become easier (Reinhardt & Thorne, 2016, p. 416).

In the view of ever-increasing interest in digital games (Palandrani, 2021), game designers who seek financial benefit through selling video games have inevitably had to design their games using different languages to capture attention of players across world (Dixon et al., 2022). With availability of different languages in digital games, they might become a possible natural source of authentic language in use for L2 learners (Dixon et al., 2022; Reinhardt & Thorne, 2016) since games allow players to choose the language of the game, meaning that players can play in any language offered in the game. Consequently, this option leads to authentic language input. Considering the fact that increasing number of language learners playing digital, the current chapter outlines the pedagogical foundations, affordances and challenges of video games in language learning. Further, it compares games for entertainment purposes vs. for educational purposes. It concludes with a suggestion for integration of a game, *Minecraft*, for language teaching purposes.

Early Developments in Game-Based Learning

Before moving on with the subject of digital game-based language learning and teaching (DGBLLT), this part of the current chapter will discuss the earlier practices incorporating play in language learning and teaching since what we know about DGBLLT is largely based on the role of plays and games in language learning (Reinders, 2017). Play, as Reinders (2017, p. 331) describes, is a learning and teaching activity which triggers problem-solving skills and in which children are "physically, cognitively, emotionally, and socially" engaged.

Preliminary work conducted by Bruner (1972) highlighted the importance of play in young learners with regards to its effects on children's problem-solving skills, tolerance in facing obstacles and their creativeness. Sheridan et al. (2011) further argued that children gain a deeper level of emotional satisfaction through play. They further discuss that thanks to play, children gain different sets of skills such as "apprenticeship, research, occupational therapy and recreation" (p. 73). Play triggers the formation of these sets of skills. Another theory put forth by Vygotsky (1978) claims that play further promotes the formation of language skills, i.e., reading, writing and especially speaking (p. 118). Reinders (2017) highlights the importance of Vygotsky's argument and play by explaining the importance of play on allowing children to establish meaning based on the things around them even in the absence of well-established language. Play does not only help children to establish meaning, but also helps them build social environment through scaffolding and collaboration (Reinders, 2017). The actual use of games in language classes dates back to many decades ago (see Lee, 1979). In language classes, using and practicing meaningful language is important, and since games trigger the use of meaningful language in practice, they must be integrated as an element in the classrooms (Wright et al., 2006).

Pedagogical Foundations of DGBLLT

After the introduction of *Tennis for Two* by Higinbotham and Dvorak, video games have been a part of people's lives. In the view of their extensive adaptation as means of entertainment (Reinders, 2017), their role as sources potentially conducive to language learning has been acknowledged (Lai et al., 2013). Lai et al. (2013) further argue that this extensive adaptation has inevitability brought about changes for game-based learning. Even though digital games and traditional games have differences, they share many features (Reinders, 2017). Therefore, before discussing the foundations of DGBLLT, it is important to point out the features of traditional

According to Prensky's (2001) definition, games should include a) goals and objectives, b) rules, c) outcome and feedback, d) challenge, e) interaction, and e) story. Except for story, most elements of games resemble to the features of task-based language teaching (TBLT) (Reinders, 2017). According to Richards and Rodgers (2014, p. 174), several principles of TBLT which are drawn from communicative language teaching, and they can also be incorporated in digital games:

- activities that involve real communication,
- activities in which language is used for carrying out meaningful tasks,
- language that is meaningful to the learner.

> Think about a digital game which involves the TBLT principles proposed by Richards and Rodgers (2014).

Accordingly, several key assumptions of task-based teaching "are purposeful activities and tasks that emphasize communication and meaning [in which] learners learn language by interacting communicatively and purposefully" (Feez, 1998, as cited in Richards & Rodgers, 2014, p. 176). Since tasks, quests or activities involved in traditional games and digital games carry a sense of meaning and accomplishment, they are somewhat connected to TBLT (Peterson, 2010a).

In line with Vygotsky's sociocultural theory of cognitive development (Dalgarno & Lee, 2010; Lantolf & Thorne, 2006; Ma et al., 2011; Peterson, 2010a), in addition to enabling TBLT, digital games, massively multiplayer online role-playing games (MMORPGs) in particular (Reinders, 2017), promote discovery and experiential learning (Wright et al., 2006), which enable 'learner' players to create different identities which in turn would result in decrease in learners' anxiety, and more opportunities for meaningful language input, and purposeful language output (Rankin et al., 2008; Reinders, 2017). Further, games give learners a sense of self-directed learning (Butler et al., 2014), which essentially promotes autonomous learning (Benson, 2013).

Affordances and Challenges of Digital Games
Affordances

After the introduction of digital games into language learning contexts, the field of language education has witnessed a shift in game-based language learning. The field of

language education has not only constrained itself to the use of commercial off-the-shelf (COTS) games but also has designed games for educational purposes (Lai et al., 2013).

As has been discussed in previous part of the current chapter, digital games, especially massively multiplayer online games (MMOGs) are believed to trigger social interaction among players (Dixon et al., 2022), which, according to Vygotsky's (1978) zone of proximal development, can yield better learning gains. As games would naturally force players to create collaboration among themselves, they would in turn lead to interaction, and also to natural language in use.

In addition to creating a social interaction among players as discussed above, previous meta-analyses on digital games and L2 acquisition have mostly focused on the aspect of L2 vocabulary acquisition. While some meta-analysis studies compared DGBLLT tasks and non-gaming tasks, some focused on different game-based activities. Tsai and Tsai (2018), who examined 26 studies published between 2001 and 2017, reported that DGBLLT was more conducive to L2 vocabulary acquisition compared to non-gaming tasks (d = .71). Another meta-analysis conducted by Chen et al. (2018) compared adventure and non-adventure games and reported that the former significantly led to more vocabulary acquisition than the latter (d = 1.87). Another aspect that previous meta-analyses on DGBLLT focused was the effects of designs and game mechanisms on second language acquisition. Dixon et al. (2022) investigated the effects of different game designs and mechanisms including 26 studies. Adapting Plonsky and Oswald's (2014) benchmark for measuring effect sizes, their results indicated that DGBLLT overall had small effect size for between-group studies (d = .50), and medium effect size for within-group studies (d = .95). Their analysis of between-groups studies (treatment vs. control groups) revealed no significant effect size (d = .09) in the delayed posttests. However, in their analysis of within-subject design studies, they found a positive medium-to-large effect size (d = 1.36) in comparisons between pretest vs. delayed test results. However, they reported a negative small effect size in terms of comparisons between posttest vs. delayed test results (d = -.69). They further compared moderator effects in games (i.e., game purpose, players, dependent variables, game input, player output, and teacher mediation) for both between-group and within-group studies. Their results on between-group studies on game purpose effect highlighted that games designed for both entertainment and education purposes had small effect sizes, d = .66 and d =.45, respectively. However, their results on within-groups design studies indicated a large effect size for games designed for entertainment purposes (d = 2.03) and a medium effect size for educational games (d = 1.13). This finding can suggest that entertainment games can be more conducive to language learning compared to educational games. On the one hand, comparisons based on moderating variable factor of the number of players in between-group studies highlighted medium effect size for multiplayer games (d = .87) and small effect size for single player games (d = .55). On the

