Mediation of Digital Tools in English Learning

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Abstract

Given the emergence of the use of digital tools in English teaching and learning and of sociocultural theory (SCT) in recent years, this paper sets out to introduce the concepts of tools, digital tools, and mediation in SCT. It then argues for the ground for enhancing and promoting the use of digital tools in English learning and teaching. Studies documenting evidence of technology-enhanced artefacts are reviewed to discuss how mediation of digital tools brings about cognitive, social, and linguistic changes to EFL/L2 learners. The paper concludes with implications for language education in the digital era, particularly English learning with digital tools.

1. Introduction

The use of digital tools in English classrooms has become indispensable in the age of online learning. Since their arrival, digital tools have proved effective in bringing about benefits in language development for English learners across contexts. Digital tools range from computers, applications, web pages to digital textbooks and materials. Seen from

sociocultural theory (SCT), these cultural tools are mediators to learners' learning and developmental processes, and thus myriads of studies have been carried out in the last decade to explore this issue (e.g. Jung et al., 2019; Lee, 2015, Nishioka, 2016). Given the emergence of digital tools in English classrooms, especially during the COVID-19 pandemic time as well as sociocultural theory as a theoretical framework in studies on English learning, an investigation into how these technology-enhanced artefacts mediate the English learning process is of great necessity. On this ground, this paper is to address the topic and draw implications for English teaching and learning in this digital era.

2. Tool Use in SCT

Originally, Vygotsky (1978, p. 54) borrowed the concept of tools from Hegel and Marx to relate to human labour activities. He stated, "Marx cites that definition when speaking of working tools, to show that man uses the mechanical, physical, and chemical properties of objects so as to make them act as forces that affect other objects to fulfil his personal goals". In this sense, a tool is a physical object that serves the purpose of labour. In education, a tool can be interpreted as a technological device such as a computer or an online forum for teaching and learning. According to Vygotsky, tools and symbols are two aspects of the same phenomena because a tool is technical and can alter "the process of a natural adaptation by determining the form of labour operations"; a sign is psychological and can transform "the entire flow and structure of mental functions" (Vygotsky, 1981, p. 137). Vygotsky (1978) connected material and mental tools through their mediating function; in other words, they both fall into the same psychological category. "All manners of things have been considered as tools if their function or their consequence is mediation" (McDonald et al., 2005, p. 114). The literature, by and large, has referred to tools and artefacts interchangeably. For example, McDonald et al. (2005) stated,

> Following Marx, the general meaning of an artefact is a technological device which, in combination with labour use, transforms the consciousness of those who use it and the society in which it is used. Such an artefact, tool, or instrument alters individual minds and the activities of

societies through social interaction, tool production, and tool
use (p. 114).

In other words, tools are components of SCT developed by Vygotsky and his colleague to indicate that mediated process involves human mental activity in which symbols and sociocultural constructs are embedded (Le, 2020; 2021). Individuals do not establish a direct relationship with the world, but through the use of tools; they are mediated for this relationship. Individuals collaborate with others and use tools to control the world according to their needs and goals. In other words, tools become mediators between the subject and the object.

As mentioned earlier, mediation is one fundamental concept of the SCT, which considers that the mind is mediated (Lantolf, 2006). Mediation is the process whereby individuals' understanding is refracted through the experience of others, and in educational settings, it implies learning using semiotic tools (e.g. languages of both spoken and written forms) or cultural artefacts (e.g. a book, a computer). Mediated learning thus takes place when learners' psychological processes, including reasoning, strategic orientation, and problem-solving, are generated through interaction with others (e.g. teachers, peers) and the use of tools.

For Vygotsky and other researchers, tools refer to anything used to solve a problem or achieve a personal goal. Symbolic language is a crucial tool. Kozulin (1998) classified three kinds of mediators: material tools, psychological tools and other human beings. First, regarding the material tools, Kozulin (1998, p. 62) claimed, "They presuppose collective use, interpersonal communication, and symbolic representation". These material tools were invested by human beings to master nature (Vygotsky, 1978). The material tools range from wood sticks to laptops, and as they serve different individuals, their use leads to different consequences. Overall, the invention and use of material tools have transformed our way of thinking.

