Research Article

A Comparative Study of Human and Computer Mediators: L2 Learners' Vocabulary Development and social identity

Najmeh Hamzehnejadi

Department of Foreign Languages, Kerman Branch, Islamic Azad University, Kerman, Iran, n.hamzehnejadi@iau.ir

Mehry Haddad Narafshan *(Corresponding Author), hnarafshanmehri@gmail.com

Department of Foreign Languages, Kerman Branch, Islamic Azad University, Kerman, Iran

Valeh Jalali,

Vjalali@iauk.ac.ir

Department of Foreign Languages, Kerman Branch, Islamic Azad University, Kerman, Iran

ABSTRACT

The increasingly global nature of our lives provides a suitable foundation for integrating technology into all aspects of human life in general and education in particular. Hence, the focus of the present study was to compare the impact of human and technology-based mediators on vocabulary development and social identity of young English language learners. Over 6 months, two groups of 30 learners (15 students in each group) were exposed to two forms of mediation: the teacher and computer-made mediators. Pre-tests and post-tests were used to measure learners' improvements in vocabulary development and social identity. A small change in vocabulary development was observed for the teacher-mediated group, but no change was observed in their social identity. However, learners involved in computer-mediated instruction proved superior compared to the teacher-mediated group in both vocabulary development

and social identity. It shows that the learners interacting with a computer mediator surpass those interacting with a human-made mediator, namely the teacher. This makes us believe that nonhuman mediators (technology in this study) may prove more effective than human mediators, which may be attributed to the enticing features of technology that can enhance learners' motivation and interest.

1. INTRODUCTION

Living in an increasingly globalized world provides a welcoming framework for the integration of technology in all aspects of human life in general and education in particular. A shift has been occurred, therefore, in the educational system toward online teaching which has been inevitably stimulated and accelerated recently due to the Coronavirus situation all over the world (Bao, 2020). The process of teaching, consequently, has been gone under the change, sweeping teachers and teacher educators to become computer and techno-literate and nurture a set of relevant skills such as designers, mentors, and facilitators as they employ extensively and readily digital devices and transform their practices with technological innovations (Herring, Koehler, & Mishra, 2016; Herring, Koehler, Mishra, Rosenberg, & Teske, 2016). The same is true for the process of learning especially in early childhood (Luo, Berson, Berson, & Li, 2021) influencing both children's later school performance (Wartella, Rideout, Montague, Beaudoin-Ryan, & Lauricella, 2016) and digital skills (Saçkes, Trundle, & Bell, 2011). Regarding the sensitivity of the childhood period in terms of growth and development across a host of domains, early digital and technological experiences will be profoundly effective (Knudsen, Heckman, Cameron, & Shonkoff, 2006). When we refer to language learning, most often we mean four skills of listening, speaking, reading, and writing (Cerezo, et. al., 2019; Peregoy & Boilly, 2001). Undeniably, vocabulary has a more prominent and determinant role in language learning since when the vocabulary container is empty, there will be nothing to pour into the sentence structures and form the sentences (Agca & Ozdemir, 2013; Cakmak, 2019). The impact and necessity of vocabulary mastery have also been felt in EFL learning, which means the ability in selecting and using appropriate words (Nation, 2013; Suhardiana, 2021). Compared to L1, vocabulary learning in L2 is more difficult and requires more time, effort, and even resilience (Metruk, 2020; Suwantarathip & Orawiwatnakul, 2015). Moreover, the difference between word pronunciation and their spelling adds to this burden and may lead to terrified learners (Anwar, 2021; Nguyen and Khuat, 2003; Zou & Xie, 2019). Although children are motivated and energetic and their adaptability to new challenges and learning situations is better than elders, keeping them motivated and interested is a hard task (Flores & Corcoll, 2015) since the language journey seems a hard one after facing the potential challenges of language learning (a load of difficult and strange words) (Alkhalifah et al., 2012; Bicen & Beheshti,2019).

In parallel with the aforementioned points and guided by the sociocultural theory, learning, therefore, is no longer regarded as merely the acquisition of knowledge and skills but the participation in communities of practice and identity development (Lave, 1991; Rogoff, 1990). In other words, learning is not the end; rather

it is a means to an end which is personal development and identity construction-reconstruction of students. That is, while the students being scaffolded and assisted in how to shift from passive and dependent learners to active and independent one as a member of class community, from peripheral participation to the central one, they increasingly learn to engage in social and cultural communities out of the class as well and to take responsibility of own agency (including the use of knowledge and skills). The learning process, therefore, functions as a mediator to alter students' personal identity. This assertion is confirmed by Wells (2000) who noted that learning is 'the transformation that continuously takes place in an individual's identity and ways of participation through his or her engagement in particular instances of social activities with others' (p. 56).

1.1. Research Questions

During his life, Vygotsky presented different lectures on children's cognitive development. Vygotsky's idea was that an individual's performance should be measured twice: first, with the help of a mediator and, second, independently. The first one shows us how many problems the child can solve with the help of the mediating hints, what lies in the zone of his or her nearest intellectual development. The difference between a child's independent and mediated performance shows us his/her intellectual potential. Different children may have the same scores when tested independently, but those who can profit more from some hints show the richest developmental potential. When we measure what children can do independently, we measure what they can do already. And when we measure what children can do with the help of mediators, we measure what they will be able to do in the near future. This is what Vygotsky refers to as the zone of proximal development: created in a joint performance with the help of a mediator, which will soon become the child's capacity.