other hand, results for within-group studies highlighted a nonsignificant to small effect size for multiplayer games ($d = 0.59$), and a large effect size for single player games ($d = 1.45$). As for moderating variable of game input, written, and written-plus-spoken factors had small effects for between-group studies ($d = .43$, $d = .58$, respectively), and while the written one had large effect size for within-group studies ($d = 2.27$), the written-plus-spoken one had medium effect size ($d = 1.15$). However, it should be noted that by the nature of the digital games, they in fact support bimodal and/or multimodal inputs (i.e., pictorial (visual)-plus-written, visual-plus-audio input, etc.), meaning that rather than written only input, most of the digital games naturally support bimodal input. In player output moderator variable, the researchers found a medium effect size of none output ($d = .73$), large effect size for spoken output ($d = 1.29$) and no effect size of written and spoken output ($d = .27$) for studies conducted using between-subject design. As for the studies conducted using within-subject design, they found a large effect of none output ($d = 1.61$), small to medium effect sizes of written ($d = .98$) and written and spoken output ($d = .94$), and small effect size of spoken output ($d = .66$).

Research studies conducted in the field also revealed positive effects of DGBLLT. Miller and Hegelheimer (2006) and Ranalli (2008) conducted studies employing a game called *The Sims*, and found that the game supported by game-related materials, which aimed at meeting "criteria for CALL task appropriateness", helped the participants in both studies acquire L2 vocabulary items. Rankin et al. (2006) investigated the effects of an MMORPG game, *EverQuest II*, on L2 vocabulary acquisition. The results indicated positive L2 vocabulary gains, which was believed to be the result of interactions the participants entered with non-player characters (NPCs). In another study, deHaan et al. (2010) investigated the effects of a video music game with the participants divided into two groups: a) players, and b) watchers. Employing an experimental research design, they found that both groups recalled vocabulary items included in the game; however, the viewers recalled significantly more vocabulary items. The researchers believed that this was a result of player involvement since players were more involved the game cognitively, they recalled less vocabulary items. Sundqvist (2009) found a positive correlation between playing digital games and the participants' vocabulary size. In a later study, Sundqvist and Wikström (2015) investigated the same variables using two assessment tools: a) tests, and b) the participants' essays. They found that those who spend more time playing digital games compared to others used higher-band frequency level vocabulary items in their essays, who were followed by non-gamers and those who play games at a moderate time, respectively. This result may be noteworthy since it may shed light on differences between passive and active vocabulary levels of learners. Likewise, Sylvén and Sundqvist (2012) revealed that the participants' vocabulary levels and the time they spent on digital games correlated positively, which is a very common outcome of several studies (e.g., Hannibal Jensen, 2017).

Challenges

Although the related literature usually produced positive results, DGBLLT, of course, has limitations and challenges. Reinders (2017) categorized these limitations and challenges under three labels: a) operational, b) pedagogical, and c) methodological. Under the operational category, we can see issues related to the perceived effectiveness of games and the concept of being game literate. Teachers' efficiency may lead to some challenges at this stage since some teachers may not know the concept and the effects of digital games on language learning, let alone guiding their learners in digital games (Reinders, 2017).

In the second category, some issues regarding the implementation stage such as "privacy, safety, and security, as well as concerns by parents and other stakeholder" are raised (Reinders, 2017, p. 337). These concerns can be categorized as practical challenges since they include issues regarding the implementation stage of digital games into the language classrooms. Since there is no well-established guideline for integrating games into classroom, and thus into the curricula (Lai et al., 2013), some teachers may face problems in integrating games. Further, even those who support the use of gamification in language classes argue that already-established documents solely focus on the use of simplified gaming tools (Reinders, 2017). In addition, since the time spent on videogames usually happens outside the classroom, it is hard for teachers to monitor students' progress (Reinders, 2017).

Under the last category, we see challenges in establishing a well-founded methodology for research purposes. One of those issues is that there is not yet an agreed-upon definition of a videogame in the DGBLLT literature, since the concept itself includes several components which are hard to name and categorize. For example, Yip and Kwan (2006) regard such simple games as crossword puzzles in the category of video games. Compared to high-cost games which include complex mechanisms such as leveling up, simple design games such as crossword puzzles and tile-moving games seem to be less entertaining, less complex and lacking several components of digital games. The latter category of games, including flashcards, crossword puzzles and tile-moving games, can be defined as "a rapid sequence of small changes or tasks and characterized by a high degree of sequenced repetition exercising one or a small set of isolated skills" (Franciosi et al., 2016, p. 357), while the former ones include "a narrative, or a series of interrelated events" (Franciosi et al., 2016, p. 358). The inclusion criteria and definition of such games could potentially mislead the results of studies and give readers a sense of misunderstanding of digital games and their effects on language learning. Although *Duolingo* is not a game, Dixon et al. (2022) included it in their meta-analysis study since it includes complex mechanisms and elements of game similar to those of complex videogames.

