

Technology-Enhanced Language Learning (TELL): A Review of Resources and Upshots

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ABSTRACT.The purpose of this paper is to investigate the effectiveness of using technology in improving learning in general and language learning in particular. To do this, a review of recent studies in technology-enhanced learning with a specific focus on technology-enhanced language learning (TELL) was conducted. It was revealed that using different kinds of technology can have positive impacts on students' progress in different educational contexts in general. These benefits are multidimensional and comprehensive encompassing cognitive, metacognitive, and affective domains of learning. In the case of language learning, the same results were obtained. The findings showed that technology-based language instruction can be used effectively as teacher-delivered instruction. It was also indicated that technology can have a positive effect on language learning when its potential capacities are incorporated into pedagogy and curriculum. Besides, it was demonstrated that students' listening, writing, speaking, and reading skills were enhanced and the technology was seen to have positive impact on sub-skills such as grammar and vocabulary learning. Problem solving as one of the most significant strategies in language learning was also improved. Generally speaking, utilizing technology in the EFL/ESL context provided enjoyable environment for students to learn English. These benefits and consequences are not restricted to any specific age and gender groups.

1. INTRODUCTION

This review study is deliberated to contend with the effectiveness of using technology in language education for future investment decisions. Researchers, material developers, and teachers are interested to know what has been done and what we already know about TELL so that they can make educated decisions in selecting the appropriate technology to use in teaching process.

Technology encompasses a wide range of tools as multimedia computers, Internet, mobiles, smart boards, videotapes, online chartrooms, web pages, interactive audio conferencing, and so on. To investigate the effectiveness of using technology in language learning, it is irrational to expect any single study to tell us all things. However, a comprehensive review of many studies can get us closer to an answer (e.g., Cavanaugh, 2001; Chapelle, 1997; Lou, Abrami, & d'Apollonia, 2001; Salaberry, 2001). For finding the effectiveness of using technology in language education it is need to analyze findings of numerous empirical studies as a research method called meta-analysis (Glass, 1977; Hedges & Olkin, 1985; Lyons, 1995a). Meta-analysis helps us develop a careful map of past and current studies in the field of technology and language education. This review attempts to investigate the overall effectiveness of uses of technology in language education through meta-analysis.

A. Defining Technology

The term *technology* in this study refers to the use of systems that rely on computer chips, digital applications, and networks in all of their forms. These systems are not limited to the commonly recognized desktop and laptop computers: Almost all electronic devices these days include an embedded computer chip of some sort (DVD players, data projectors, interactive whiteboards, etc.).

Mobile devices that employ a computer at their core (cell phones, personal digital assistants [PDAs], MP3 players, etc.) will undoubtedly occupy a more central role in language teaching and learning in the years to come (TESOL technology standard frame work, p 45).

B. Role of Technology in Education

Technology has several fundamental roles in language education; it is used as resources, delivery system, or productivity. Computer programs seems to be most effective in supporting student centered learning as the technology can provide scaffolds for students with special needs, and interests, and it support factual knowledge acquisition, and create new learning experiences for students (Pedersen & Liu, 2003). Besides, if computers serve as resources, significant learning gains were found (Wegerif, 2004).

C. Type of Technology, Software, and Objective of Technology

Type of technology refers to the carriers (e.g. laptops, PCs, PDAs...etc.) of the instructional material while software is the type of instructional material itself (e.g. tutorial, drill & practice, exploratory environment...etc). For example, laptop programs were found to be effective in student engagement (Penuel, 2006) and academic achievement (Nabah, 2012) or by using multimedia talking books beginning readers can learn to read (Chera & Wood, 2003; Doty, Popplewell, Byers, 2001).

D. Effectiveness of Technologies in Language Learning

It is essential in language learning to expose learners with authentic, comprehensible input to engage them in teaching and learning process (Krashen, 1998). To do this, demanding materials in the target language for successful language learning is necessary, but to some extent is limited.

