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Technology in the Classroom: The Features Language Teachers Should Consider

Sophie Cuocci
University of Central Florida, sophie.cuocci@ucf.edu

Padideh Fattahi Marnani
padideh.fattahi@ucf.edu

Introduction

In the early 2000s, the United States made the commitment to provide students with the necessary resources and skills to guarantee success in life. With the fast development of technology came a generation of highly computer-literate students, the digital natives, who led to the integration of technology in school being deemed essential (Driscoll, 2002). Technology has now become a prevalent part of today's education (Hashim, 2018; Vail, 2003). However, to properly integrate technology to promote learning, educators must consider the contextual, active, social, and reflective aspects of learning (Driscoll, 2002). Therefore, integrating technology in the classroom must be combined with appropriate pedagogies and strategies to be used to its full capacity (Lawrenz et al., 2006). Factors such as frequency of use, purpose, forms, connection to specific problems, and potential side effects are essential to keep in mind before adding technology to the classroom (Furr et al., 2005; Lei & Zhao, 2007). Moreover, the use of technology and some technology tools might also highlight the disparity in students' access to technology (Harrell & Bynum, 2018), including outside of the classroom, and also in accessibility (Shaheen & Lohnes Watulak, 2019). These extra considerations can be time-consuming for educators who already feel overwhelmed by their workload (Hester et al., 2020).

With the increasing number of English learners in the United States and around the world, there has been a consistent need to identify new teaching strategies to develop the effectiveness of the teaching process (Pazilah et al., 2019). Research conducted over the last two decades have suggested that the use of information and communication technology (ICT) has positive effects on students (Cakici, 2016). One example of ICT is the increase in their motivation, a factor identified by researchers as a stimulant to achieve a specific target (Ng & Ng, 2015; Pazilah et al., 2019). It is therefore unsurprising that many language teachers now rely

on teaching techniques using technology advancement to ensure motivating lessons (Morat et al., 2016; Pazilah et al., 2019). Studies have shown that the implementation of technology in language education promoted communication and exchange of ideas (Ahmed & Nasser, 2015; Pazilah et al., 2019). Technology use in language classrooms can lead learners to be more engaged in knowledge construction, collaboration, and reflection (Rosická & Hošková-Mayerová, 2014) and can lead to an increase in motivation (Morat et al., 2016; Pazilah et al., 2019). It also allows teachers to enrich and enhance course content comprehension and, when multiple types of technology tools are implemented, can provide a sense of freedom, motivation, and encouragement beneficial to the learning process of language learners (Pazilah et al., 2019; Roy, 2019).

However, implementation of technology in language learning can have potential disadvantages such as the creation of distraction, the risk of misusing technology, and an increased risk of communication breakdown due to language barrier, which can negatively affect students' learning (Pazilah et al., 2019). Some models have been developed to help educators choose the right technology tools. One of them, the Substitution, Augmentation, Modification, Redefinition (SAMR) model offered by Puentedura (2006), is a framework that teachers can use to select, utilize, and evaluate technology in K-12 settings. Based on this framework, technology tools can be good tools of substitution, implying that the lesson is carried out the same way as in a traditional classroom but with the use of technology. Technology tools can also supplement the lesson or enable learners to reach a transformational stage in the teaching and learning process, meaning that they are able to redesign tasks to better achieve their educational goals (Ahmed & Nasser, 2015). Although models such as SAMR have the potential to simplify the selection process of technology tools; "they represent teaching with technology in sterile and hierarchical

ways that most often serve to misinform and mislead teachers rather than enhance pedagogy and practice" (Hamilton et al., 2016, p. 439).

Even day, educators still face challenges in identifying among the myriad of technology tools offered to them, which ones best fit their classes' needs and in choosing and properly implementing them to best support students' learning. This represents a double challenge of educators having to first identify the type of technology that best suits their educational goals and then to be trained on how to use said tools. When teachers fail to do so, technology can be pedagogically useless (DenBeste, 2003). Therefore, this literature review aims to gather information from recent studies on the efficiency of the features provided by different technology tools used in classrooms with a focus on language learners. It includes a brief review of some of the positive and negative effects of technology on learners and it then explores some of the factors in terms of technology implementation that can either positively or negatively affect language learning. Despite researchers' interests in ICT, it is important to continue to develop among educators a better understanding of educational technologies and potential issues that might surround them (Kirkwood & Price, 2005).