It has been argued that the classroom often permits limited learning opportunities (Jeffers, 2006; Walan, 2020). But the classroom has the potential to be a valuable learning experience when we use the mediators that exist within such a context, each with different roles and each enacting that role with different motivations and limitations. Not all students will achieve the same benefits from existing mediators. McGonagle (2012) mentioned that this does not devalue workplace learning but, rather, 'reflects the need to ensure that students are fully prepared and monitored. Even if we focus only on human actors, it is necessary for all stakeholders – rather than only students – to be trained and prepared for the full process of workplace learning. Thus, to enrich the learning climate of the classroom, a full range of actors, both human and nonhuman, who interfere – in positive and negative ways – with classroom learning are needed. Different mediators present diverse opportunities to learn. And based on the contextual needs, one mediator in particular merits more detailed consideration (Kamp, 2017). Accordingly, the present study sought to

answer the following research questions.

1. Comparing the teacher and computer mediators, which one is a stronger mediator to develop L2 vocabulary among young children?

2. Comparing the teacher and computer mediators, which one is a stronger mediator to develop social identity among young children?

2. REVIEW OF LITERATURE

2.1. Multimedia models of learning and vocabulary acquisition

Computer-assisted language learning (CALL) has changed the turbulent process of learning vocabulary to a job full of excitement and interest making learning easier, faster, and more influential (e.g., Başoğlu & Akdemir, 2010; Li & Hafner, 2021; Martin& Ertzberger, 2013; Oberg & Daniels,2012). No paper book can provide the learner with multimedia in texts accompanied with high-quality images, sounds, and videos in fluid content format with high speed and convenience. And it cannot be denied how much learners are comfortable with the computer in moving the pages, going back and forth for checking the vocabulary, finding the definitions, changing the images, and increasing or decreasing the sound, all of which are provided with the least cost and hassle by the computer. In other words, learners find their answers through pushing some buttons in a few seconds (Chun & Plass,1996; Kayaoglu & Dag Akbas, 2011; Segler et al., 2002). Ellis (1995) pointed out that when learners can simultaneously use the reading context and the words' definition on the computer screen, it switches their attention between the two, which reduces their cognitive load (Sharma & Raj,2021; Sweller & Chandler, 1994). According to the results of several studies on the use of multimedia in vocabulary learning, it has been reported that multimedia can provide learners with a combination of several modalities such as textual, visual, and auditory in different formats like video, image, and text, which certainly creates a special and unique advantage for learning (Mohsen & Balakumar, 2012; Nation, 2013). Many carried out studies regarding multimedia strongly advise its involvement in second language vocabulary acquirement and give assurance about its usability to language practitioners (e.g., Barrot, 2015; Tsai, 2006). Providing learners with entrenched input by audio-visual flashcards, videos, animations, and three-dimensional virtual worlds(3DVWs) can answer each learner's language learning preference and keep them motivated and satisfied (Cheong et. al, 2021; Wang & Beasley,2002).

One of the supportive theories for this claim "the positive impact of multimedia input on vocabulary acquisition " is Dual Coding Theory (DCT) by Paivio (1991). This theory (DCT) is a general cognition theory that mainly deals with learning and language learning issues. This theory holds that mental imagery

influences learners' mind and memory. According to this theory, learners will be able to develop a deep understanding of new materials using verbal associations or visual imagery but the combination of both is more successful in learning (Kanellopoulou et. al, 2019; Reed et. al, 2010; Wong& Samudra,2019; Zarei et al., 2019). Verbal and nonverbal mental representations as two hands in hand mutual complementary systems present better retention and recall for learners compared to coding the learning materials in a single system of verbal or nonverbal mental representations. Such mutual coordination of verbal and nonverbal mental systems will facilitate and meliorate the learning process for learners who stay back on the learning road and push them forward (Chang, 2006; Kirschner et al., 2018). Dual Coding Theory was integrated by Mayer (2003) into the Generative Theory of Multimedia Learning (GTML) to explain the L2 learning. According to this theory, L1 and L2 share a common imagery system, and the L2 system contribution comes from the linking of the two verbal systems through translation, which enhances content learning (BR, 2021; Paivio & Desrochers, 1980) and language acquisition (Mayer, 2003) providing additional processing and storage.

2.2. Vygotsky's Theory of Mediated Learning Experience

Vygotsky (1978) believed that human cognition is constructed and activated through human beings' interactions with the outer world, and human cognition is the offspring of the relationship between subjects and objects. According to the sociocultural theory (Vygotsky, 1978), interaction and community in the context play a main role in "making meaning". This mediation can be actualized whether by human beings or by signs. Human beings' development and evolution unlike other universe beings as animals have different definitions and conceptions. Framing and proposing patterns and structures of behavior through mediation and socio-cultural interactions help and lead individuals forward in the path of humanity and evolution. The signs are channels of transferring knowledge and input from the outer world to the inner world of learners' mind and cognition. Along the stimulus-response connection route, signs take the role of mediators in the form of symbolic signs such as schemes or pictures, moderate learning tribulations, and boost cognitive functions of learning and memorization (Vygotsky, 1979).