Second, psychological tools are to mediate the psychological processes of humans. In the early days, casting lots, tying knots and counting fingers were used to mediate between their mind and the abstract world. As a result, modern societies have transformed and updated these tools into "symbolic tools" (Kozulin, 1998). Numbers, arithmetic systems, music, art, and language are examples of symbolic tools (Lantolf, 2006). Symbolic tools, considered strictly human, belong to what Vygostsky (1978) called "higher intellectual processes".

The third type of mediation takes place through interaction between individuals. Vygoskty (1978) used the example of a child who wants to grasp an object far from their reach. In trying to do so, the child points at it in an attempt to establish a direct relationship with the object. Their mother comes to aid them and interprets the child's pointing as the desire to reach the object. At this moment, pointing becomes a sign for others. The child's orientation towards the object and people in the surrounding changes because the child realises the function of pointing. At this point, the child will use the pointing to establish a relationship with others. The mother, in this case, serves as a mediator, who helps the child achieve their goal through another mediation tool: pointing. The example indicates that mediation is the way by which humans establish a relationship between their mental representations and the world.

From the sociocultural perspective, learning is seen as a process in which people appropriate cultural tools (Wertsch, 1998; Vygotsky, 1978). As cultural tools have continuously been developed, this implies that our learning, reasoning, and knowing are being transformed as new resources become available (Lantz-Andersson et al., 2009). In general, the use of SCT to analyse the use of digital tools in the current age of online learning is appropriate because SCT considers tools and recently digital tools to mediate the learning process and that interaction between users and the tools promote understanding and generate thoughts. Also, "tool-assisted social interactions come to be internalised in the private thoughts of the individual" (Hung, 2009, p. 173). However, the use of digital tools may "problematise the concept of thought within current sociocultural theories of technology and cognition" (Shaffer & Clinton, 2006, p. 283) because it changes the traditional position of privilege that humans occupy in sociocultural analyses.

3. Mediation of Digital Tools in English Learning

The 20th century is inaugurated by a period of technology-enhanced language learning thanks to not only "motivational and assisting tools but also essential appliances for language learning and teaching" (Al-Kadi, 2018, p. 7). This transformation is argued to be seen from the SCT perspective as Goulah (2007) pointed out,

> In terms of digital technology, language learning, and literacy, the forum of student-student interaction, student-teacher

interaction, and student-computer interaction (directly or as a mediational tool for the previous two) is best understood from a sociocultural perspective (p.64).

The relevance and appropriateness of viewing tools used in SCT can be explained by the fact that sociocultural theory puts emphasis on the interaction between the human mind and the use of tools and how tools can transform activities and cognition of learners as discussed in the previous part of this paper. In addition, since technology has been employed in language education, whether mediation is done via digital tools has been examined. Rubtsova (2019) stated,

> Perceiving digital media as a new means of mediation opens a wide range of possibilities for investigating development of higher mental functions in digital society. One of the further steps of research is to demonstrate how traditional types of activity (e.g. reading, writing, play and communication) are transformed in digital contexts and what effects it can have on such functions as attention, memory, will and thinking (p. 117).

Digital tools, including smartphones, tablets and the many other sophisticated appliances and new applications, such as Twitter, Facebook, Instagram, and Skype, extend potentials for more resources and mediated learning. Viewed in SCT, digital tools are considered to structure learning activities, co-determine students' reasoning when solving word problems, and add a level of complexity that they have to consider in their activities (Lantz-Andersson et al., 2009). Claims about the mediating roles of tools have been made for various sources. For instance, language software may provide a good framework for language practice and engage students in one another's ideas through exploratory talk (Mercer et al., 2019). The use of software in language learning and teaching is also recommended in recent research findings, such as digital storytelling assisting students in acquiring knowledge related to their video topics (Niemi & Multisilta, 2016), digital textbooks enhancing students' self-regulation (Lee, 2015), videomaking providing students with more powerful modes to express their intentions (Toohey, et al., 2015), digital video production engaging students extensively in language-based tasks and cultivated collaboration

and creativity (Goulah, 2007), video as a mediation tool enhancing output-based instruction in foreign language learning (Hung, 2009), and video games and word processors enhancing students' participation in multimodal literacy (Shaffer, & Clinton, 2006).

Learning via the Internet, learners can make much integrative use of computer-assisted language learning to enhance their L2 skills (Nieto, 2007). These digital tools are seen to provide learners with "opportunities of online communication and participation; language learners using these versions of the web are not only consumers but also producers of technology-based materials" (Al-Kadi, 2018, p. 7). Besides, the use of computers and software can stimulate students' motivation, critical thinking, creativity, and analytical skills.