Effects of Technology Use on Learners

The progressively more common use of technology amongst students has led educational instructions to integrate technology into teaching and learning. However, the effect of technology in the classroom on academic performance and students' engagement remains debatable as researchers have identified both positive and negative outcomes. Some studies emphasized the potential negative outcomes of technology on learners' achievement. Bond et al. (2020), for example, highlighted the fact that using technology can potentially make teaching and learning processes more intensive. On the other hand, researchers such as Salaber (2014) suggested that

student learning can significantly improve as a result of an enhanced learning environment. Technology seems to be specifically beneficial in certain content areas such as mathematics (Li & Ma, 2010).

Positive Effects of Technology on Learners

Collaborative learning, as defined in the theoretical framework of social constructivism learning theory, highlights the process of co-construction of knowledge through social interaction (Chen et al., 2018; Salomon & Perkins, 1998; Stahl, 2006). It can thus lead to positive outcomes in terms of learning. This connection between collaboration and learning was noticed by various researchers throughout the years. A meta-study analysis based on 425 empirical studies suggested that collaboration had significant positive effects on knowledge gain, skill acquisition, and student perception (Chen et al., 2018).

Using tools reinforcing collaboration can thus potentially lead to students' improved knowledge and skills acquisition. In a study conducted in 2012, Bouta et al. examined the effect of using an online 3D virtual environment in teaching mathematics in primary education. The authors focused on the influence of such environment in student engagement and its ability to enhance collaborative learning. The participants in this study were immersed in a virtual environment incorporating a macro-script and learning tasks related to basic fractions over four teaching sessions. Findings indicated that the virtual environment actively engaged the students' interests, which promoted richer interactions between them. In turn, these richer interactions resulted in higher levels of engagement in the collaborative learning process. Similarly, in 2019, Alioon and Delialioğlu designed authentic collaborative mobile learning activities and implemented them in a computer networking course for two consecutive semesters. The researchers looked specifically at the effects of the activities on student engagement and

motivation. The improvement of the activities' content and instructional process made between the two semesters triggered an increase in collaboration among students and interaction with their instructor. This study suggests that though the technology tool helped with collaboration, the feedback-based improvements made between the two semesters were essential to enhance it.

Motivation has been identified as a key element of the learning process (Alizadeh, 2016; Boekaerts, 1986; Spratt et al., 2002). Research has also shown that using technology promoting motivation among students lead to positive learning outcomes (Ilter, 2009; Lin & Chen, 2017). Not only can technology in the classroom improve students' motivation, but it can also improve learners' ability to transfer knowledge, develop their interests in the content taught, and their self-perception in terms of their role in classroom interactions (Rosen, 2009). In a study conducted in 2009, Rosen investigated the effect of learning with integrated animations on transfer of knowledge and motivation to learn science and technology among 418 students enrolled in 5th and 7th grades. The author noted that students developed more interest in learning and perceived themselves as playing a more central role in classroom interactions. Thus, technology has the potential to enhance collaboration among students and trigger their interests, both factors contributing to the learning process.

Negative Effects of Technology on Learners

Researchers have also identified different factors linked to technology that can potentially affect students' learning. Some have looked at specific tools and applications, such as Rashid and Asghar (2016). In their study involving 761 undergraduate students enrolled in a university in Saudi Arabia, the authors identified phone calling and watching TV as negative predictors of academic performance, whereas media sharing, social media use, and Facebook were considered positive predictors (Rashid & Asghar, 2016). While based on self-reported data, this study

emphasized the need for educators to carefully choose the right technology tool to achieve positive learning outcomes. Other studies have suggested that the use of social media such as Facebook can negatively affect some aspects of learning while promoting others. The findings of a study conducted by Junco in 2012 showed that while the use of social media positively affected students' time spent in co-curricular activities, it also negatively affected engagement in class. The context of technology use can therefore affect students' learning outcome.

Some studies have also suggested that technology does not have a tremendous impact on students' learning; such findings were highlighted in a second order meta-analysis conducted by Tamim and colleagues in 2011. This second order meta-analysis included 25 meta-analyses encompassing 1055 studies focused on the potential effects of computer technology on student achievement in face-to-face classrooms. The findings suggested that technology use in face-to-face classes had only a small to moderate impact on student achievement across 40 years (Tamim et al., 2011).

This variety of answers regarding the benefits of technology use for students can be explained by the effect of several factors. Because "technology can amplify great teaching, but great technology cannot replace poor teaching" (OECD, 2015, para. 3), educators must consider these factors when deciding to integrate technology into their classrooms. Careful planning, sound pedagogy, and appropriate tools are thus vital (Englund et al., 2017; Koehler & Mishra, 2005; Popenici, 2013).