Turning the camera from non-human tools and signs to human beings as mediators, it should be said that children have no idea about dangerous and treating stimuli in the world around them. Here the compassionate and watchful parents and caretakers put them between the stimuli and the child to prevent any calamity and hazard. Children are not supposed to experience every dangerous situation to learn from it and not repeat it because in some dangerous situations it may not be the next time to behave and act differently and use previous experiences. Parents and caretakers come here as mediators and teach them to avoid such dangerous situations. Vygotsky proclaims that through mediation, human beings can go upper

from the ladder of cognition and, undoubtedly, its influence can be tracked on their behavior (Vygotsky, 1978;1986). According to Vygotsky, mediation helps and takes the hand of the human being in the uphill of meeting their goals and falls into three categories of material tools, psychological tools, and other human beings (Flavin, 2020; Kozulin, 1998).

Vygotskyan theory of mediation has brought different air to the field of education. According to sociocultural approaches, knowledge is constructed as the outcome of the relationship between social and individual processes. Vygotsky believed that symbols around us mediate our activities (John-Steiner & Mahn, 1996; Taber, 2020). As mentioned by Lantolf (2001), our mind is mediated. It means that we do not connect to the world directly, so we need a mediator. Vygotsky (1978) stated that the properties of objects (human and non-human) can play the role of mediator to help us achieve our goals (Feyzi Behnagh & Yasrebi,2020). Therefore, teachers can use different mediators in different ways to connect the learners' present zone of development (what they know) to their ZPD (what they want to know).

2.3. Social Identity

The cultural meaning people attach to their own and others is called social identity. That is, the social status and roles, being a woman, an artist, a father, or a student, for instance, by which individuals define and identify themselves, and share the same values and attributes with others form one's "social identity. The notion of social identity is similarly associated with the classic sociological concept of the self that contemporary sociologists describe as an approximately stable set of socially formed ideas one has about one's existence(Johnson & Johnson, 2008). As stated most skillfully by Mead (1962), through language, interaction with big Os (significant others), and cultural, structural, and social transitions, one shapes and internalizes own concept of self. Introducing the notion of "the looking glass self", Charles Horton Cooley Nungesser (2013) similarly pointed to the importance of others in forming one's sense of self as s/he seeks to interpret the attitudes of others being held about her/him. In the same vein, Goffman (1983) pointed to the evolving and fluctuated nature of the self which is being constantly constructed through a constant ritual of interaction with others and with social order which has been developed in a social system. That is, even the values being attributed to social identity in general and sex, gender, sexuality, race, and nation in particular, are not fixed and universal but dynamic and context-based leading to the dynamic sense of self across the lifetime. Indeed, perception of self goes beyond one's biological or psychological properties and is constructed and reconstructed concerning the social context and practice see also (Butler, 1990; Collins, 1990; Connell, 1987; Fuss, 2013; Kessler & McKenna, 1978; Mohanty, 1984; West & Fenstermaker, 1995; West & Zimmerman, 1987).

3. METHODOLOGY
3.1. Design

Hence, the focus of the present study was to compare the impact of human and technology-based mediators on vocabulary development and social identity of young English language learners. Over 6 months, two groups of 30 learners (15 students in each group) were exposed to two forms of mediation: the teacher and computer-made mediators. Pre-tests and post-tests were used to measure learners' improvements in vocabulary development and social identity.

3.2. Participants

At a private school in Kerman, Iran, a course on English conversation for EFL learners with a focus on vocabulary and grammar development was administered online during the academic year 2021-2022. The research participants were 30 primary-school Iranian female students who were assigned into two groups with the same level of English language proficiency. They had studied English for an average of 1 year at different registered English language institutes, and as elementary EFL learners, their language abilities were assessed based on the school placement test to have almost homogenous participants. They were all 8 years old and in the second year of their elementary education. At the time of the study, these students were enrolled in online classrooms due to the COVID-19 pandemic. It is also essential to note that they had sufficient knowledge about technology and ways to use it. Despite being different regarding social and economic distance, all families had a computer system with a broadband internet connection. The class met online two days per week for 90 minutes over six months. One of the researchers was responsible for teaching both groups during the experiment. The students were assigned to two groups but not randomly; instead, the existing classes were used as follows: Teacher-mediated group (n=15) and computer-mediated group (n=15). Participants were informed that their participation was voluntary during the project. They were ensured that they could leave the project at any stage of the research, and only those who took part in all stages of the program were included in the final data.

3.3. Instruments and Materials

An online vocabulary test was the first instrument employed in the current research. The participants' vocabulary development was measured using two vocabulary tasks: a receptive and a productive vocabulary task. The so-called vocabulary tasks were included to measure the participants' vocabulary knowledge in the topics children were exposed to, during the intervention period. From each of the eight topics, six words from three syntactic categories of nouns, verbs, and adjectives were selected with a total number of 48 words. These selected words were then assessed in a productive and receptive vocabulary task in which the same words were included. In the productive task, children were shown a picture of the target word and at the same time, they were supposed to fill in the blanks in the sentences in which the target word was omitted. One point was given to each correct answer; thus, in this regard, a maximum of 48 points was assigned to the whole task (Cronbach's, for pre and post-test, were .86 and .88 respectively). The receptive task, on the other hand, provided learners with one target word orally at a time. Out of all four pictures available, the children were then supposed to select the one which could appropriately match the target word. The mentioned scoring procedure was also applied for this task; one point was given to each correctly selected item; thus, in this regard, a maximum of 48 points was assigned to the whole task. (Cronbach's ، for pre- and post-test, were .80 and .81respectively).