To simply summarize the challenges, we can see that videogames usually require some sort of skills that are both technical and metacognitive (Chen, 2010), and to overcome

these, Lai et al. (2013) suggest scaffolding activities which include: a) helping learners through giving tips on gameplay (Neville et al., 2009), and b) building up strategies which help learners to get used to the turn-takings that take place in most of the collaborative games such as MMORPGs and virtual worlds (Örngren Berglund, 2006, as cited in Lai et al., 2013). These games can be played between players of different national backgrounds that have different cultural backgrounds (Sykes et al., 2010). In addition, for L2 learners to establish a richer engagement with the game and the language, several researchers suggest holding sessions which can take place before gaming (e.g., Bryant, 2007; Chen & Huang, 2010), during gaming (e.g., Deutschmann et al., 2009; Rankin et al., 2006), and after gaming (e.g., Bryant, 2007; Chen & Huang, 2010). Pre-gaming activities could involve giving out compensation strategies for learners who have relatively lower language ability for them to feel less threatened by gaming and by the language use in games, which can potentially help them build confidence (Shih & Yang, 2008). During gaming activities can be seen in the forms of helping learners immediately in the gaming stage (Rankin et al., 2006). Bryant (2007) used the helping format before and during the gaming stage when necessary. Post gaming activities could take the form of debriefing sessions on the gaming and learning experience (Bryant, 2007; Chen & Huang, 2010).

Another remedy for overcoming with the difficulties listed above is having a well-established connection between videogames and the curricula (Lai et al., 2013). In order to have this connection, several researchers suggest using games as an assignment in the classroom (Chen & Huang, 2010; Neville et al., 2009), integrating the elements involved in the game and the outcomes of a language class (Chen & Su, 2011; Oliver & Carr, 2009), and, as has been discussed in one of the previous sections of the current chapter, having a task-based curriculum built around the game in question (Sykes et al., 2010). In order to have such a task-based curriculum, Sykes et al. (2010) suggest using some of the quests or sentences from the quests in the classroom as a pre-gaming activity since activities that learners find relevant and useful are more effective (Deutschmann et al., 2009). In using sentences from the quests, practitioners can teach unknown vocabulary items to prepare learners for the game.

Games for Entrainment Purposes vs. Educational Purposes

As has been argued in the related literature, we come across with two types of games when it comes to their purpose: games for entrainment purposes vs. educational purposes, which can be regarded as pleasure- and education-oriented games, respectively (Sundqvist, 2019). The former one is also called commercial off-the-shelf (COTS) games while the latter can be referred to as "serious educational games" (Lai et al., 2013).

COTS Games

There are three types of COTS games: "video games, MMORPGs and collaborative virtual environments" (Lai et al., 2013, p. 186). Research on video games has demonstrated their

effects on listening and reading skills, as well as their conduciveness to L2 vocabulary acquisition (Lai et al., 2013); however, they fall short in providing learners opportunities for productive skills as they are limited to input-oriented gameplay which does not require learners to write or speak (Lu et al., 2011).

As for the second type of COTS games, with the inclusion of relatively rich actions (Thorne et al., 2009), MMORPGs provide learners with examples of real language in use. In addition, they also bring human-to-human (Sykes et al., 2010) and human-to-non-human (with the existence of NPCs) interactions, which in turn lead to the development of communicative competence and cultural knowledge (Peterson, 2010b). They offer a great opportunity for creating a task-based language learning environment as well (Rankin et al., 2006). In addition to featuring the benefits listed above for video games, MMORPGs also allow learners to use the language since they allow a space for learners to interact with either the game or other players. Besides, interacting with the game itself includes talking with NPCs. As Rankin et al. (2006) found, playing MMORPGs, particularly interacting with the NPCs, led to L2 vocabulary acquisition. When interacting with NPCs, depending on the game, learners can find chances to experience the consequences of their choices since the nature of MMORPGs allow for role-playing, meaning that players choosing different options while doing the same quest see different endings to that quest. While some offer limited choices for gamers, such as accept or decline options and did not change over time (see Figure 1), some have expanded opportunities, giving a full sentence instead of *accept* or *decline* option (see Figure 2). In this way, players can see different uses of language leading to more language input. In addition to MMORPGs, single role-playing games (RPGs) such as *The Witcher 3: Wild Hunt* also offer this sort of interaction for their players. Further, although most MMORPGs, which are only limited to written interaction, do not offer spoken interaction, players can use third-party applications to establish a spoken interaction. In addition, written interactions in the games can be considered as written-as-if-spoken (Norris, 1991) interactions since they, at some level, involve using language for the purpose of interaction, and lead to language acquisition. However, although written-as-if-spoken language achieves a sense of interaction between people, it is wrong to consider it as an equal medium of interaction with the spoken one since spoken interaction requires less time to establish. Although both of them happen simultaneously, written-as-if spoken takes time to establish since all of the parties involved in the communication need some time to write and read. Thus, it can directly contribute to the improvement of speaking skills.

What other games can you think of involving written-as-if-spoken interactions?

Figure 1 *A screenshot comparing past and recent interaction with NPCs in World of Warcraft (WoW)* (Adapted from Zagden, 2020).

Figure 2 *A screenshot from a quest dialogue with an NPC in New World* (Adapted from Society of Gaming, 2021).

As a result of rapid developments in technology, people have become familiar with the concept of virtual environments, which can now be regarded as metaverses. Advancements in technology expanded the variety of things and possibilities in

metaverses. Similar to the advantages offered by MMORPGs (Lai et al., 2013), metaverses offer chances for productive language use as well. In addition to these advantages, in metaverses, learners and teachers have the opportunity to create an environment which is not built around a gameplay (Lai et al., 2013). In fact, when considered from this perspective, virtual environments or metaverses fall short in providing gameplay, which leads to the questioning of their classification under digital games (see Chapter 4 in the book for a detailed discussion of VR environments).

In addition to three types of games discussed above, multiplayer first-person shooter (FPS) or third-person shooter (TPS) games can also lead to language acquisition as well since some of the games such as *Valorant, Counter-Strike: Global Offensive* and *PlayerUnknown's Battlegrounds* offer their players in-game communication with spoken interaction. Further, since these games force their players to establish a collaboration, players naturally have to communicate with each other to win the game. In addition, some mobile games also offer opportunities to acquire a language (see Chapter 3 for discussion of mobile language learning).

In short, in comparing different types of games, we need to consider the player interaction (Dixon et al., 2022) and engagement to see the real effectiveness of the games. Dixon et al. (2022) considered that the player interaction factor was connected to the number of players, that is, single, multiplayer, or massively multiplayer online games. However, player interaction does not solely depend on the number of players, rather, it is formed by several factors including number of players, tasks included in the gameplay, players' interaction with both other players and NPCs, story of the game, and the interaction types that games offer.