Factors Positively Affecting Language Learning

As previously mentioned, educators must consider various factors that can potentially affect students' learning when choosing technology tools to use in their classroom in order to efficiently promote learning. Educational media and social media are both technology tools that

are commonly used in the teaching and learning of English language (Pazilah et al., 2019; Yunus et al., 2010). They can potentially benefit learners by creating a more interesting and innovative way, for learners and teachers, to connect and interact (Khan, 2015) as well as promoting collaboration and discussion (Mansor & Rahim, 2017). When used appropriately, technology can also foster motivation and autonomy among language learners (Takeshi et al., 2020).

The Connection Between Convenience and Motivation

An important feature afforded by some technology tools is the convenience of use. Hardware which promotes mobility, such as smartphones and tablets, provide learning opportunities outside of the classroom. Previous studies have been able to identify some positive effects of a mobile learning environment on students' performance (Ahmed & Nasser, 2015). Applications, when designed following appropriate learning theories, combined with learners' motivation seem to positively affect language learning. Takeshi et al. (2020) investigated the effect of mobile-assisted language learning in vocabulary recall and learner autonomy. The participants, 94 Japanese undergraduate students, were enrolled in three different English writing classes and divided into two groups. While one group relied on a paper-based list of expressions, the other was able to use Quizlet, an application offering premade and customizable digital flashcards, matching games, practice assessments, and live quizzes, on their smartphone. The findings of this study suggested that the participants using their mobile devices recalled significantly more expressions than those who used the paper-based list. Although the quality of the essays was not significantly different between the two groups, the mobile-device participants used more expressions, felt more motivated towards vocabulary learning, and felt more responsible for their own learning. The convenience of being able to use the application outside of the classroom was thus noted.

Similarly, in a study conducted in 2020, teachers used Quizlet digital flashcards and tailored them to their students' needs. The findings suggested that using teacher-prepared digital flashcards instead of teacher-prepared wordlists seem to improve students' technical vocabulary knowledge (Yüksel & Mercanoglu, 2020). The convenience of students being able to use digital flashcards anytime and anywhere, the variety of activities, and the obtention of immediate feedback were all identified as potential explanations of students' learning improvement.

With the rise of smartphones and tablets in the last few decades, learners who have been exposed to language learning materials can now easily use various applications and apply learning strategies outside of their classroom and thus can potentially improve their language skills (Alzubi, 2019; Fabian, et al., 2018; Pollara & Broussard, 2011). The factor of convenience offered by text messaging can then be linked to autonomous learning skills. This connection between the use of text messaging as instructional support and learners' autonomy has been observed in multiple studies (Behforouz & Frumuselu, 2020; Farangi et al., 2017; Hazaea & Alzubi, 2018; Leis et al., 2015; Nasr & Abbas, 2018). Text messaging allows learners to have more opportunities to learn outside the classroom, in their own time (Behforouz & Frumuselu, 2020).

These studies typically suggest that the convenience of the technology tool used can improve students' motivation and autonomy, leading to benefits in language learning. Educators should then consider the compatibility of the chosen applications or web resources with mobile learning tools (e.g., smartphones, tablets) so as to promote learning both in and outside of the classroom.

The Importance of Feedback and Contextual Guidance

Educators commonly use feedback as a tool to help learners identify their mistakes and correct them. When provided properly, this pedagogical means of offering modified input to students leads to the production of modified output by the students (Swain, 1985). According to Swain (1985), the combination of proper input and production of adequate output in response to said input is necessary to further language learners' development. Therefore, it is important that teachers look at technology tools able to provide proper feedback to students. There are several ways in which a given technology tool can provide feedback.

Peer Feedback

While some studies suggested that technology-supported peer feedback—especially in writing classes—can be superficial and induce technical problems affecting students' motivation in peer interaction; others have claimed that it benefits students by offering a non-threatening atmosphere.

In a systematic literature review based on 20 studies, Chen (2016) observed the positive effects of computer-mediated peer feedback in EFL/ESL writing classrooms. When using computer-mediated peer feedback, students were provided with more opportunities to access written discourse, which indirectly helped improve their writing skills. They were also not exposed to off-task discussions or unequal/unbalanced participation (Chen, 2016). This came also as an advantage for writing teachers who could closely observe and timely intervene on students' interaction processes during peer-feedback activities. This type of feedback provided opportunities of instant access to or ability to reply to any feedback, as well as the possibility to monitor interactions. It also allowed more opportunities for learners to work at their own pace, reflecting on their ideas and rehearsing their answers (Chen, 2016; Swaffar et al., 1998).