An adapted online presentation of Bruner and Benson (2018) social identity scale was another instrument that was utilized in the present work. It is comprised of nine items seeking students' degree of agreement or disagreement on a 5-point Likert scale that its alternatives are organized from strongly disagree (1) to strongly agree (5). The score is achieved with the sum of the items; the higher marks the students get; the deeper social identity they certainly possess. It is also inherent to note that a good internal consistency with a Cronbach alpha of 0.92 was obtained by the above-mentioned scale. For ease of comprehension, the researchers read the questions in simple language and the children chose the answers.

3.4. Data Collection and Analysis Procedures

Firstly, to guarantee the homogeneity of children in terms of the level of English proficiency, we applied the Oxford placement test for young learners to select the elementary participants and assigned them equally into two groups of T-mediated and C-mediated groups. Both groups received 24-week vocabulary training in the beginning 30 minutes of each conversation class but in different ways performed by one of the researchers (who was the students' teacher). To measure the vocabulary and multiple intelligences level, we administered the vocabulary test and the multiple intelligences questionnaire. The learners were enrolled in a semester course of English conversation for EFL learners. The main objective of the course was the improvement of the students' proficiency in aural-oral skills with a focus on vocabulary and grammar development. Each session, five new words were introduced on the themes of body parts, family, daily routines, fruits, animals, clothes, school supplies, jobs, home, and transportation. During the first week, we introduced the computer-mediated classroom mode in which there was no teacher present, and the learners could use the capabilities of the computer to determine the meaning of the words presented from the full vocabulary list.

In the computer-mediated group, contrary to its teacher-mediated counterpart, there was no sign of teacher presence or assistance. The computer screen displayed new words. Clicking on the words enabled the learners to see animations, word charts, 3-D images, and digital flashcards explaining the meaning of the words. The computer then read an animated story to the class using the new words as well as some of the words they had already learned. A variety of digital games could also be played using the new and old vocabulary. They could then use these words along with any of the words they had learned in previous sessions to make their stories and drawings. In addition, there were some digital tests to check the learners' comprehension and production. There was only one difference between the two groups, which was whether they received mediation via a teacher (human) or a computer (non-human).

In the teacher-mediated group, in the same period, the teacher wrote the new words on the board first. In each session, five new words were introduced. Following the presentation on the board, the teacher helped the students understand the words by teaching them through paper flashcards, examples, role plays, and real objects. After that, the teacher read a story to the class using some of the new words as well as some words they already knew. As part of the lesson, the teacher also played some games (such as puzzles) with the class that involved both the new and old vocabulary. They were then asked to create stories and role-plays with all the new words and any words they had learned in previous sessions. The teacher also used multiple-choice, gap-filling, matching, cloze, and open-ended questions to check learners' comprehension and

production in some sessions.

Students at the final stage completed a post-test to evaluate their post-test knowledge using a vocabulary test. In addition, both groups completed a multiple intelligences questionnaire. The researchers collected the data and analyzed it directly.

4. RESULTS AND DISCUSSIONS

The result of Paired sample t-test analysis did not show a significant difference in the mean scores for vocabulary development in the pre-test (M=15.47, SD=1.55), and post-test of the teacher-mediated group (M=17.00, SD=1.60), t=-3.23, df= 14, p<0.01, and the effect size of vocabulary development was ES=0.97 and r=0.43. It can be concluded that the magnitude of the effect size for this research variable was moderate.

Table 1
Paired Sample T-Test of Vocabulary Development (Teacher-Mediated Group)

VARIABLE	GROUP	N	MEAN	ST. DEVIATION	T-TEST	DF	P-VALUE
VOCABULARY	Pretest	15	15.47	1.55	-3.23	14	0.00
	Posttest	15	17.00	1.61			

The results showed a significant difference in the mean scores for vocabulary development in the pre-test (M=15.60, SD= 1.06), and post-test of the computer-mediated group (M=19.23, SD= 0.65), t=-9.66, df= 14, p< 0.01, and the effect size of vocabulary development was ES=4.13 and r=0.90, It can be concluded that the magnitude of the effect size for this research variable was perfect.

Table 2
Paired sample T-Test of Vocabulary Development (Computer-Mediated Group)

VARIABLE	GROUP	N	MEAN	ST. DEVIATION	T-TEST	DF	P-VALUE	
VOCABULARY	Pretest	15	15.60	1.06	-9.66	14	0.00	
	Posttest	15	19.23	0.65				

The result of the independent sample t-test analysis did not show a significant difference in the mean scores for vocabulary development in the pre-test of the teacher-mediated group (M=15.47, SD=1.55), and pre-test of the computer-mediated group (M=15.60, SD= 1.06), t=-0.28, df= 24.68, p> 0.05, the result confirmed there was not a significant difference in the mean scores.

Table 3
Independent sample T-Test of Vocabulary Development (Pre-test)

VARIABLE	GROUP	N	MEAN	ST. DEVIATION	T-TEST	DF	P-VALUE
VOCABULARY	Teacher-Mediated Group	15	15.47	1.55	-0.28	24.68	0.79
	Computer-Mediated Group	15	15.60	1.06			

The results showed a significant difference in the mean scores for vocabulary development in the post-test of the teacher-mediated group (M=17.00, SD=1.61), and post-test of the computer-mediated group (M=19.23, SD= 0.65), t=-4.97, df=18.43, p< 0.01, and the effect size of vocabulary development was ES=1.81 and r=0.67.