Serious Educational Games

One might think that educational games might provide a larger space for language acquisition compared to COTS games. However, research suggests the otherwise (Dixon et al., 2022). Reinhardt (2019) notes that the results of a body of research on the effectiveness of educational games on language acquisition might be misleading because of the limited number of games designed specifically for language learning since game designers do not focus on designing games for educational purposes. The ones that are designed include "repetitive and superficial tasks in which the learning objectives are too obvious" (Reinhardt, 2019, p. 280), making them less game-oriented compared to those designed for gaming purposes. In line with this, in designing educational games, one should consider balancing the instruction (i.e., materials provided for language acquisition) and gameplay (Neville et al., 2009), meaning that one should offer "a strong and playful character while at the same time integrating a clear pedagogical rationale" (Lai et al., 2013, p. 190). Indeed, Loewen et al. (2019) found that using *Duolingo*, which some consider as a digital game designed for language learning purposes in mobile environments since it somewhat contains some elements of gamification, only one of the nine participants

achieved the passing score. They also claimed that most of the MALL applications base their pedagogies heavily on "grammar-translation and audiolingual-type activities", which may fail to reflect the true benefits of digital games. In order to balance gaming and educational elements, practitioners and game developers should work in collaboration to establish pedagogical elements in digital games. Further, practitioners should consider using games designed for gaming purposes such as *Minecraft* to integrate gaming and language learning since such games allow modification to some level.

Suggestions for Integrating Digital Games with Language Learning: Example of Minecraft

Thanks to almost unlimited variety of environments it offers, language teachers can easily integrate *Minecraft* with the learning environment and/or tasks. A language learning environment can be created in *Minecraft* by establishing a world in *Minecraft* and sharing it with the learners using servers. Language teachers can also make use of existing *Minecraft* worlds, which have already been built by several different users of *Minecraft*. Teachers can choose maps that are shared on online forums which resemble school environment.

Figure 3 *A screenshot from a random map on Minecraft*

As can be seen, a random map on *Minecraft* is quite sophisticated, and has a lot to offer. However, as has been discussed, the maps on *Minecraft* can be altered, meaning that the player has a saying in designing the world. Using several elements and items included in the game, players can build apartments, roads, educational buildings and other things a person can imagine since the game lets its users to modify the game using mods and the game's items. These mods can help modify the game. These mods can be categorized

under five different topics: a) utility and performance mods, b) mobs mods, c) solo play mods, d) building mods, and e) quest mods (T, 2022). In addition, *Minecraft* offers a different platform for educational purposes called *MinecraftEdu*, which can be used to design educational tasks.

Players are free to design a map of their choice. In addition, using the items in the game, teachers can give written instructions to help learners to know what they are supposed to do. However, we should keep in mind that this is not similar to giving instructions in the classroom. This is only limited to written input. With *signs* and the figures of items, teachers can direct learners. Figure 4 below illustrates a classroom design.

Figure 4. A screenshot illustrating ICT classroom in *Minecraft*

As can be seen from the figure above, players can design an educational setting in *Minecraft* for several subjects, and language classrooms are not an exception. As for the integration of language education and *Minecraft*, ELT practitioners can design, or use ready-made, maps and classrooms given in the figure above, they can design a classroom which includes the following three items in the game: a) an *anvil*, b) a *chest*, and c) a *book and a quill*.

Using the *book and the quill*, learners can write their writing assignment using *Minecraft*. Later, using the *anvil* item, learners can name their assignments (see Figure 5). Finally, using *chests*, students can submit their assignments (see Figure 6). In addition, students can work as a group for writing task using the same *book and quill* item. After one of the learners finishes writing his/her own part of the assignment, he/she can use the *chest* to submit his/her part. After that, another student from the same group can use the same *book and quill* item to write his/her own part. While doing the task, group members do not need to connect to the server at the same time. Students can pick a time convenient for

themselves. This is only one of way of integrating of *Minecraft* into language education settings and it can set an example for similar integrations.

As for holding sessions as has been discussed in the chapter to help overcome some challenges related to digital games, teachers should introduce the game and the gameplay in the class before using it, which will serve as a pregaming activity and will help learners to have a sense of the game. For a during gaming activity, teachers can consider using *signs* item in the game to give directions. Since this can easily be done as an extramural activity, teachers can ask learners to submit their assignments using *Minecraft*. In addition, in an online server, as has been discussed in the chapter, players (or in our case students) can use third-party applications to establish communication or use the text in game to establish written communication. We can promote text as written-as-if-spoken interaction. However, we should consider drawbacks as well. Since it is a digital game, learners can lose the sense of submitting and assignment, and might spend hours playing the game. In order to overcome this, practitioners can use *signs* and figures to direct the learner. In addition, practitioners can set a deadline for submitting the assignment.

Figure 5. A screenshot illustrating the use of anvil item

Figure 6. A screenshot illustrating the inside of a large chest

Conclusion

Developments in technology inevitably led to changes in language teaching contexts. Drawing on several theoretical foundations, DGBLTT found its place in language teaching and learning; however, we still cannot say that its potential has been fully recognized in language learning yet, because of the dearth of pedagogically developed practices and research that can guide learners and teachers to make most out of the affordances digital games offer. There are still areas in digital games whose true potential in language acquisition are to be further explored. As has been discussed throughout the chapter, research still needs to investigate the effects of number of players, tasks included in gameplay, players' interaction with both other players and NPCs, story of the game, and the interaction types that games offer on language acquisition. Further, defining a video game or digital game has been an issue, which leads to uncertainty in inclusion criteria in meta-analysis studies.

As suggested in the current chapter, *Minecraft* can be used to integrate writing tasks into digital games. In addition, through modifying, teachers can integrate listening tasks into the game as well. Besides, there are other games, such as *Grand Theft Auto V* with multiplayer option to establish an RPG server, which can support the integration.

In sum, teachers can consider digital games as one of the tools in their toolbox to promote informal language learning and to introduce an element of fun and a source of motivation for some learners. The design, selection or integration of educational or entertainment games for language learning should be primarily driven by pedagogy. Regardless of type, games that elicit more communication, provide expose to comprehensible input, etc. should be adapted. As has been suggested in the chapter, practitioners and game designers should work together to establish a pedagogically valid gameplay. Pedagogical validity also involves existence of gamification. It can be suggested that games designed for educational purposes should include more elements of gamification. Further, some other concerns such as addiction, violence, etc. should also be addressed when integrating or promoting digital game playing for language learning purposes. However, it should be noted that the issues and concerns raised for the use of MALL in the Chapter 3 in this book also apply to using digital games. In order to overcome these concerns, practitioners should be careful in choosing the game appropriate for their learners' levels, ages, and sociocultural background, and should provide pedagogical support.