In 2021, Elboshi looked at the impact of using web-based technology, such as blogs and social networks, to facilitate and promote peer feedback in ESL writing classrooms. After reviewing 47 empirical studies, the author found that ESL students using web-enhanced peer feedback improved their writing skills and motivation both to give effective feedback and to write for a broader audience (Elboshi, 2021). Although students might lack the ability to provide correct and effective feedback, they tend to be willing to support collaborative learning focused on the 'unknown future' (Elboshi, 2021; Green, 2005, p. 295).

Teacher Feedback

Second language writing teachers usually depend on text-based feedback. Text-based electronic feedback can be delivered through asynchronous comments. It allows for faster feedback and unlimited space compared to hardcopies and can also increase legibility. Perception of students on the digital writing environment and feedback seem to have an impact on grammatical accuracy and successful global and local revisions (Ene & Upton, 2014; Tafazoli et al., 2014). However, some studies have shown that when feedback is represented only as red corrections without praise, students perceive it as aggressive and demotivating. The need for an added email address can also be seen as a burden; and some students might not have access to the Internet at home (Cunningham, 2019). Thus, students' perceptions of the technology when it comes to text-based feedback should be carefully taken into consideration.

In 2019, Ko conducted a study on 208 undergraduate students from three college-level English reading classes in South Korea. The findings of this study showed that the use by the instructors of a popular Korean social media forum to provide immediate feedback to their students led to positive reactions to using smartphones and social media as learning tools. The participants had to use the forum to produce sentences using target phrasal verbs. The instructor

was then able to provide immediate feedback during class time using a projector. Students perceived the use of technology-enhanced vocabulary feedback over the course of one academic semester as beneficial, comforting, and considered it a tool promoting active learning. It led to increased interest and satisfaction, enhanced cooperation and sharing, and improved word use. It also had some disadvantages such as the occasional impossibility to participate due to their phone charging, the distraction it caused, and the shame felt when their sentences were compared or when they received negative feedback, even when done anonymously. This study shows that technology can be an excellent tool for educators to provide timely feedback. It might also motivate students to engage more. However, teachers should be aware of the benefits and constraints of technology-enhanced teacher feedback to integrate them properly into their classes and develop strategies to reduce students' negative perceptions of its use.

In 2019, an exploratory study investigated the efficacy of screencast and text feedback given to 12 students over four assignments in an intermediate ESL writing course (Cunningham, 2019). In this study, the author used screencast feedback or recordings of spoken comments on student work with the possibility for the instructor to use gestures, highlight phrases, and show areas of interest. Students found utility in both screencast and text feedback, screencast video feedback was preferred for its efficiency, clarity, ease of use, and heightened understanding (Cunningham, 2019). These results confirmed previous studies' findings that screencast feedback in composition and disciplinary writing contexts has a positive effect on students. It can help strengthen teacher-student relationships (Anson et al., 2016) while providing conversational, personal (Anson et al., 2016), positive (Warnock, 2008), and explanatory (Thompson & Lee, 2012) feedback. It can also easily link comments to text (Sommers, 2013; Thompson & Lee, 2012; Warnock, 2008), though they might feel awkward listening to the comments or have

difficulties hearing harsh comments (Sommers, 2013). Because audiovisual feedback strengthens teacher-student relationships and are perceived as more personal (Anson et al., 2016), educators must consider the affective impact of their feedback to avoid students feeling disrespected and dropping off (Cunningham, 2019; Young, 2000).

Similarly, in 2017, Özkul and Ortactepe examined the use of video feedback in an EFL writing class. The findings of this study suggested that teacher feedback provided through videos might be even more effective than written teacher feedback in terms of EFL learners' writing skills improvement. Although they could not interact with the researcher who provided their feedback, the students were addressed by the researcher as if it were a conferencing session, which led them to be more careful when writing their second draft. Their positive perceptions could also be due to the novelty of the practice, although this study suggested that technology promoting direct audiovisual feedback could possibly enhance learning. In this study, the simple use of technology was not what led to improved writing skills. However, the features of the technology tool chosen, the type of feedback, the association of the feedback with visuals and the personalization of the feedback, were key elements in helping learners improve their writing skills. A notable disadvantage highlighted by the participants was the "late delivery," as it is more time-consuming for teachers to create this type of feedback. Students perceived it as a weakness of video feedback. This also highlights the importance of the aspect of immediacy to keep students motivated in using said technology tool.