Table 4
Independent sample T-Test of Vocabulary Development (Post-test)

VARIABLE	GROUP	N	MEAN	ST. DEVIATION	T-TEST	DF	P-VALUE
VOCABULARY	Teacher-Mediated Group	15	17.00	1.61	-4.97	18.43	0.00
	Computer-Mediated Group	15	19.23	0.65			

The second hypothesis predicted that the teacher's use of technology integrated projects would positively influence the participants' social identity. Running paired samples t-tests, as it is shown in Table

3, significant changes is observable in the social identity in the post-test. The effect size was *ES*=20.91 and *r*=0.995. In addition, students from the control group revealed no gains in social identity.

Table 5: Paired Sample T-tests of social identity

Time	Groups	*N*	Mean	*SD*	*T*-Test	*df*	*P*-Value
pre-test	CG	21	26.36	0.67	-2.06	20	0.07
post-test	CG	21	27	0.89			
pre-test	EG	21	26.54	0.93	-42	20	0.000
post-test	EG	21	43.36	0.67			

Independent t-tests reaffirmed significant gains in the social identity for the students from the EG group in the post-test. The effect size was *ES*=20.91 and *r*=0.995. Besides, the control group students had no gains in social identity. Table 4 shows the results of independent t-tests in the pre-, post-tests.

Table 4: Independent T-tests of social identity

Time	Groups	*N*	Mean	*SD*	*T*-Test	*Df*	*P*-Value
pre-test	CG	21	26.36	0.67	-2.06	20	0.07
post-test	CG	21	27	0.89			
pre-test	EG	21	26.54	0.93	-42	20	0.0000
post-test	EG	21	43.36	0.67			

Discussion

The present study was an attempt to compare computer-mediated and teacher-mediated L2 vocabulary instruction to children enrolled in a private primary school. The two modes had a positive effect on the learners' vocabulary development. Vygotsky maintained that mediation helps children enhance their cognition, and this undoubtedly has its effect on their behavior (Vygotsky, 1978,1986). He believed that mediation assists people to achieve their goals. Learners involved in computer-mediated instruction proved superior compared to the teacher-mediated group. This makes us believe that nonhuman mediators (technology in this study) may prove more effective than human mediators, which may be attributed to the enticing features of technology that can

enhance children's motivation and interest. As Lantolf (2001) mentioned, we do not connect to the world straight; therefore, what is required is a mediator. Children learn while engaged with a computer since this is the most convenient way for them to connect with their surroundings, thus with the application of technology in language classes, students' motivation to pay attention is believed to improve (Yiltanhhlar & Kivanc, 2015).

Educational software's most important functionality is not teaching efficiency but arousing students' interest and thus enhancing their learning experience; it is the learning process that offers the greatest contribution, not the teaching activity. Fat (2000) concluded that these kinds of technologies help students feel more responsible and self-regulated. This could be a contribution to teachers who have been trying to make students more responsible and self-regulated since the constructivist approach to learning emerged. Technology use can enhance the educational process as an educational assistant (Ghuloum, 2010), as a teaching prompt (Walker, 2012), or basically as a general aid (Leuski et al., 2006).

The results of the present study were in line with the prior findings on the superior effects of the digital condition compared to the traditional teacher-centered condition lacking technology (Garcia-Ruiz et al., 2008; Jung, 2002; Lan, 2015; Lin, 2010; Schwienhorst, 2002). However, they contradicted the findings by Hitosugi, Schmidt, and Hayashi (2014), which showed that the digital environment was not a preferred mode in comparison with explicit instruction helping students learn vocabulary more effectively. The difference may be explained by the explicit place of the target words and reinforcement tasks in the mentioned study.

Moreover, the results revealed a significant social identity development for the computer-mediated group but not for the teacher-mediated group. Technology helped school children get a deeper meaning of social self. In other words, through a series of technology-integrated phases of project development, they internalized the cultural and structural relationships of the larger social system around them. Imbued with technology, our life has been correspondingly changed including our education specifically language learning, communication, off-the-record experiences, and our perception of the world, life, and ourselves (Carpenter, Koehler, Willet, & Greenhalgh, 2019). In the present study, we supplied a technology integrated mediated class by which new possibilities around the social identities were provided giving children a chance to formulate and reformulate, to form and reform their images and perception of themselves through making own networks and relations, interacting with each other, sharing their emotions and experiences (Shumaker, Loranger, & Dorie, 2017), and raising their awareness toward self-concept and identity of own and others (Mañas-Viniegra, Núñez-Gómez, & Tur-Viñes, 2020).

Our results support Dual Coding Theory (Pavio, 1986) and the Generative Multimedia Theory of Learning (Mayer, 2001) confirming the idea that multimedia input enhances learning by providing an additional route for

meaning making, reducing cognitive load in processing, and strengthening retention. The findings mentioned further lend support to the results of the previous research claiming multimedia input accessible online is more effective in vocabulary learning than the traditional teacher-centered approach to English vocabulary instruction (Folse, 2006; Walters, 2006; Webb, 2008). In addition, the multi-modality of computers has activated participants' different intelligences. Considering the theory and the positive findings obtained, it is thus proposed that technology can play the role of an efficient vocabulary-learning mediator for young learners. As proposed by Gao (2019), regarding language teacher agency, language teachers should explore ways to create and sustain the contextual conditions that are conducive to changes in their learning and professional practice. The application of current computer mediation to support teaching may bring about the desired change. All in all, the findings imply that computers' multi-modality can provide learners with a combination of textual, visual, and auditory modalities in different formats like video, image, and text. This most surely offers an unprecedented form of mediation activating different intelligences simultaneously. However, far more research needs to be done before one may conclude that computer functions as a better mediator than a teacher or can be a more efficient replacement.