So, language educators believe that by using information and communication technologies (ICT), we can solve this problem (Egbert, Chao, & Hanson-Smith, 1999; Hanson-Smith, 1999; Salaberry, 2001).

The uses of technology provide qualified access and exposure to linguistic and cultural materials .For example using digital multimedia technologies enhance access efficiently than a single medium alone ((Hanson-Smith, 1999; Thorton & Dudley, 1996). Traore& Blankson(2011) used audio-visual technologies in teaching English and found that it helped students to learn English more than other group using single technology .

Technology uses enhance authenticity using video and the internet. These kind of materials provide a natural and context-rich linguistic and cultural situation that enable the learners to access authentic target language that can reflect cultural changes effectively than printed sources (Bacon & Finnemann, 1990; Hanson-Smith, 1999; Herron, Cole, Corrie, & Dubreil, 1999; Herron, Dubreil, Cole, & Corrie, 2000; Kitajima & Lyman-Hager, 1998; Lafford & Lafford, 1997; Lee, 1998; Weyers, 1999). Patel (2013) studied the effectiveness of authentic materials on learning communication skills.

E. Providing Opportunities for Communication

Successful language learning requires providing opportunities and engaging learners in authentic communication in the target language. ICT has again been used in many different ways to create opportunities for language learners to communicate in the target language (Hanson-Smith, 1999; Kelm, 1998; Muyskens, 1998; Warschauer & Kern, 2000).

2. METHOD

A. Search Procedures and Criteria for Inclusion

The current study reviews a thorough collection of recent articles towards the effects of using technology on students' progress in two domains of general education and English as a foreign/second language. The research encompasses plethora of quantitative, qualitative and mixed methods studies investigating the effect of technology on learners' improvement. These studies were published between 2004 and 2014 and 30 articles which met the following criteria were investigated for this review: 1. Evaluating the effect of technology on students' progress was the main purpose of the study. 2. The context of the study was general or second/ foreign language learning (i.e. in the area of education) and 3. Positive effects of utilizing technology were described.

The studies not written in English were not included in this synthesis, nor were studies that were master or doctoral dissertations, and book chapters. Finally, a total of 30 articles from the following journals were selected for this review: *Journal of Language and Translation*, *The International Arab Journal of Information Technology*, *Journal of Academic and Applied Studies*, *Advances in English Linguistics (AEL)*, *The JALT CALL Journal*, *Teaching of Psychology*, *Mathematics Education Trends and Research*, *Language Learning & Technology*, *Computers & Education*, *Discourse: Studies in the Cultural Politics of Education*, *European Online Journal of Natural and Social Sciences*, *Interdisciplinary Journal of Contemporary Research in Business*, *International Journal of Research Studies in Educational Technology*, *The Turkish Online Journal of Educational Technology*, *Journal of Second and Multiple Language Acquisition*, *Journal of Language Teaching and Research*, *Journal of Advances in English Language Teaching*, *Journal of Arts and Humanities*, *International Journal of Education and Development using Information and Communication Technology*, *International Journal of Scientific Research and Reviews*, *Social and Behavioral Sciences*, *Computers & Education*, *Australian Journal of Language and Literacy*, *Eurasia Journal of Mathematics, Science, and Technology Education*, *English Language and Literature Studies*, *Journal of Basic and Applied Scientific Research*, *International Journal of Advancements in Research & Technology*.

B. Coding and Analysis

The selected studies were coded based on a coding scheme (table 1) used in a number of previous reviews. To analyze the studies, the characteristics of each study were coded and classified into two categories regarding the purpose of the study. As Creswell (1994) stated the central aim of a review is to summarize the previous research toward a specific topic and to identify the issues which need further investigation. Thus, the present review provides in-depth knowledge about the effect of technology on students' progress.

To provide a systematic review, selected studies were divided into two categories: the general education and language education. The type of technology was specified and the ramifications of each study were identified through these two categories.