Third Party Feedback

Feedback might not necessarily solely be given by educators. Some technology tools can allow learners to open their work to constructive criticism to others. In 2019, Henry investigated how one can understand the L2 motivation that arises when learners create media. In this study,

four groups of four 13-year-old students enrolled in a seventh grade English course in Sweden were asked to create a blog about an imaginary trip to an English-speaking country. The author was able to identify three conceptual categories of motivational influence: influences associated with the artifact, the perception of the audience, and the documentation of identities. The findings revealed that the possibility of having an audience seemed to have influenced one of the groups under study, leading to modified vernacular, the use of interactive language characteristics of blogging, demonstrating that these participants had a clear desire to create a relationship with an implied audience. The participants in this group had demonstrated a higher level of motivation because of the type of activity which appealed to the participants desire for recognition, connection, and social networking. Despite the smaller number of participants, the findings of this study suggest that some students might be particularly receptive to digitally mediated social interaction, creating an increase in engagement and potential in learning. The possibility of having an external audience providing potential external feedback (e.g., comments) increased engagement level with some participants.

Automatic Feedback

Technology and applications can provide instructed feedback based on user input. On one hand, typical language learning programs such as Duolingo usually only offer limited feedback, such as displaying a correct answer and indicating a correct or incorrect evaluation (Burston, 2014). This limitation in terms of feedback has been pointed out and some have mentioned a need for improvement (Isbell et al., 2017). On the other hand, Automated Writing Evaluation (AWE) systems to aid writing learning and instruction are becoming increasingly popular in the education field and in ESL classrooms (e.g., Nunes et al., 2022), notably due to its ability to

provide immediate feedback; however, it seems to still be up to the teachers to adapt features of the technology to promote positive learning outcomes.

Nunes and colleagues (2022) reviewed 8 studies covering the usefulness of AWE systems for writing learning and instruction among 1,659 students 11–17 years of age. In all but one study, AWE's ability to provide automated feedback was identified as being a positive factor in the writing learning process. Chew and colleagues (2019) designed and evaluated the effectiveness in writing summaries of the Summary-Writing-PAL (SW-PAL). SW-PAL is a computer-assisted summary writing learning environment which focuses on summarizing strategies, learning theories, prior knowledge, and cognitive load. This computer-assisted environment provided users with a concept mapping tool, a working example, and scaffolding referring to a strategies identification feedback tool which helped students check the strategies (e.g., deletion, sentence combination, copy-verbatim, topic sentence selection, and paraphrasing) which they employed while writing summaries (Chew et al., 2019). The study, conducted on 58 undergraduate students of varying levels of English proficiency, led to positive learning outcomes in terms of summary writing; these findings were confirmed with a second study conducted in 2020 (Chew et al., 2020). The authors also noted the positive effect of the "synergistic operations of concept mapping, worked examples, and feedback in SW-PAL" (Chew et al., 2020, p. 446) in the performance demonstrated by ESL students in writing summary. This suggests that tools such as a SW-PAL have the potential of providing adequate feedback, making it a powerful motivating and self-learning tool (Chew et al., 2020).

Aligned with the findings of Chew et al. (2020), Proctor and colleagues (2007) previously suggested that creating an online reading environment with embedded comprehension strategy support could lead to EL's improvement in comprehension as the coaching avatars the

participants had access to effective support in use of reading comprehension strategies (Proctor et al., 2007). Overall, researchers seem to agree that to provide adequate feedback, the technology tool chosen needs to provide more than simply displaying the correct answer. Concept maps, identification of strategies, and working examples seem to be essential in students' learning.

These studies show that feedback, whether it is provided automatically by the technology tool, by learners' peers, teachers, or by external viewers, can lead to improved students' engagement and learning. It seems, therefore, important for language teachers to consider the feedback features of a technology tool prior to integrating in their classroom, especially when working on writing skills.

Structured Learning Routines and Technology-Supported Scaffolding

The findings of some studies indicate that to be effective, technology tools must provide or assist in providing scaffolding and structured learning routines. Brown (2014) defined scaffolding as the "process of simplifying tasks for learners, of making critical features of language, and structuring a task for success as opposed to failure" (p. 295). Scaffolding is also considered a collaborative tool involving both students and teachers, which can be done using technology to increase second language learning (Kurose, 2019; Liu, 2013; Wei et al., 2014). Scaffolding in second language learning seems to be specifically favorable to writing skills improvement.