5. CONCLUSION

The mediated programs of the digital environment presenting vocabulary in various contexts can be designed and arranged parallel to textbook lessons for language learners to become involved in meaningful learning of vocabulary. According to Hurwitz and Schmitt (2020), the so-called programs might be presented through a wide range of contexts making out like learners' experiences in real-life situations, creating interactive environments for a kind of real-life communication, utilizing computer programs aids to support meaning. They should not only be made available to language instructors to apply as teaching materials in their classrooms but also for learners to make use of them, as mediators in-and out-of-class experiences. Moreover, when applying for programs from online environments for vocabulary learning, a student-centered task must be designed and used to set learners' passive intelligences in motion. Thus, a redefined role for computers was admittedly being referred to, through the obtained results of the present paper.

You can find no research study without limitations. Thus, the outcomes of the current work should be interpreted considering some limitations. First, according to the rules and regulations of the school, the researcher was not permitted to divide learners into two groups through random assignment procedures. This is exactly what the nature of quasi-experimental research is referred to, using existing classes. Although there were no substantial differences evident between conditions at pre-test, feasible effects of selection

cannot be eliminated. Second, the generalizability of the present article's findings might be limited since our sample was comparatively small and selective. It would be beneficial to conduct the same study again with a larger sample that can be more representative. Moreover, it was not crystal-clear what learners were exactly doing when they appeared online, and what sort of activities were the most effective for their long-term progress and improvement. Unfortunately, another common limitation in this sort of study is that it's unclear how long our intervention results are sustained. It would be inherent to take repeated measures in the future to examine the impact of computer mediation as time goes on.

REFERENCES

Agca, R. K., & Özdemir, S. (2013). Foreign language vocabulary learning with mobile technologies. *Procedia-Social and Behavioral Sciences, 83*, 781-785.

Alkhalifah, H., Hansen, E., Tapp, A. & Hansen, D. (2012). *Does the use of Technology Actually Help English as a Second Language Students?* In Proceedings of Society for Information Technology & Teacher Education International Conference, Chesapeake, VA, 2212-2215.

Anwar, Y. T. (2021). *The EFL students' difficulties in discovering the meaning of new words in learning vocabulary at SMAN 1 Gedangan Sidoarjo* (Doctoral dissertation, UIN Sunan Ampel Surabaya).

Barrot, J. (2015). A sociocognitive-transformative approach to teaching writing. *Indonesian Journal of Applied Linguistics*, *4(2),* 113-122.

Basoglu, E. B., & Akdemir, O. (2010). A comparison of undergraduate students' English vocabulary learning: Using mobile phones and flash cards. *Turkish Online Journal of Educational Technology-TOJET, 9(3),* 1-7.

Bicen, H., & Beheshti, M. (2019). Assessing perceptions and evaluating achievements of ESL students with the usage of infographics in a flipped classroom learning environment. *Interactive Learning Environments*, 1-29.

BR, A. (2021). Exploring Dysphasia Learners' Vocabulary Acquisition through the Cognitive Theory of Multimedia Learning: An Experimental Study. *International Journal of Emerging Technologies in Learning*, *16*(12).

Cakmak, F. (2019). Mobile learning and mobile assisted language learning in focus. *Language and Technology*, *1*(*1*), 30-48.

Cerezo, R., Calderón, V., & Romero, C. (2019). A holographic mobile-based application for practicing pronunciation of basic English vocabulary for Spanish speaking children. *International Journal of Human-Computer Studies*, *124*, 13-25.

Chang, C. Y. (2006) *The effects on learning English alphabet via Internet multimedia for lower-achievement students*. Master's thesis, National Taipei University of Education, Taiwan.

Cheong, C., Alabdulaziz, M. S., Alhammadi, A., & Cronholm, S. (2021). Printable Table of Contents. JITE: Research. *Journal of Information Technology Education: Research*, *20*(1).

Chun, D. M., & Plass, J. L. (1996). Effects of multimedia annotations on vocabulary acquisition. *The modern language journal*, *80(2),* 183-198.

Ellis, N. C. (1995). The psychology of foreign language vocabulary acquisition: Implications for CALL. *Computer Assisted Language Learning*, *8(2-3),* 103-128.

Fat, J. P. T. (2000). Fostering creativity in education. *Education*, 120, 4.

Feyzi Behnagh, R., & Yasrebi, S. (2020). An examination of constructivist educational technologies: Key affordances and conditions. *British Journal of Educational Technology*, *51*(6), 1907-1919.

Finnsson. (2015). *Computer Games & Their Effect on The Language Acquisition of Non-Native English Speakers*. Thesis.University of Iceland.

Flavin, M. (2020). Reboot the Messenger: A Narrative for Technology Enhanced Learning. In *Re-imagining Technology Enhanced Learning* (pp. 121-144). Palgrave Macmillan, Cham.