Researchers have raised questions about the potential communication on computers and mobile devices as well as investigations into the effectiveness of design in mobile-assisted learning (Burston, 2015; Duman et al., 2015) and instructor-centeredness in the mobile learning environment (Shadiev et al., 2017). Other studies have indicated that computer-assisted language learning (CALL) and mobile-assisted language learning (MALL) can enhance students' reading, listening, and speaking skills (Burston, 2015), pronunciation (Fouz-González, 2017; Liakin et al., 2017), oral fluency (Blake, 2009), and language repertoire (Kitade, 2008). In teaching writing, Pham and Usaha (2016) concluded from their study that the online writing forum does not foster students' writing quality but facilitates peer feedback. According to these authors, multimedia networking generates a good social environment for peer communication, which, in turn, provides opportunities for students to revise and edit their papers; however, students' language development is unlikely to be detected from their writings.

Another form of digital tools is Short Message System (SMS), the first and foremost form of CMC, which has been explored to see if it can help improve L2 learners' vocabulary. It was found to give learners exposure to lexical items in threats that systematically function in information exchange (Hayati et al., 2013; Zhang et al., 2011). Given the roles of linguistic features included in SMS, L2 learners' lexical development and reading comprehension (Wang & Smith, 2013), grammar and writing (Alkhezzi & Al-Dousari, 2016) are considered to be fostered via CMC by text messaging.

However, the interaction hypothesis that face-to-face communication involves more linguistic elements and more potential for language development (Ellis & Fotos, 1999) seems to challenge language learning and teaching digitally. Studies have been conducted to hypothesize the relationship between advances in technology, development of CMC and the necessity to expand the definition of interaction. Interaction is now referred to as the forms of interpersonal interaction (interaction between people), intrapersonal interaction (mental process), and interaction between a person and an electronic device (e.g. computer, smartphone). L2 learners who engage in synchronous CMC can be involved in meaning negotiation, resulting in fostered input, which mediates the linking of meaning and form (Blake, 2009; Chapelle, 2006). In the learner-computer interaction process, L2 learners may gain similar benefits if they seek language support when they encounter language barriers. As a result, their language is modified.

Not only with computers and other appliances, but textbooks have also witnessed transformation to become digital materials to be compatible with the introduction and development of information communication technology "to raise the digital generation with creativity and professionalism" and bring about "students' self-regulation or ability to take control of the learning process" and develop their "digital literacy" (Lee, 2015, p.63).

In addition, digital texts consisting mainly of tapping on the screen animations boost students' active engagement in the reading process in English (Martin-Beltrán et al., 2017). With such use of digital materials, English education has seen the emergence of the concept of digital literacy to refer to a learner's competence to use digital devices and tools to locate, evaluate and create information (Mohammadyari & Singh, 2015). Apart from digital literacy, computer-mediated communication (CMC) has gained notice from language education. Nguyen (2008) defined CMC in which all digital tools in language educational settings have the potential to generate language learning and communication in learners as follows,

> CMC can be viewed both as mediational tools and as a communication process. When viewed as tools, CMC is examined from technological aspects that provide the medium for communication. Other aspects are revealed when CMC is perceived as a communication process, which includes the message, the sender and the receiver (p. 24).

However, CMC has several drawbacks related to second/foreign language education. Nguyen (2008) pointed out that computer conferencing seemed much less intimate and self-exposing than oral communication due to its impersonal nature. Online learning may cause misunderstandings and misinterpretations because of the lack of gestures, facial expressions and other general social, non-verbal or para-verbal cues such as head nods, smiles, eye contact, distance, and tone of voice. Another challenge of using CMC is students' and teachers' limited computer literacy in minority and low-income communities. Goertler (2009) also stated that it is difficult, if not impossible, to control with whom the students engage and what form that engagement takes. Similarly, Babni (2019) pointed out that even though CMC tool use has a positive impact on students' writing skills and performance, they tended to exert a detrimental influence on students' academic written productions because most students failed to confine to the standards of academic writing in terms of layout, organisation, style, level of formality, grammar, content, mechanics and tone. Nevertheless, if trained to use the tools, learners can use digital tools to transform their thoughts and develop their language.