In a study conducted in 2003, Englert and colleagues looked at the effects of technology-enabled scaffolding in first and second grade students' writing skills. The participants first wrote a story in a web-based environment on a supported paragraph activity, then typed the story in the web-based environment on a free-writing activity. Finally, they were asked to compose a story

without technology support. The technology enhanced scaffolding strategies led to students incorporating more genre specific characteristics as they demonstrated an improvement on their conventional writing skills on the supported writing assignment, (Englert et al., 2003).

In 2012, Bouta et al. examined the effect of using an online 3D virtual environment in teaching mathematics in primary education. The authors focused on the influence of such an environment in student engagement and its ability to enhance collaborative learning. The participants in this study were immersed in a virtual environment incorporating a macro-script and learning tasks related to basic fractions, over four teaching sessions. Findings indicated that the virtual environment actively engaged the students' interests, which promoted richer interactions between them. In turn, these richer interactions resulted in higher levels of engagement in the collaborative learning process. While the study did not specifically examine language learners' improvement, it highlights the importance of a careful design to promote learning. This structured, careful design integrating technology was also found to be positive for both teachers in learners in a study conducted in 2007 and involving podcasts in an ESL course under three different scenarios: duplicating class sessions, adding relevant information to class content, and as being added as being an integral part of the class.

In a case study involving two beginning level ESL adult learners, Wei and colleagues (2014) used digital graphic organizers as a pre-writing scaffolding technique. To observe the effect of the software on students' evolution of metacognitive writing strategies (e.g., planning, organizing strategies) the authors adapted the five-model approach (prepare, present, practice, evaluate, and extend) to the instruction, modeling, and practice of the technology tool. The participants had been pre-taught, modeled, and were able to practice before being able to use the

software independently. This technology enhanced strategy-based instruction strategy led to an increase in students' writing skills both in terms of quality and complexity.

In a study conducted in 2018, Cummins and Deng investigated the effectiveness of texting to enhance academic vocabulary learning: English language learners' perspective. Participants in the treatment group received three texts per day (i.e., morning, afternoon, evening) including a limited number of words, their definition, part of speech, source in students' reading and examples. Every night, they received summary emails, a short quiz in a word-game format, and both weekly and monthly downloadable vocabulary summary. The students in this study preferred text instruction over PCs or paper-based learning activities and materials. They perceived text messages positively as they provided small, easily accessible and understandable chunks of information 3 times a day. This was perceived as stimulating their intrinsic motivation, and helpful in learning academic vocabulary. This study gives us a better understanding as to why text messages could be a positive technology tool to develop vocabulary with English learners: short, repeated but not overwhelming, exposure to target vocabulary, different information and access to a short quiz at the end of the day were all features perceived as motivating by the students. However, future research should examine non-academic vocabulary teaching and investigate the long-term effect of using text messages as well as the effect of adding features such as multimedia messaging service on students' perception of this tool and its efficiency in developing vocabulary.

Kurose (2019) used different technology tools (e.g., applications such as Fakebook, Padlet, Storyboard, PowerPoint) to implement scaffolded authentic tasks aiming at improvement Chinese students' second language (i.e., Japanese). The findings suggested an improvement in

the students' use of grammar and vocabulary in the target language as well as increasing an increased confidence in speaking the target language (Kurose, 2019).

Similarly, in 2019 Li and Cummins conducted a study which confirmed the findings of previous studies: texting can lead to significant learning gains of target words and outperformed web-based vocabulary instruction, self-paced learning, and the use of dictionaries. While this article does not explain the reasons why texting seems to be more efficient than other more traditional technology tools (i.e., web-based instructions, online dictionaries) or tools promoting self-paced learning, its findings confirm previous studies. Texting is considered a "push model" or a one-way communication offering the ability for the instructors to control the content, frequency, and timing of the messages sent to learners. These previous studies have suggested that the push model has allowed teachers to effectively provide students with a structured, practical, and convenient learning routine, which could explain the benefits of using text messages as a technology tool to promote vocabulary learning.