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LEARNING ENGLISH AS A FOREIGN LANGUAGE IN INNOVATIVE LEARNING ENVIRONMENTS

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Before you read, reflect on the following questions:
1. What do you think about the effect of learning environments on language learning process?
2. How do you arrange your classroom as a foreign language teacher?
3. To what extent is technology integrated into our classrooms?
4. Have you heard about innovative/smart/future learning environments before?

Introduction

In this age when the world of science and technology is constantly evolving, it is necessary to design education systems that can keep up with the changing world. While technology is changing so rapidly, it doesn't seem possible to teach Z generations which is regarded as digital natives only with traditional education methods and classrooms. The updated pedagogy and technology makes it compulsory to rethink and reshape the educational systems. Being one of the key elements of these systems, classrooms also need to be redesigned as they play a crucial role in foreign language learning process. The question of where the language learning will take place can have enormous effect on how language learning progress (Benson, 2022). Thus, it is required to rethink on the language classrooms to enable them to keep up with the new era and to achieve a successful language learning process. Even the term of classroom is changing nowadays, as learning is not restricted to just physical settings. Moreover, the new pedagogies take care of social and emotional conditions of learners. Thus, terms such as learning space and environments are more comprehensive than classrooms. Like the variety in classroom terminology, the new and future classrooms' terminology and features also show variety. Nevertheless, the goal and key components are the same in these settings. Thus, the

terminology related to these concepts was used interchangeably in this chapter. Beginning with the rationale for transformation in learning spaces, this chapter continued with two innovative learning environments samples which were iTEC and Future Classroom Labs. It was hoped that these samples would guide the both pre-service and in-service teachers to redesign their language classrooms. Thus, the chapter concluded with the implications for utilizing these environments for foreign language teaching.

The Need for Innovation in Learning Spaces

OECD (2021) indicates that, the time spent by students in schools is 7.638 hours during primary and lower secondary education. The spaces where students spend so much time need to be structured comfortably and effectively for learning. The learning space is still at the heart of learning process, but the effectiveness of these spaces should be questioned (Warger & Dobbin, 2009). According to Oblinger (2006), spaces are representative of change; changing fields will change the application. A learning space where students find the educational objects they need and feel comfortable will increase their success and improve their skills. Physical environment is one of the most crucial factors affecting the students' success in English language learning (Kiatkheeree, 2018). However, the existing classrooms are not well designed as they are limited in terms of adapting to learning styles (Atif, 2012). Moreover, *"the traditional language lab, based on the largely behaviorist audio-lingual method, became outdated as new technologies emerged and a shift in language teaching and learning occurred"* (Kronenberg, 2016, p. 64.)

Traditional classrooms fall short of developing 21st century skills that can be listed as creativity and innovation, critical thinking, problem solving, decision making, learning to learn, metacognition, communication, collaboration, information literacy, information, communication and technology literacy, citizenship (local and global), life and career, personal and social responsibility-cultural awareness and competence (Binkley et al., 2012). According to Zhang and Zhou (2017), future classrooms should have the features of contextuality, openness, intelligence, interaction, and cloud. Traditional classrooms are lack of multiple pedagogical dynamics concerning with students so there is a need for reshape the learning spaces (Dovey & Fisher, 2014; Mulcahy, 2015). Learning spaces should be flexible and responsive in order to support these pedagogies and increase the efficiency of technology (Baeta & Petro, 2018). The classrooms of the future should have flexible designs that encourage creativity, autonomy and cooperation and supported by technological and physical infrastructure (Göçen et al., 2020). Students need certain elements in learning areas such as flexibility, comfort, sensory stimulation, technology support, relevance, studio classrooms, knowledge partners/collaboration, life-learning spaces and corridor niches (Chism, 2006). Some advances in technology have been realized since Chism (2006) listed these elements. Therefore, "technology integration" into learning environments may be a more accurate expression than "technology support" in learning environments nowadays. As the role of technology in education

differs as to different reasons and levels, the expressions used in the literature also change. According to Hughes (2005), technology-supported pedagogy is possible in three ways. These include: a) replacement, b) amplification, and c) transformation. *Replacement* occurs when technology replaces existing teaching practices, learning processes, and goals. On the other hand, a*mplification* refers to the use of technology to achieve the same learning goals more effectively. Lastly, *transformation* is observed when technology changes students' learning routines or teachers' roles, such as content, cognitive processes, and problem solving. Instructional technologies can preserve the current situation as in replacement, or renew it as in transformation. The transformative role that Hughes (2005) attributes to technology can be characterized as technology integration. Moreover, "technology integration is a powerful tool of change and learning can happen anywhere and anytime" (Fu, 2013, as cited in Şendurur & Arslan, 2017, p. 26). For example, learning environments where technology only plays an auxiliary role, such as the presence of only a smart board in the learning environment, may be insufficient to meet the interests and needs of children and adolescents who are highly connected with technology. As a matter of fact, it has been shown that smart boards have problems such as difficulty in using pen, out-of-date programs, lack of content, and difficulty in preparing materials (Çoklar & Tercan, 2014; Karakuş & Karakuş, 2017). It is possible to say that a number of technological tools and applications integrated into education may have both technical and pedagogical problems. Therefore, there is a need for learning environments that include a variety of technological tools and applications that do not depend on a single application.

Due to the shortcomings of existing learning spaces, the stakeholders of education have had different suggestions for new classrooms. These suggestions have different names such as innovative learning environments (OECD), future learning environment, smart learning environment (Cheung et al., 2021), flexible learning spaces, physical learning space, 21st learning space, and modern learning environments (Fletcher et al., 2020).