Table 1. *Coding Scheme for Primary Studies*

1. Publication
a. Name of the article and authors
b. Year of publication
2. Context of the study
a. General education/ language education
b. Number of participants
c. Participants' age (average)
d. Participants' gender
e. Educational institution (in which teachers have taught)
3. Country
4. Technology used
5. Effectiveness of using technology
6. Data Analysis
7. Out comes (findings)

3. RESULTS

The selected studies for the current review encompass research carried out between 2004 and 2014. The research was conducted in variety of educational contexts: from elementary school to university. 56/6 % of the studies were carried out among students of a general course and 43/3 % of the articles were conducted in an EFL/ ESL context. In the studies we reviewed, for data collection, two kinds of instruments were mainly used to measure the effect of technology on students' learning: questionnaires and interview.

Table 2 demonstrates the studies carried out in the domain of general education.

Table 2. *Studies on the Effect of Technology in a General Course*

Code	Publication	Educational institution	Country	Data analysis
1	Omidinia&Masrom&Selamat(2013)	Unspecified	Malaysia	Unspecified
2	Naba'h(2012)	Secondary school	Saudi Arabia	ANCOVA
3	Madhavaiah,Nagaraju& Peter(2013)	Unspecified	India	qualitative approach

4	Soltani (2012)	Unspecified	Baku, Azerbaijan	Unspecified
5	Attaran, Alias & Siraj (2012)	Unspecified	Malaysia	qualitative approach
6	Walsh (2010)	primary school	Australia	online questionnaires
7	ong (2009)	primary school	Malaysia	ANCOVA
8	Nomass(2013)	Unspecified	Libya	Questionnaire
9	Dlaska(2002)	University	UK	Qualitative approach
10	Sharndama (2013)	Unspecified	Nigeria	Qualitative approach
11	Fallahkhair, Pemberton & Griffiths(2005)	Unspecified	UK	qualitative approach
12	Patel (2013)	Unspecified	Unspecified	Qualitative
13	Liuzhi (2012)	university	China	Qualitative

Table 3 is the summary of the studies on English students (as a second or foreign language).

Table 3. *Studies on the effect of technology in an EFL/ ESL context*

Code	Publication	Educational institution	Country	Data analysis
14	Kiliçkaya,&Seferoğlu(2013)	Teacher training course	Turkey	MAXQDA version 10
15	Naba'h,Hussain, Omari,&Shdeifat(2009)	Secondary school	Jordan	ANCOVA
16	Ghorbani,&Marzban (2013)	High school	Iran	T-test
17	Hassanabadi, &Iranban (2013)	High school	Iran	Descriptive statistics
18	Bahmani, &Ghajari(2013)	Keshavarz, primary, junior and high schools	Iran	ANOVA
19	Rostami, &Ghanizadeh(2014)	Akbari, junior school	high Iran	t-test
20	Smith, &Woody(2000)	university	Georgia	ANCOVA
21	Traore,&Blankson(2011)	High school	China	interviews
22	Mehrgan(2012)	university	Iran	KR-21 formula
23	Iravani,&Tajik (2012)	High School	Iran	T-test
24	Wang&Smith (2013)	university	Japan	Questionnaire & interview
25	Serin (2011)	university	North Cyprus	ANCOVA
26	Behzadi, &Manuchehri(2013)	High School	Iran	T-test
27	Jewitt (2005)	Unspecified	England	qualitative approach
28	AbuSeileek(2007)	university	Saudi Arabia	T-test
29	Tsou , Wang , &Tzeng(2004)	elementary school	Taiwan	T –test
30	Khiyabani, Ghonsooly,&Ghabanchi(2014)	High school	Iran	T-test

Another categorization consists of specifying the kind of technology used and the consequences of using it. Table 4 shows the consequences of using technology on students of a general course.