These studies confirm the advantages technology-enhanced scaffolding strategies offer to second language learners. However, teachers need to also implement routines around technology use. As previous studies have suggested, when given free rein on the choice of what, how and when to use technology tools, students' selections might lead to poor learning, laziness, passivity, and wasted time (Sciarone & Meijer, 1993; Yang & Walker, 2015). They might become passive receivers of knowledge because of the overwhelming amounts of information (Schmid, 2008). Others have suggested that using multimodal presentation of information might increase students' cognitive load and thus prevent effective learning (Ngu & Rethinasamy, 2006; Schmid, 2008). In 2006, Ngu and Rethinasamy (2006) noticed that students who had computer-assisted language learning (CALL) lessons on English prepositions did not perform as well as the

students exposed to traditional lessons; suggesting that the cognitive load brought by CALL lessons was too overwhelming for students. Therefore, when choosing a technology tool, educators must examine how said tool can enable effective scaffolding strategies and define clear learning routines.

Provision of Appropriate Input

Comprehensible input plays a vital role in language learning (Leena, 2020) as learners must be exposed to it to acquire a new language (Krashen, 1982). *Comprehensible input* is defined as the simplification made to the new language so that learners can understand it (Krashen, 1982). Thus, for an input to be comprehensible, it needs to involve a conscious effort and the use of various means to make the lesson accessible (Echevarria et al., 2017). With the wide array of features it offers, technology can assist teachers in providing such comprehensible input (Stairs-Davenport & Skotarczak, 2018). Leena (2020) recommended that to best serve learners' needs, multimedia should be inviting, challenging, directed, and learner determined as in enabling the creation of a "mutual relationship between learning autonomy and the scaffolding provided by the teacher" (p. 29). When exploring the role of technology in mediating class interaction, shaping class discourse, and supporting ELs' language development, Kim (2021) found that while technology worked as a mediational tool in the classroom and influenced student learning, the role of the teacher in orchestrating multimodal interactions and in providing linguistic scaffolding was essential.

In 2020, Ebadi and Ebadijalal investigated the effects of Google Expeditions virtual reality on EFL learners' willingness to communicate and oral proficiency. Half of the 20 upper intermediate ELs were trained on using Google Expeditions in their native language. Participants were taught in Persian how to use Google Expeditions using their smartphone. After being

divided into two groups, the participants had to choose a museum and were given 20 minutes to roleplay as a museum guide and visitors. Each student was able to present four times, twice in their team and then twice for the whole class. The other group only had access to online search and pictures. The findings revealed that the use of virtual reality tools can help ELs develop their oral proficiency likely due to participants having to spend less time preparing sentences, and thus having more time to memorize them and work on fluency. The role of targeting purposeful input as well as a careful implementation of the technology tool cannot be excluded as factors contributing to this positive outcome.

Franciosi and colleagues (2016) explored the effects of a simulation game and an online vocabulary learning application on long term vocabulary retention. This study involving 213 students enrolled in an EFL course at a university in Japan lasted 14 weeks. Participants in the treatment group were trained to use Quizlet activities and then were randomly assigned to a team of four to five in order to play *3rd World Farmer*. Participants had to collaborate to find strategies and debrief on them at the end of the meeting. The other group was solely exposed to Quizlet activities. The authors identified collaborative gameplay as a variable helping learners develop long term retention of target language vocabulary. Simulation likely helped participants ground the vocabulary use in authentic contexts; this was also reinforced by the necessity to collaborate and accomplish goal-oriented tasks. In this study, comprehensible input was enabled through a two-step process. First, students were introduced to new vocabulary via Quizlet activities. Second, they had to use the new vocabulary in context while playing *3rd World Farmer* and collaborating with their teammates. Lastly, they were exposed to various audiovisual supports.

Therefore, it seems important that teachers identify specific sets of objectives to achieve (Amin, 2019) and examine ways that technology tools can help them provide comprehensible input to bolster their students' language learning skills.

Factors Negatively Affecting Language Learning

Among the various factors potentially affecting language learning; some studies suggest that interconnectedness breakdown and teachers' and students' perception on technology in education are key elements potentially negatively impacting students' progress.

The Risks of Collaboration: Lack of Interconnectedness and Common Interests

While previous studies have shown that collaboration in a computer-based learning environment can have significant positive effects on knowledge gain, skill acquisition, and student perception (Chen et al., 2018), its absence or poor planning can represent a risk for students' learning.

In 2017, Vosburg explored the effects of group dynamics on language learning and use in a massively multiplayer online game (MMOG). His findings suggested that participants' feelings of interconnectedness towards one another directly influenced their willingness to communicate in German. Among the reasons provided by the participants as to why their spoken German production fluctuated, the lack of common interests within the group, the various levels of motivation with regard to gaming or language learning were identified as key elements affecting their motivation. While this study focused on German and not English learning, the characteristics hindering or benefiting language development through the use of an MMOG are transferable to learners of different languages—including English—and learners in general. MMOGs can be a useful tool to motivate students and give them the opportunity to develop their target language proficiency. However, both individual and common interests in the technology

tool, as well as interconnectedness between teammates, have the potential to negatively affect learning, thus making the use of MMOGs in the classroom counterproductive.