Although the initiations and names are different, the aim is common which is to help learners gain the 21st century skills. In accordance with these skills, the new learning spaces are flexible, technology rich, arranged in a way that enables collaboration and not restricted to just physical spaces as also illustrated by Partnership for 21st Century Skills (n.d.) as follows:

21st century skills are classified as:
   a. Learning skills: critical thinking, creative thinking, collaborating, communicating
   b. Literacy skills: information literacy, media literacy, technology literacy
   c. Life skills: flexibility, initiative, social skills, productivity, leadership.
by Partnership for 21st Century Skills (2007)

The term 'learning environment' suggests place and space – a school, a classroom, a library. And indeed, much 21st century learning takes place in physical locations like these. But in today's interconnected and technology-driven world, a learning environment can be virtual, online, remote; in other words, it doesn't have to be a place at all. Perhaps a better way to think of 21st century learning environments is as the support systems that organize the condition in which humans learn best (p. 3).

Similarly, OECD (2015) lists the features of Innovative Learning Environments (ILEs) in ten principles, which can be summarized as follows:
- learning should be central and help learners regard themselves as learners, and engagement should be enhanced
- learning should be social and collaborative
- ILEs should give importance to the motivation and emotions of learners
- ILEs should concern with individual differences
- ILEs should ask for hard work for each learner without excessive overload
- ILEs should enhance horizontal connectedness both in and out of school and across learning activities
- ILEs should innovate the core elements such as teachers and learners and dynamics tie these elements such as pedagogy
- ILEs should open up to new partnerships
- ILEs should make assessments through a strong leadership

Technology is not addressed in these principles but it is a powerful and central tool for accomplishing them (Groff, 2013). Smart learning environments include mobile learning, personalized learning, adaptive learning, flexible learning and blended learning (Cheung et al., 2021). Each of these approaches either are about technology integration or somehow related to technology. It is not realistic to think the future classrooms without technology integration. Technology uptake is not luxury anymore but a key component of todays' learning environment (Colton et al., 2020). It can play a key even a leading role in learning environments (Groff, 2013). Based on these rationales, an innovative learning environment which is Future Classroom Lab (FCL) was explained below with the aim of guiding both practitioners and researcher. Firstly, iTEC was briefly mentioned as it was the pioneer of FCL.

Samples for Innovative Learning Environments
iTEC
European Schoolnet, which is a non-profit organization interested in innovation in education, has initiated several projects trying to reshape the future classrooms with technology uptake. One of them is Innovative Technologies for Engaging Classrooms (iTEC). Within the scope of this project, 2500 classroom were redesigned through eight strands of activity which were a) Future Classroom Toolkit b) Initial Teacher Education

network and emerging network of Future Classroom Labs, c) the Future Classroom Ambassador scheme, d) Continuing Professional Development (CPD), e) family of related projects (e.g. Future Classroom Lab which was explained in the next title), f) influencing national policy and strategy, g) exploitation of iTEC technical research and industry collaboration, and h) further engagement with school leaders and teacher communities. These activities enhance teachers and policymakers to build the future classrooms through collaboration. For example, the Future Classroom Toolkit explains the process of change through learning scenarios and stories. The initial teacher network and ambassadors create collaboration across Europe and disseminate the outcomes. The activities were illustrated in Figure 1.

iTEC resulted in some crucial key findings for both teachers and learners. These findings can be summarized as: a) iTEC improved 21st century skills such as critical thinking, digital literacy, creativity and collaboration, b) the roles in the classroom changed; students became the tutors and co-designers of their learning process, c) iTEC increased students' motivation and attainment, d) enthusiasm, pedagogical skills, digital competence of teachers, and collaboration among teachers increased. Besides these positive outcomes, it was stated that further work was needed. Thus, a new attempt for future classrooms has been launched by European Schoolnet, which is Future Classroom Lab.
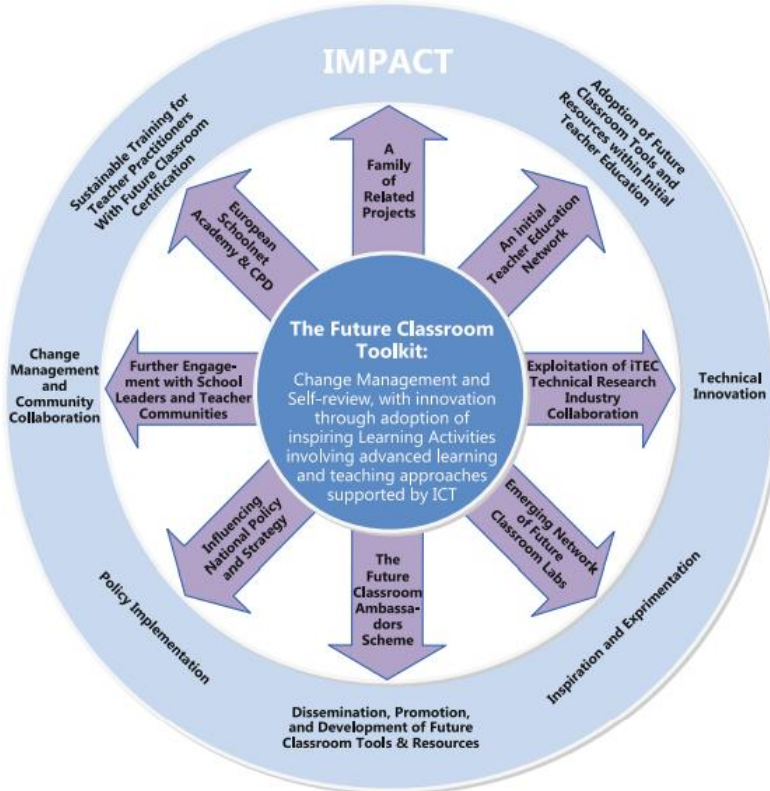

Figure 1 *ITEC* (Ellis et al., 2015)

Future Classroom Labs

One of the initiatives trying to design the classrooms of the future is the Future Classroom Lab proposed by the European Schoolnet. Having reviewed the iTEC, CPDLab, Living Schools Lab and Creative Classroom Lab projects, the European Schoolnet launched FCL practices in 2012. FCL was originally designed as an inspiring learning environment in Brussels. This setting in Brussels invites visitors to consider the role of pedagogy, technology and design in their classrooms (fcl.eun.org). FCL aims to make educational institutions aware of the change in technology that is developing day by day and to investigate the usability of this development in educational environments (Future Classroom Lab: Geleceğin Sınıfı Laboratuvarı)

FCL was designed as a Living Lab for ICT implementation in schools and aimed at bringing the policy makers, ICT suppliers, teachers and educational researchers together to:

- *Rethink how new technologies can support the educational reform process at both national and European level;*
- *Engage in regular workshops, seminars and courses on how existing and emerging technologies can have a transformative effect on teaching and learning processes"* (Future Classroom Lab Learning Zones, 2013, p. 1).