Table 4. *Consequences of Using Technology on Students of a Course Other than English*

Code	Publication	Educational institution	Type of technology	ramifications
1	Omidinia&Masrom&Selamat(2013)	Unspecified	ICT	facilitate teaching and learning activities and assist school management
2	Naba'h(2012)	Secondary school	Macro-Media Flash Professional Version 6	scientific stream students were superior to literary stream students in their academic achievement
3	Madhavaiah, Nagaraju, and Peter (2013)	Unspecified		By using technology, teaching and learning are facilitated and students learn faster and easier than before
4	Soltani (2012)	Unspecified	information technology	improve the training needs, educational policies, human resources and curriculum designs
5	Attaran, Alias & Siraj (2012)	Unspecified		smart schools on integration into curriculum, ICT has not been incorporated in the everyday life of the school
6	Walsh (2010)	primary school		students' literacy skill improve by using technology
7	Ong (2009)	primary school		The students in smart schools have positive attitude toward science

8	Nomass(2013)		Unspecified		most of the students prefer use of technology, especially computers in developing second language skills
9	Dlaska(2002)		University	multimedia technology	affect language learning, and facilitate the creation of authentic learning situations
10	Sharndama (2013)		Unspecified	ICT devices	teacher can manipulate teaching process to facilitate delivery, learning activities as well as evaluation
11	Fallahkhair, Griffiths(2005)	Pemberton,&	Unspecified	TAMALLE	supports learners in creating and managing their personal language knowledge
12	Patel (2013)		-		technology affect on teaching communication skills
13	Liuzhi (2012)		university	Multimedia technology	motivate vocational students' interests in learning

As the table indicates, using different kinds of technology can have positive impacts on students' progress in different educational contexts in general. Utilizing ICT, for example, can facilitate teaching, learning, and evaluation. Multimedia technology can also create an authentic learning situation and motivate students towards learning. TAMALLE as another type of technology leads to students' management of their own language knowledge. Smart schools have also provided opportunities for students to adapt positive attitudes regarding science. Consequently, using technology motivates learners to acquire the materials more easily. Table 5 shows the results of using technology in an EFL/ ESL context.

Table 5. *Consequences of Using Technology on Students in an EFL/ ESL Context*

Code	Publication	Educational institution	Type of technology	of ramifications
14	Kiliçkaya, &Seferoğlu(2013)	Teacher training course	Software and Web Based Applications	improve students' listening, writing and grammar skills
15	Naba'h, Hussain, Omari, &Shdeifat(2009)	Secondary school	Macro-Flash Professional Version 6	scientific stream students were superior to literary stream students in academic achievement
16	Ghorbani,&Marzban (2013)	High school	Microsoft Office Power Point 2007	facilitate grammar learning both inside and outside the classroom
17	Hassanabadi, &Iranban (2013)	High school	Different kind of technology	Using technology improve students communicative activities
18	Bahmani, Keshavarz, &Ghajari(2013)	primary, junior and high schools	Different kind of technology	smart schools improve social skills of students
19	Rostami, Akbari, & Ghanizadeh(2014)	junior high school	Power Point Presentation and World Wide Web	Smart Schools Programs have a positive and significant influence on learners' reading comprehension ability
20	Smith, & Woody(2000)	university	color graphic illustrations	benefits students with a high visual orientation
21	Traore& Blankson(2011)	High school	audio-visual technologies	help students in learning English more than the use of single technologies such as televisions with closed-captioning

