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Effect of Technology Enhanced Language Learning on EFL Reading Comprehension at Tertiary Level

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Abstract
The study investigated the impact of the affordance of computer assisted language learning (CALL) and mobile assisted language learning (MALL) on EFL reading comprehension at tertiary level. Pre-formed intact groups were used to conduct this quasi-experimental study. It used a pretest and post-test control group design. The participants were 122 first year university students. Computer-based reading comprehension exercises were used as intervention that lasted for six weeks. Vocabulary was pre-taught through WhatsApp. Post-test results of the reading comprehension achievement test revealed that the treatment group outperformed their counterparts in the control group. The results indicate the significance of technology incorporation in language learning process. The study shows the effective use of technology in EFL reading instruction. It works best when integrated in the instructional scheme. Results of the study also suggest that freely available technological resources can be used to create a conducive reading environment. The study needs to be replicated with bigger sample and longer period of intervention for more accurate results.

Keywords: Computer-based instructional materials, EFL reading comprehension, Hot Potatoes, Technology Enhanced Language Learning (TELL), WhatsApp

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1. Introduction

Reading is a fundamental skill for academic success. Tertiary level students need to read vast amount of information to achieve their academic goals (Wright, Fugett, & Caputa, 2013). English as a foreign language (EFL) reading process is very complex as it entails interplay of multifarious factors and absence or presence of any one of these factors can spell success or failure. Students in Saudi universities are found lacking in language skills which are necessary for sustained performance in their pursuit of various disciplines (Khan, 2011). Limited exposure to English texts, lack of motivation and teacher-centered pedagogical practices are some of factors that have resulted in unsatisfactory performance of Saudi students in all language skills (Elyas & Picard, 2010; Morris, 2011). Another challenge for EFL reading in Saudi context is that reading has never been a skill of choice in Saudi culture because it is an oral culture and not a literate one (Zaharna, 1995). Therefore, there is a need to improve EFL reading practices in Saudi Arabia. Modern technology in form of computers and mobile phones has shown promise in language teaching and learning process (Bush, 2008; Chapelle, 2010; Slavin, Cheung, Groff, & Lake, 2008). Among other possibilities of the use of computers as instructional tools, use of computer authoring tools can be an important step in integrating technology in language classrooms. Use of these tools has been proved effective in EFL reading instruction (Davies, Walker, Rendall, & Hewer, 2011; Sadeghi & Soleimani, 2015). Likewise, mobile language learning (MALL) has also gained popularity in the past two decades. However, no study has been carried out in Saudi context to investigate the effect of these authoring tools on EFL reading comprehension and impact of MALL on vocabulary learning of tertiary level students. There is a gap in literature and the present study aims to fill it.

2. Literature Review

2.1. EFL/ESL Theory and Reading

This section reviews some of the theoretical perspectives on ESL/EFL reading before looking at the studies conducted in use of technology for promoting reading comprehension. ESL theory has been in a state of flux (Taber, 2006) in the best part of the preceding century. Different methods were proposed and discarded in quick succession. Krashen (1981), by propounding his Second Language Acquisition theory, tried to reconcile the competing methods through his fifth hypothesis that is the input hypothesis. According to this hypothesis he asserted that any method could be used for language acquisition as long as it ensures maximum comprehensible input in a low affective filter (Dulay & Burt, 1978; Krashen, 1981) environment. This view is strengthened in the light of brain research. Brain scans indicate that there is no specialized center in the brain to control reading process and areas that control it seem to be spread across brain which means that bits of information during the reading activity need to cross synaptic gaps. Signal in these gaps is carried by a chemical called dopamine and low filter environment helps in release of more dopamine (Willis, 2008). Repeated Reading (RR) technique put forward by Joshua Cohen (2011) has also been found helpful. Free voluntary reading (FVR) (Krashen, 2011) sometimes referred to as sustained silent reading (SSR) has been identified as the best approach to reading. Readers need to have access to diverse reading materials. It is important that they should be able to choose reading materials that interest them and that are in their Zone of Proximal Development (ZPD) (Vygotsky, 1978) or (i+1) as Krashen (1982) puts it. Internet can be immensely helpful in doing that.

Schema theory approaches the problem of reading from another angle. It asserts that during reading an interaction among reader, writer, text and reader's previous knowledge takes place. This connection with previous knowledge, called activation of schemata by schema theorists, has been identified as decisive factor in the success of reading comprehension (Bartlett & Bartlett, 1995; Rydland, Aukrust, & Fulland, 2012). Literature supports construct of this theory as the learners' performance improved when materials related to their previous knowledge were presented to them (Boulware-Gooden, Carreker, Thornhill, & Joshi, 2007).