In order to build an active learning process, there should be a cooperation among learning spaces, pedagogy and technology (YEGITEK, 2018) as shown in the following figure.
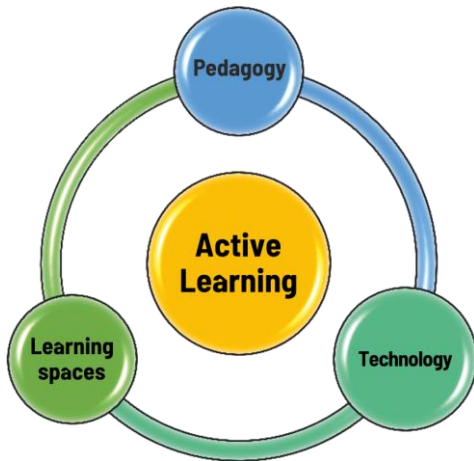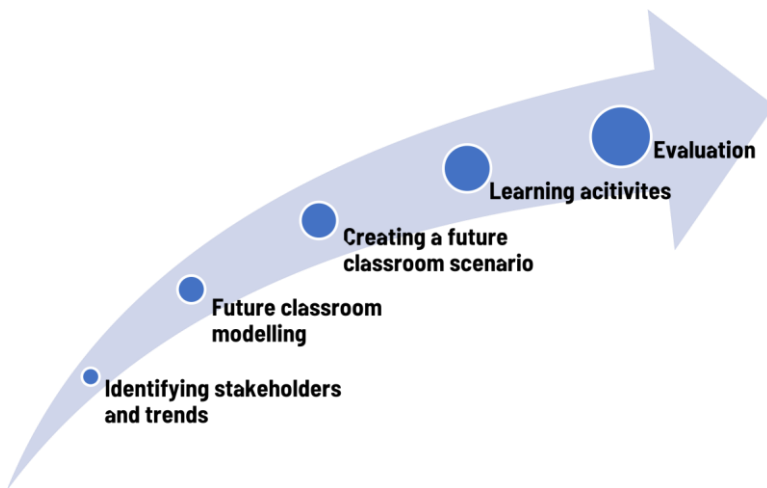

Figure 2 *Components of future classroom* (Adapted from Göçen et al., 2020)

Göçen et al. (2020) state that "any kind of technological tool and educational activity that is not supported by the appropriate pedagogy can be a waste of time" (p. 86). In fact, this is supported in all technology driven learning approaches. Technology itself does not have a magic that teach learners. A true and effective utilization of technology for pedagogy is needed for active and efficient learning.

FCL has five toolkits which can be regarded as the main steps of designing a future classroom. These are identifying stakeholders and trends, future classroom modelling, creating a future classroom scenario, learning activities, and evaluation. (see Figure 3). Firstly, it is determined who will be involved in the process. Thus, an innovation team that can consist of a wide range of administrators, researchers, parents and students is created. This innovation team identifies the trends in education and selects appropriate ones for the target school. At this stage, the school is evaluated and an available and appropriate area where the classroom will be designed is determined. Then, a new scenario is created or an existing scenario can be adapted in accordance with the school evaluation results. The Future Classroom Scenario is a document that covers descriptions of where to set up the learning space, what resources to use, how to leverage technology, the role of the learner, learning objectives, target skills, and relevant trends. In the fourth stage, teachers with different experiences come together to create and share learning activities through a web-based tool called Learning Designer. Finally, a process evaluation is realized by using the guide that the FCL presents.

Evaluation

Learning acitivites

Creating a future classroom scenario

Future classroom modelling

Identifying stakeholders and trends

Figure 3 *FCL toolkits*

Learning Zones

There are six zones of education in FCL: create, interact, present, investigate, exchange and develop (see Figure 4). All of these zones are equipped with technology compatible with the zone itself and the learning scenario. The flexibility of learning zones and greater access to technology in FCL allow students to learn actively, flexible and cooperatively and peer learning (http://fclturkiye.eba.gov.tr/). FCL laboratories are designed according to the needs of the schools. Therefore, in a FCL design phase, a need analysis must first be conducted by the school principal and teachers.

Figure 4 *Learning zones*

Create: In this zone, students plan, design and produce their own tasks. Learning by producing, developing soft skills, producing for real life can be given examples of the key concepts of this zone. Tools such as Chroma key, podcast software, animation software, streaming software, flipped camera, digital cameras can be utilized for this zone.

Interact: Learning includes active participation of learners and teachers. 1:1 computing which provides personalized learning can be used for classroom motivation. The classroom should deviate from traditional arrangement and be reshaped. These goals can be achieved with the help of interactive board, mobile learning devices, classroom management systems, and learning response systems.

Present: Developing feedback skills, incorporating eSafety application into school, learning to share and communication are the key concepts of this zone. Online broadcasting tools (e.g. VLE, blog), HD projector and redesigned furniture are the useful tools for Present.

Investigate: Project-based learning is encouraged by enabling students to think critically. Thus, the key concepts of this zone includes developing critical thinking and problem solving skills, learning by discovery and encouraging interdisciplinary projects. Online laboratories, robots, microscopes and 3D models can be used in this area.

Exchange: Online collaboration, teamwork, learning by game are the key concepts and brainstorming wall, interactive board, and mind mapping tools are among the tools that can be used in this zone.

Develop: In this learning zone, students benefit from informal learning. Self-directed learning and self-reflection are encouraged. Supporting motivation, flipped classroom, learning with games, promoting informal learning are the key concepts of this field. Portable vehicles, informal furniture, books and e-books, games and headphones are the suggested tools.