Flores, C., Corcoll, C. (2015). Learning a foreign language in infant education: *a challenge for the school*. 1-6. http://srvcnpbs.xtec.cat/cirel/cirel/docs/pdf/challenge.pdf

Folse, K. S. (2006). The effect of type of written exercise on L2 vocabulary retention. *TESOL Quarterly*, *40*, 273-293.

Gao, X. (2019). The Douglas Fir Group Framework as a Resource Map for Language Teacher Education. *The Modern Language Journal*, *103*, 161-166.

Garcia-Ruiz, M. A., & Edwards, A. (2008). Collaborating and learning a second language in a Wireless Virtual Reality Environment. *Int. J. Mobile Learning and Organisation*, *2*, 369-377.

Gardner, H. (1983). *Frames of mind. The theory of multiple intelligences*. New York, NY: Basic Books.

Gardner, H. (1991). *The unschooled mind: How children think and how schools should teach*. New York, NY: Basic Books.

Gardner, H. (2011b). The theory of multiple intelligences: As psychology, as education, as social science. *Address delivered at José Cela University on October 29, 2011.*

Ghuloum, H. (2010). *3D Hologram Technology in Learning Environment*. Proceedings of Informing Science & IT Education Conference. 693-704.

Guernsey, L., Ishmael, K., & Prescott, S. (2020). *Online learning in the wake of COVID-19 tips and resources for PreK-12 with equity in mind*, New America. Retrieved 4/10/2020 from https://www.newamerica.org/education-policy/edcentral/online-learning-wake-covid-19/.

Hatlevik, O. E., & Christophersen, K. A. (2013). Digital competence at the beginning of uppersecondary school: Identifying factors explaining digital inclusion. *Computers and Education*, *63*, 240–247. https://doi.org/10.1016/j.compedu.2012.11.015

Hidalgo, A., Gabaly, S., Morales-Alonso, G., & Urueña, A. (2020). The digital divide in light of sustainable development: An approach through advanced machine learning techniques. *Technological Forecasting and Social Change*, *150*, 119754.

Hitosugi, C. I., Schmidt, M., Hayashi, K. (2014). Digital Game-based Learning (DGBL) in the L2 classroom: The impact of the UN's off-the-shelf video game, *Food Force*, on learner affect and vocabulary retention. *CALICO Journal*, *31*, 19-39.

Hurwitz, L. B., & Schmitt, K. L. (2020). Can children benefit from early internet exposure? Short-and long-term links between internet use, digital skill, and academic Computers & performance. *Education*, *146*, 103750.

Jeffers, G. (2006). Talking about teaching in non-crisis situations: learning from a teacher support project. *Irish Educational Studies, 25(2),* 187-206.

John-Steiner, V., & Mahn, H. (1996). Sociocultural approaches to learning and development: A Vygotskian framework. *Educational psychologist, 31(3-4),* 191-206.

Jung, H. J., (2002). Virtual reality for ESL students. *The Internet TESL Journal*, *8(10)*. Retrieved from http://iteslj.org/Articles/Jung-VR.html

Kamp, A. (2017). Humans, nonhumans, and the mediation of workplace learning in the senior school curriculum. *Journal of Vocational Education & Training*, *69(2)*, 214-228.

Kanellopoulou, C., Kermanidis, K. L., & Giannakoulopoulos, A. (2019). The dual-coding and multimedia learning theories: Film subtitles as a vocabulary teaching tool. *Education Sciences*, *9(3)*, 210.

Kayaoglu, M. N., & Akbas, D. (2011). A small-scale experimental study: Using animations to learn vocabulary. *Turkish Online Journal of Educational Technology-TOJET*, *10*(2), 24-30.

Kırkgöz, Y. (2010). An analysis of written errors of Turkish adult learners of English. *Procedia-Social and*

Behavioral Sciences, *2(2),* 4352-4358.

Kirschner, P. A., Sweller, J., Kirschner, F., & Zambrano, J. (2018). From cognitive load theory to collaborative cognitive load theory. *International Journal of Computer-Supported Collaborative Learning*, *13*(2), 213-233.

Kozulin, A. (1998). *Psychological tools: A sociocultural approach to education*. Harvard University Press.

Lan, Y. J. (2015). Contextual EFL learning in a 3D virtual environment. *Language Learning & Technology,19*, 16-31.

Lantolf, J. P., & Sunderman, G. (2001). The struggle for a place in the sun: Rationalizing foreign language study in the twentieth century. *The Modern Language Journal*, 85(1), 5-25.

Leuski, A., Pair, J., Traum, D., McNerey, P., Georgiou, P., Patel, R. (2006). *How to Talk to a Hologram*. International Conference on Intelligent User Interfaces, 360-362.

Li, Y., & Hafner, C. (2021). Mobile-assisted vocabulary learning: Investigating receptive and productive vocabulary knowledge of Chinese EFL learners. *ReCALL,* 1-15. doi:10. 1017/S0958344021000161

Lin, Y. C. (2010). *Research on vocabulary acquisition of upper elementary school students in a collaborative virtual environment*. Master's thesis, National Dong Hwa University, Taiwan.

Martin, F., & Ertzberger, J. (2013). Here and now mobile learning: An experimental study on the use of mobile technology. *Computers & Education*, *68*, 76-85.