Dual coding theory (DCT) advocates that human cognition is divided into two subsystems called 'logogens and imagens' where the former handles language and the latter handles concrete objects. Activation and development of these subsystems have been identified as a causative variable for successful cognition (Clark & Paivio, 1991; Sadoski, Paivio, & Goetz, 1991). Eight times higher recall is reported for vocabulary presented with pictures (Clark & Paivio, 1991). Simple view of reading comprehension, as propounded in (Hoover & Gough, 1990) looks at reading as interaction of decoding and linguistic comprehension in overlapping loops. The present study tried to incorporate some of the elements of these theories to create a technology assisted EFL reading environment conducive for comprehension.

2.2. Technology and EFL Learning

Phenomenal advances in technology in the second half of the last century in the fields of computers and telecommunication (Warschauer, 2000) have made tools available for the educators to assist them in the teaching and learning process (Azizinezhad & Hashemi, 2013; Idrus & Ismail, 2013). They can design pedagogically informed tasks (Chapelle, 2010; Garrett, 2009; Warschauer & Healey, 1998) based on these affordances (Harrington, 2010) to help create a learning environment (Murray, 2008) that is characterized by appropriate difficulty levels (Cameron, 1989; Pearson, 2007), feedback (Chickering & Ehrmann, 1996) and link to previous knowledge, interactivity (Chan et al., 2006), conduciveness, innovation (Chapelle, 2001) and positivity (Eaton, 2011; Li, 2013). Hypermedia has capability to help create such an environment (Ghasemi, Hashemi, & Bardine, 2011; Nassaji, 2003; Ollerenshaw, Aidman, & Kidd, 1997; Son, 2008). Teachers need training and continuous technical support in employing these capabilities to the maximum advantage of the learners (Ghasemi et al., 2011; Gilakjani & Leong, 2012; Hashemi & Aziznezhad, 2011; Hsu, 2009; Johnson, Perry, & Shamir, 2010; Romano, 2003). Research into teachers' attitudes and perceptions towards instructional technology has reported encouraging results (Güneyli, Özgür, Zeki, & Örnek, 2009; Yunus, Nordin, Salehi, Embi, & Mahamod, 2013). Technology on its owns offers no magical solutions (Biancarosa & Griffiths, 2012; Kenning, 2007) and its success depends upon how teachers are prepared to use it (Balajthy, 2007; Romano, 2003). Two meta-analysis studies, (Zhao, 2003) based on nine studies and (C. Kulik & Kulik, 1991) involving 248 studies, reported significantly large effect sizes in favour technology use. The above cited literature leaves a little doubt that technology can play an important role in language learning. In the following section literature is reviewed in relation with technology as a lever to promote reading comprehension.

2.3. Technology-Assisted Reading Comprehension

Readers, while interacting with a text for the purpose of comprehending (Carroll, 1971) it, employ different strategies (Basaraba, Yovanoff, Alonzo, & Tindal, 2013; Birch, 2014; Dreyer & Nel, 2003; Zhang, 2008). They encounter immense difficulties in relating the information to