Figures 5, 6, 7, and 8 *FCL examples from Türkiye* (Retrieved from fclturkiye.eba.gov.tr)

The Challenges

It is clear that these environments have many advantages for both learners and teachers. However, it is not easy to design these classrooms. FCL Regio project, which "brings together local and regional authorities to explore opportunities and challenges related to the innovative and meaningful integration of ICT schools" (Future Classroom Lab Regio Network, 2018, p. 4), conducted online surveys in different countries. These surveys showed that cost and accessibility of devices, ban of the technology in the classroom, online safety related issues and risks, lack of deployment/implementation by the policymakers and ethical use of technology were the main challenges encountered when trying to use new technologies in the classroom. In the same survey, it was also found that designing innovative learning environments involved the following difficulties: lack of financial resources, attitude of going beyond traditional classrooms, and students' and teachers' reluctance to study/work in these spaces. Educators should go beyond the status quo routines, review key ideas and interrogate beliefs and values for innovation (Hammerness, 2005, as cited in Blackmore et al., 2011). This is one of the biggest challenge for innovation as this can be regarded as tiring, time-consuming and bothering. The conservative attitude to the technology also make the redesign of the classrooms difficult. Moreover, "the judicious use of technology may disrupt teaching and learning approaches" (Fletcher et al., 2020, p. 109). Thus, some educators may find the innovative classrooms challenging in terms of management and teaching. Another

main problem is financial issues. It is apparent that the technology, furniture and the other equipment needed for this settings are not easily affordable especially for developing and non-developing countries.

Outcomes for FCL- What research says?

Some of the studies encountered in the literature aimed at getting opinions from users about FCL and similar learning environments. For example, Baeta and Petro (2018) determined the views of teachers and students on Innovative Educational Environments (IEE), which included FCL, through a survey method conducted with 9 teachers and 163 students from 9 different schools. The results showed that teaching strategies developed in innovative learning environments enriched the learning process. The study also revealed the positive impact of the learning environment on adapting differentiated pedagogical dynamics. Similarly, Sardinha et al. (2018) aimed to determine the opinions of teachers, students and decision makers who used FCL in their studies. In this context, the opinions of 107 decision makers, students and teachers were obtained through an internet-based questionnaire. According to the results, the reasons that led to the design of the FCL were pedagogical approaches of future classrooms, students with learning difficulties, the philosophy of the school and educational needs. In addition, it was determined that 77% of the students had positive attitudes towards the FCL environment. 76% of the participants thought that it was easy to switch between the six learning areas of FCL and 75% of them believed that the class was suitable for different activities. Similarly, Göçen et al. (2020) found that teachers regarded the classrooms of the future as environments equipped with technological tools, encouraging for contemporary teaching methods, and providing equality, autonomy and motivation, as a result of semi-structured interviews with 11 teachers from different branches participating in FCL training. Ambrosi (2015) conducted a case study to examine science teaching through problem-based learning in classroom settings such as FCL and UniLab. The results showed that these technology-integrated environments enhanced problem-based learning. It was also emphasized that these environments turned students into small scientists.

Other studies in the literature on FCL are review studies. Arstorp (2018) mentioned the requirements of teacher education in his study and suggested the use of FCL for this purpose. He emphasized that teachers who needed to have digital skills could not achieve this with existing classes, but FCL would increase the interest and awareness of the pre-service teachers. On the other hand, FCL has some disadvantages such as the time and energy required to create the FCL. Contrary to Arstorp (2018), Wastiau (2014) stated that projects such as FCL were insufficient as long as they were limited to physical space, they could only cover limited pre-service teachers and could not reach large audiences.

Implications for Foreign Language Teaching

Learning environments is one of the important factors affecting also FLE (Foreign Language Education). "New learning space for English language does improve teacher pedagogy and student learning behavior and technology is a key consideration in this triad" (Nambiar et al., 2017, p. 39). FLE is a dynamic process where the learners should practice communicative and linguistic skills regularly for an affective language education. In accordance with the dynamic and active nature of FLE, the settings where the language is learned should promote active learning. However, this is more difficult to achieve in traditional classrooms. Traditional learning spaces such as horseshoe design hinder effective interaction between learners. However, prominent language teaching approaches such as Communicative Language Teaching advocates that "the primary function of language is to allow interaction and communication" (Richards & Rodgers, 2001, p. 161). In order to develop communicative skills such as speaking, learners should interact with other individuals (which they can also do in traditional classroom) or non-human systems that technology presents. Compared to the traditional classrooms, innovative learning systems such as FCL are more likely to present the opportunity of more interaction with humans thanks to its flexible furniture and non-human systems through the technology it includes. Flexibility can be achieved through both the furniture that is mobile and comfortable and also mobile devices such as tablets and smartphones. Moreover, ILEs have a variety of technology such as augmented and virtual reality. It is long known that authentic learning and living in the country where the target language is spoken is a unique experience for an active and effective language learning. However, this is not easy to achieve for each learner. However, classrooms equipped with these kind of technologies such as virtual reality can realize this to some extent and present authentic-like environments.

Desuggestopedia (Lozanov, 1991, 1992) suggests that the language learning environments should be relaxing and cheerful and should provide peripheral learning. An innovative learning environment such as FCL takes what desuggestopedia says into consideration and create a colorful and colorful walls and doors that provide learning without being aware of it.

In a foreign language classroom, multi-purpose activities such as group problem solving, individual - research and audio visual aids, student participation, self-presentation, role playing, lecture/demonstration, student testing and evaluation should be used (Yıldız & Çakır, 2013). With its different zones, FCL can present the opportunity of using various activities and resources. For instance, the zones of exchange and interact enhances collaboration while the zone of present may promote the presentation skills and highlight the importance of feedback.

Through the zones, skills and knowledge such as active learning, feedback, project-based learning, critical thinking, production, collaboration, informal learning, self-reflection can be developed in a FCL settings. It should be noted that all of these skills that are listed as

key concepts in the zones have a high importance for FLE. Besides, FCL is one of the examples for ILEs. A variety of classrooms may be designed with different pedagogy and technology that will make the language learning process easier, effective and motivating.

Conclusion

Learning setting is one of the essential elements of learning process. As both the technology and language learning approaches are updated, the settings should be renewed based on the new findings and implications of this change. It is clear that the design of these classrooms have challenges and some disadvantages. Thus, by reviewing these challenges and trying to minimize it, schools and policy makers can design the classrooms of today and future in a collaboration with teachers and learners. There should be a huge collaboration among each stakeholders of education for creating these classrooms. Firstly, a need analysis should be done as each region and school will have different needs and expectations. The process of designing classrooms should be flexible and the classrooms should be adjusted to the targets and needs. Thus, the design of these classrooms is beyond just adding some furniture and technology in the class. They should be designed with a good and justified pedagogy and appropriate technology.

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