The arrivals of digital tools and the appropriateness of SCT in addressing the mediating role of these materials have prompted various studies which target such aspects as CMC, synchronous and asynchronous, and specific tools, including textbooks. These studies in general administered a platform to mediate students' interaction in MALL and CALL. The digital tools employed different forms of mediation: interpersonal, intrapersonal, and person-computer. For example, motivated by synchronous computer-mediated communication (SCMC), Jung et al. (2019) studied the effects of this mediating tool on L2 learning and development. More specifically, learner perceptions of the effectiveness of SCMC interactions for L2 learning and building intercultural competence were surveyed among students from different universities in Korea, Japan, and Taiwan in a joint online class for one semester. The objective of the course was to facilitate students' development of linguistic and intercultural competence by interacting with peers from different cultures online. The authors collected data from questionnaires to track learners' perception over time through interviews and transcripts of interactions during each chat session. The results revealed that among various interactional features, the two variables that were significant predictors of positive attitudes towards SCMC were the

amount of students' attention to language and cultural issues during online discussion.

Also motivated by SCMC, Lenkaitis (2019) explored L2 learning and learner autonomy via videoconferencing on Zoom. During the course, twenty-five L2 students were divided into groups of two and three members for weekly interaction in a six-week course. The data collected from surveys and online interactions between the students indicated that Zoom was an effective mediating tool that helped learners develop autonomy and experience the use of L2. Also, students' L2 proficiency level was a determinant factor in their interaction and engagement. SCMC could facilitate L2 learning between peers in the same context. The study put forward interpersonal activities via videoconferencing. In addition, in the instructor's absence, the students felt comfortable communicating with their peers online because they did not feel any pressure from receiving the instructor feedback, from which learner autonomy emerged. However, autonomous learning strategies were identified as an indispensable factor in learning achievements.

Synchronous online communication has motivated MALL research. Wrigglesworth (2019) studied the effects of mobile learning to increase students' out-of-class exposure and learning. The researcher used a multimedia messaging systems platform supported by smartphones for students to do their assigned communication-oriented tasks. The results demonstrated that the students' participation in language learning was enhanced from the views of interactionism and sociocultural theory. Besides, the students found that the platform was an effective environment for language learning and interaction. However, communications between students were mainly confined to task completion. Negotiation of meaning between students, an essential vehicle driving in second language acquisition (Foster & Ohta, 2019), was limited. Students' affordability of smartphones should be a concern for administrators and teachers in applying mobile learning.

Nishioka's (2016) research explored the use of digital storytelling by native-Korean college students who majored in L2 Japanese and tourism. During the study, the participants were required to use Japanese to describe a tourist attraction and stored their works as digital stories in group work. The collaborative digital storytelling aimed to increase opportunities for students to share their opinions and linguistic features, enhance peer interaction, and promote peer scaffolding. The data

collected from questionnaires, stimulated recall interviews, observations, and recordings demonstrated that collaborative digital storytelling could provide an environment to assist peers in language use. In general, the participants at a lower proficiency level were scaffolded by those at a higher proficiency level. However, one participant revealed that the difference in L2 proficiency level was a barrier to his understanding, which did not make a comprehensible input for his language development.

In a research strand of digital materials, Lee's (2015) study took digital textbooks as digital tools and studied the mediating role of self-regulation between digital literacy and learning outcomes (academic performance and learning motivation) when using digital textbooks as an English learning tool. The researcher used descriptive and regression statistics for data analysis. The findings showed that students' self-regulation was fully mediated between digital literacy and academic performance and that self-regulation was partially mediated between digital literacy and learning motivation. The study confirms that mediating role of self-regulation between digital literacy and learning outcomes suggests using digital textbook English learning and teaching.

Inspired by asynchronous CMC, Ma (2019) and Pham and Usaha (2016) explored the effects of online peer feedback on EFL students' L2 writing. Ma (2019) collected online peer comments and EFL students' final writing papers from an ESP (English for academic purposes) course. The quantitative and qualitative data analyses showed that the students generally provided friendly comments because they avoided hurting peers' feelings in such a social network even though critical comments could contribute to L2 writing achievement. Similarly, Pham and Usaha (2016) created a blog for EFL students to post their writing assignments and make suggestions for revision. These researchers concluded that online networks provided a social learning environment for peer interaction. These two studies by Ma (2019) and Pham and Usaha (2016) showed that the quality of online peer comments was a determinant of students' writing quality.