Similarly, in a study conducting a systematic and in-depth review of 34 relevant empirical studies from 2009 to 2019, Zang and Zhou noticed that while technologies had an overall positive effect on students' writing skills and perceptions of learning tasks, they can lead to negative effects when students lacked co-responsibility for the writing. These findings also aligned with Li and Zhu's who suggested that writing groups displaying co-ownership and cognition produce texts of higher quality (Li & Zhu, 2017).

These studies highlight the importance of gathering students' input on the choice of game teachers would like to use (e.g., some students might prefer to play a MMOG such as RuneScape compared to World of Warcraft) and make sure that they are able to connect with their teammates.

Students and Teachers' Perceptions

While the use of technology in the classroom is becoming more and more common, many still perceive it negatively. Whether it is the general concept of using technology tools or their perception on a specific tool, it can lead to negative outcomes for the learners. Previous research has highlighted educators' concerns about using technology such as texting (i.e., instant messaging) or blogs (Yunus et al., 2013). Some believe that students might not take their work seriously nor transfer knowledge gained in school to their postings (Sweeny, 2010). Others mention the development of a scrolling habit rather than an improvement of learners' reading skills when exposed to a variety of reading materials (Ward, 2004), leading to superficial, inaccurate reading or simply to a misunderstanding of the content (Yunus et al., 2013).

Lai and colleagues (2017) observed that teachers' capacity support, or their ability to recommend, provides cognitive and metacognitive guidance on technological resources selection and use can affect students' out-of-class learning behavior with technology. A teacher who is not willing to provide the aforementioned guidance can negatively affect students' self-directed learning (Lai et al., 2017). Huang (2018) also mentioned students' perception on the importance of teachers' managerial role in online learning, referring to educators' behaviors in terms of course planning, organizing, leading, and controlling. The findings of these studies suggest that educators must feel confident about the benefits of using specific tools, they must be able to provide a structured environment and appropriate guidance to create positive perceptions of technology use in the classroom.

Students can also perceive technology use negatively, as suggested by Takeshi and colleagues (2020). While the authors highlighted the benefits of using technology to foster motivation and autonomy, they also mentioned an interesting additional finding. Some participants who were supposed to use Quizlet decided to study the paper-based list of vocabulary instead. This suggests that students' perception of technology use in learning might also affect their motivation to use such devices. It is therefore important to consider the human ability and willingness to plan, design, and implement effective educational activities, on top of hardware and software, to have a successful use of technology in teaching and learning sessions. (Abunowara, 2016).

Conclusion and Implications

With the continuous development of technology, teachers have the potential to find tools supporting the learning of their students and integrate them in the classroom. The integration of technology in school has become essential (Driscoll, 2002) and technology is a prevalent part of

today's education (Hashim, 2018; Vail, 2003). However, educators must consider different factors prior and during the integration of new technology tools in the classroom in order to promote students' learning (Cakici, 2016). This is also true when teaching ELs, which are increasingly more present in U.S. classrooms. This represents a challenge for educators who are given the responsibility to identify, among the myriad of technology tools available, which tools will best promote their students' learning.

This literature review aimed to gather information on the efficiency of the features provided by different technology tools used in classrooms with a focus on language learners. It also explored some of the factors, in terms of technology implementation, that can negatively affect language learning. Despite researchers' interests in ICT, it is important to continue to develop, among educators, a better understanding of educational technologies and potential issues that might surround them (Kirkwood & Price, 2005). Finding applications or technology tools offering convenience of access and use, adapted feedback, scaffolding, and implemented within structured learning routines seem to positively affect ELs' learning. Although teachers still need to think about providing appropriate guidance and support to successfully integrate the tool in their classroom. Finally, when used in group activities, teachers should particularly pay attention to the feeling of interconnectedness created when students use the technology tool to promote efficient collaboration and, thus, learning. This literature review gives an insight in the different features offered by ICT which can affect students, specifically ELs, in the classroom. It hopefully provides more information on research studies to educators who are interested in using technology with their ELs. It also calls for further studies to continue to develop, among educators, a better understanding of educational technologies, factors influencing their success, and potential issues that might surround them.

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