Masoomeh, E., & Mahdieh, N. (2014). Multiple intelligences and their representation in the EFL young learners' textbooks. *International Journal of Research Studies in Language Learning, 3(6),* 61–72.

Mayer. (2001). *Multimedia learning*. Cambridge; New York: Cambridge University Press.

Mayer, R. E. (2003). Elements of a science of e-learning. *Journal of educational computing research*, *29(3),* 297-313.

McGonagle, G. (2006). "*Does Work Experience Prepare Students for the World of Work and Contribute to an Effective Careers Education Guidance Programme*?" MSc Dissertation MSc Dissertation, School of Education, University of Ulster.

Metruk, R. (2020). The effects of mobile learning on EFL vocabulary acquisition. *Language, Literature and Culture in Education*, 60.

Mohsen, M. A., & Balakumar, M. (2012). A review of multimedia glosses and their effects on L2 vocabulary acquisition in CALL literature. *ReCALL, 23,* 135–159.

Motejlek, J., & Alpay, E. (2021). Taxonomy of Virtual and Augmented Reality Applications in Education. *IEEE Transactions on Learning Technologies*.

Nation, I. S. (2013). *Learning Vocabulary in Another Language Google eBook*. Cambridge University Press.

Nguyen, T. T. H. & Khuat, T. T. N. (2003) The effectiveness of learning vocabulary through games, *Asian EFL Journal Quarterly, 5*(4), 233-249.

Oberg, A., & Daniels, P. (2012). Analysis of the effect a student-centered mobile learning instructional method has on language acquisition. *Computer Assisted Language Learning, 1,* 1-20.

Paivio, A. (1986). *Mental representations: A dual coding approach*. New York: Oxford University Press.

Paivio, A., & Desrochers, A. (1980). A dual-coding approach to bilingual memory. *Canadian Journal of Psychology/Revue canadienne de psychologie*, *34*(*4*), 388.

Peregoy, S.F., Boyle, O.F. (2001). *Reading, writing, and learning in ESL*. New York: Addison Wesley Longman.

Ruiz, C. (2004). *Escala MINDS de Inteligencias Múltiples*. Trujillo: Universidad César Vallejo.

Schwienhorst, K. (2002). Why virtual, why environments? Implementing virtual world concepts in computer-assisted language learning. *Simulation & Gaming*, *33*, 196-209.

Sharma, V., Singh, A. K., & Raj, M. (2021). Conceptual Online Education Using E-Learning Platform of Cloud Computing. In *Evolutionary Computing and Mobile Sustainable Networks* (pp. 991-997).

Springer, Singapore.

Shearer, C. B. (2020). A resting state functional connectivity analysis of human intelligence: Broad theoretical and practical implications for multiple intelligences theory. *Psychology & Neuroscience*, *13*(*2*), 127.

Suhardiana, I. P. A. (2021). Attitudes of EFL Students Regarding Learner Autonomy in English Vocabulary Acquisition. *Yavana Bhasha: Journal of English Language Education*, *4*(2), 67-80.

Suwantarathip, O., Orawiwatnakul, W. (2015). Using mobile-assisted exercises to support students' vocabulary skill development. TOJET: *The Turkish Online Journal of Educational Technology, 14*(1): 163-171.

Sweller, J., & Chandler, P. (1994). Why some material is difficult to learn. *Cognition and instruction*, *12*(*3*), 185-233.

Taber, K. S. (2020). Mediated Learning Leading Development—The Social Development Theory of Lev Vygotsky. In *Science Education in Theory and Practice* (pp. 277-291). Springer, Cham.

Tsai, J. (2006). Connecting reading and writing in college EFL courses. *The Internet TESL Journal, 12(12)*. Retrieved from http://iteslj.org /Articles/Tsai Reading Writing Connection. html

Vygotsky, L. S. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.

Vygotsky, L. S. (1979). Consciousness as a problem in the psychology of behavior. *Soviet psychology*, *17(4),* 3-35.

Vygotsky, L. S. (1986). *Thought and language* (A. Kozulin, Trans.). Cambridge, MA: MIT.

Walan, S. (2020). Embracing digital technology in science classrooms—secondary school teachers' enacted teaching and reflections on practice. *Journal of Science Education and Technology*, *29(3),* 431-441.

Walker, R.A. (2012). Holograms as Teaching Agents. *Journal of Physics: Conference Series*, 415, 1-5.

Walters, J. (2006) Methods of teaching inferring meaning from context. *RELC Journal*, *37*, 176-190.

Wang, L. C. C., & Beasley, W. (2002). Effects of learner control and hypermedia preference on cyber-students' performance in a Web-based learning environment. *Journal of Educational Multimedia and Hypermedia*, *11*(1), 71-91.

Webb, S. (2008). The effects of context on incidental vocabulary learning. *Reading in a Foreign Language*, *20*, 232-245.

Yam, L. P. K. (2021). Creative teaching and communication: A study of creative teachers' traits and skills as perceived by primary school students. *Journal of Communication and Education, 5(1*), 104-120.

Yiltanhhlar, A, Kivanc, C. (2015). The role of using games in ELT: Teenagers. *International jounal of innovative educational research, 3*(3): 15-25.

Zou, D., Huang, Y., & Xie, H. (2019). Digital game-based vocabulary learning: where are we and where are we going? *Computer Assisted Language Learning*, 1-27.