During the COVID-19 pandemic time, more research on the mediation roles of digital tools has sprung due to suspended face-to-face classes. Around the world, English teachers have been instructed to switch to social media platforms, synchronous and asynchronous tools, and other digital resources to ensure effective instruction for English language learners. This suspension required the adoption of video conferencing

software, such as Zoom and Google Meet, and CALL in general to deliver synchronous live lessons. Studies in this theme thus have focused on whether digital tools served well the purpose of online language learning. For example, Bailey and Lee (2020) investigated the expected benefits, challenges, and strategies of implementing online EFL communication courses in South Korea. The reported findings revealed that students benefited from having an experienced CALL teacher because they considered knowledge to be developed through experience transformation. Besides, experienced online teachers could take the model role for their students. Through interactions with teachers via the online platform, learners were mediated to solve problems, correct language use, and become aware of knowledge gaps. In a similar vein, Basilaia and Kvavadze (2020) surveyed the online teaching process in Georgia and concluded that the transition from the traditional to the online education systems at the research site was successful. The research participants have re-realised distance learning in a new way and adapted the assignments to the new format of the lessons, which promoted students' independent learning and getting new skills. The new mode of online learning was deemed to force new regulations to be enacted, platforms and solutions for learning and teaching that might be transferred to the post-pandemic period. The study by Moorhouse and Beaumont (2020) reported the experience of trialling the use of video conferencing software to teach English online for the first time to Grade 5 learners of mixed English proficiency. The study drew on observations, post-lesson reflections, and learners' post-lesson comments collected on a learning management system. The results revealed that facilitating learner-to-learner interaction, gauging interest and giving individual feedback were challenging in this learning mode. However, the authors concluded that young language learners benefited from it because they could interact with their teachers and classmates in real-time, providing a sense of normality, social contact, and opportunities to use English during unprecedented times.

Overall, the studies discussed in this section have focused on different aspects of using digital tools in English learning. They address the positive effects of synchronous and asynchronous online communication on EFL students' language development and attitudes towards digital mediating tools used. While several researchers explored the use of digital

tools to mediate L2 learning in online classes, others employed social networking as a forum to increase students' out-of-class interaction.

4. Conclusion

This paper discusses the emergence of digital tools in English learning and views the mediating roles of these tools in the SCT. It argues that technology-enhanced artefacts bring about cognitive, social, and linguistic benefits to L2 learners. For cognition, digital tools stimulate learners' reasoning, analytical skills, and self-regulation. These tools can generate their language use for language learning, produce more language, and engage other learners in technology-enhanced platforms. Overall, digital language learning literacy will be enhanced when learners are given the opportunities to use digital tools ranging from computers, smart devices, applications, digital books to stories in English learning. It is also vital to focus on pedagogy for teaching online as currently, most EFL teachers training courses in technology-mediated language teaching seem to focus on digital literacy rather than how to manipulate digital literacy.

With such abundant digital resources for English learning in the current time, it may confuse learners with what to follow. Therefore, quality assurance of these materials must be strengthened to ensure that the materials can mediate students' learning cognitively and linguistically. Instructions for both teachers and learners on using digital tools as mediating artefacts will facilitate language learning and teaching. Such instructions have to point out the specific aspects of a digital tool and how they bring about cognitive change or linguistic development in language learners. Language users tend to take for granted that learning materials can be used in any way they like. Digital literacy can make a difference in the mediating process of learning. When learners know how to interact with a particular digital artefact, they will probably be assisted with the language tasks at hand and complete them using their cognitive, linguistic and affective capacity. For an application to be made full use of, teachers must be trained on how to use the application to scaffold learners. Scaffolding in the digital environment means more than providing hints. It requires interaction with learners via hints, questions or prompts produced via computer or social media. The absence of a classroom teacher, in this case, should be compensated for by specific instructions,

for example, audio instructions or scripts. Illustrations may also serve well the purpose of mediating learners in the learning process with online tools.

Future studies can concentrate on specific features of digital tools that can assist or transform learners' thinking. Studies that provide information on how to change digital tools into more interactive and engaging artefacts will benefit all parties involved in the English teaching and learning process. Besides, for effective English learning, instructional methods embedded in these digital tools must be explored. Other aspects such as machine learning, artificial intelligence appliances, and L2 teaching and learning applications are also issues for future research.

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