22	Mehrgan(2012)	university	grammar software	improve the grammatical ability of the TEFL students
23	Iravani, & Tajik (2012)	High School	Microsoft Office Power Point 2007	has a great impact on the students' grammar learning
24	Wang & Smith (2013)	university	Internet (email)	improve reading and grammar ability
25	Serin (2011)	university	“Adobe Photoshop” program	affect achievements and problem solving skills of the students
26	Behzadi & Manuchehri (2013)	High School	Autograph and IQ Board Software	Using technology increase creatively students mathematic skill via traditional teaching
27	Jewitt (2005)	Unspecified	Microsoft Word, CD ROMs and Of mice and men [Penguin Electronics, and games (Kingdom hearts)	impact on students' text production and reading comprehension
28	AbuSeileek (2007)	university	Microsoft Office Power Point	computer-Based grammar instruction affect on the acquisition of Verb Tenses
29	Tsou, Wang, & Tzeng (2004)	elementary school	Using Website	increase the quality of teaching and learning and improve students enjoyment and success
30	Khiyabani, Ghonsooly, &Ghabanchi(2014)	High school	Different kind of technology	Effective in acquisition and learning unknown vocabulary via traditional methods

As the table illustrates many different kinds of technology were used to facilitate learning English including; power point, the internet, games, and audio visual devices. Students' listening, writing, and reading skills were improved and the technology was seen to have positive impact on student' grammar skill and vocabulary learning. Problem solving as one of the most significant strategies in language learning was improved via the program of Photoshop software. Generally speaking, utilizing technology in the EFL/ESL context provided enjoyable environment for students to learn English. Table 6 displays the number of participants (males and females) in each study and their age range. As indicated by the tables, the use of technology and the corresponding benefits are not restricted to any specific age or gender group.

Table 6. *Number of Participants and their Age Range*

Code	Number	Male	Female	Age(average)
1	35	7	28	21
2	10	4	6	15
3	53	-	-	14
4	64		64	16
5	80	40	40	20
6	35	7	28	25
7	127	127	-	20
8	128	128	-	23
9	70	-	-	10
10	115	-	-	15
11	3421	1973	1448	18
12	212	-	212	15
13	56	56	-	15
14	80	80	-	20
15	10	6	4	15
16	124	124	-	14
17	83	48	35	20

4. DISCUSSION AND CONCLUSIONS

This review study was done to accomplish two goals: (a) to review the overall effectiveness of using technology in general education, (b) to investigate recent studies in language learning by using technology, (c) to discover effective outcomes due to using technology in general education, and (d) to examine effectiveness of using technology in language education. So, the results and implications of the study were summarized and discussed for future research and development efforts in TELL.

In terms of overall effectiveness of technology on learning, it was found that the employment of different kinds of technology can have tremendous impacts on students' progress in different educational contexts in general. The advantages range from facilitating teaching and to assessment and evaluation. Technology also improves the training needs, educational policies, human resources and curriculum designs. Besides, multimedia technology can create an authentic learning situation and motivate students towards learning. Smart schools have also provided opportunities for students to adapt positive attitudes regarding science. Consequently, using technology motivates learners to acquire the materials more easily

This review shows that technology in different forms can be used effectively in almost all areas of language education. Findings showed that modern technologies improve the quality of input, authenticity of communication, and provide more relevant and useful feedback. Many different kinds of technology were used to facilitate learning English including; power point, the internet, games, and audio visual devices. These technologies were shown to influence all language skills and sub-skills, i.e., listening, writing, reading, speaking, grammar, and vocabulary. Problem solving as one of the most significant strategies in language learning was also improved Overall,

utilizing technology in the EFL/ESL context created pleasant atmosphere for students to learn English.

This review study has significant implications for future work. First, it shows that technology can have a positive effect on language learning. These impacts encompass a wide range of advantages and benefits. If we want to focus on using modern information and communication technologies to improve language learning, technology capacities need to be incorporated into pedagogical and curriculum systems for language learners rather than print material- based curriculum. Second, findings shows some each technology useful for each specific skill and su-skill, so it is essential to explore appropriate ways in using technology for different components od language and in different contexts or classes (Slaberry,2001). Third, as review releases that technology uses are effective in improving language learning when they are incorporated in teaching and learning process in classes. Forth, it was concluded that students of both genders and with a wide range of age groups seem to benefit from TELL.

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