their previous knowledge (Ulmer et al., 2002) and dealing with phonetic aspects (Lems, Miller, & Soro, 2009) of the language. A meta-analysis of eighty-four studies by Slavin et al. (2008) spanning three decades and involving over sixty thousand participants reported significantly large mean effect size in favour of technology assistance. Another meta-analysis involving 40,000 participants in 33 studies (Slavin et al., 2008) reported positive findings in favor of mix-method approach which highlights the assistive nature of technology in teaching learning context. Three other meta-analysis (J. A. Kulik, 2003), (Soe, Koki, & Chang, 2000) and (Taylor, 2006) based on twenty-seven, seventeen and eighteen studies on role of technology respectively, also reported positive findings in favour of use of technology. Evaluation of different computer-based reading assistance programs, such as "computer-assisted reciprocal early English reading (CAREER) (Lan, Sung, & Chang, 2009), "computer assisted strategy teaching and learning environment (CASTLE) (Sung, Chang, & Huang, 2008), digital reading annotation system (DRAS) (C. M. Chen, Wang, & Chen, 2014), web based applications such as ABRA and ePEARL (Lysenko & Abrami, 2014) and Second Life (Burgess, Price, & Caverly, 2012), all reported positive findings that suggest their efficacy in improving reading comprehension. Similar positive gains were reported by Ponce, Lopez, and Mayer (2012) and Behjat, Yamini, and Bagheri (2012) when a computer program for reading comprehension instruction was used as an integral part of curriculum. The reading texts were coupled with graphics and highlighting. The impact of hypertext on reading comprehension was found positive because of its ability to present text in multimodal ways (Dreyer & Nel, 2003; Juan & Madrid, 2009; Montelongo & Herter, 2010). However, it has been emphasized that to save learners from losing their way in the maze of annotations in a hypertext environment, they must be trained to navigate through the text (Park & Kim, 2011; Walsh, Asha, & Sprainger, 2007). Computer-assisted cloze practice helps to promote reading comprehension (Rodrigues & Martins, 2008; Tabatabaei, 2012). It has also been found beneficial in silent reading approach (Joshua Cohen, 2011) and in both intensive and extensive reading approaches (C. N. Chen, Chen, Chen, & Wey, 2013; Lin, 2014). Feedback is an important aspect of learning process. Computers have been found valuable tools to provide instant and incessant feedback (Murphy, 2010; Potocki, Ecalle, & Magnan, 2013). Researchers have explored the potential of computers in keeping record of the choices of strategies made by readers while interacting with the text. It might give teachers clues to the critical areas where help is needed so they might plan their instruction accordingly (Huang, Chern, & Lin, 2009; Liu, Chen, & Chang, 2010). Shift from paper reading to screen reading also has been a concern of the educators. Numerous studies were conducted to evaluate how reading from screen might affect reading comprehension. There seems to be a consensus that it makes no difference to reading comprehension whether readers read on paper or screen (Kerr & Symons, 2006; Sahin, 2011; Sun, Shieh, & Huang, 2013; Wright et al., 2013). These findings favour digital reading in an indirect way because the digital texts can be presented with multiple annotations which are readily accessible. This feature of digital texts gives it an immense advantage over paper texts.

To conclude this review it can be safely stated that technology offers viable option of promoting reading comprehension. But computer intervention is not as straightforward as it might seem as there are issues surrounding it such as level of implementation, designing of tasks, context, cost, training and last but not the least its role in the teaching learning process. The present study was conducted in view of the unique context of Saudi Arabia hinted upon in the introduction. It evaluated the impact of a technology assisted intervention on reading comprehension of EFL students at a university.

3. Methodology

A quasi experimental pretest post-test control group design was used in this study. The participants were pretested before the commencement of intervention and a post-test was administered at the end of intervention period which spanned six weeks. Pre-formed intact groups of students participated in the study (Fraenkel, Wallen, & Hyun, 1993).

4. Research Questions

The present study tried to answer the following research questions.

a. Does technology enhanced language input have an effect on reading comprehension skill of students on Preparatory Year Program (PYP) at university level?

b. Is technology enhanced language input gender neutral in its effect on reading comprehension of students on PYP at university level?

c.

5. Participants

The participants were one hundred twenty-two students enrolled on PYP at a public university in the Kingdom of Saudi Arabia. They aged between 19 and 22 years. Half of the participants were from Males' Campus and another half was from Females' Campus. All of them had been studying EFL at secondary schools for seven and a half year. They came from surrounding villages as well as nearby cities of Jeddah and Makkah, about 150 km from the campus. They were registered as regular students on PYP; a two semester course in other subjects and English language. All first year students are given a placement test upon their registration. On the basis of placement test results, they are assigned to different sections to form mixed-ability groups. These students have similar ability level and prior to university learning experiences at schools. The English course is 6 credit hours. They attend English classes 18 hours a week, five days a week. The study was conducted during the first half of second semester.

6. Treatment and Procedure

The treatment was given to only experimental group. The reading texts were taken from the English course book New Headways Plus Intermediate student book (Soars, Soars, & Wheeldon, 2014). First ten passages from that book were used during the intervention period for reading practice. Cloze type exercises and comprehension exercises were created based on these text passages with the help of a text manipulation tool called Hot Potatoes. This is an authoring tools suite which can create different types of interactive exercises. The exercises thus created can be shared online or on CDs for use on individual personal computers (PCs). Decision of not publishing the exercises online was taken because of three reasons. Firstly, available university infrastructure was in the process of development at the time of the study so technically it was not possible to publish the exercises online. Secondly, treatment was given as part of the course schedule and not as a homework. Thirdly, it was felt that materials given as supplement do not engage students because of low stakes. Therefore, some of the potential benefits of these activities are not fully realized. The exercises were created with the help of Hot Potatoes version 6 which was downloaded from https://hotpot.uvic.ca/. Choice of this suite was made because of its user friendly interface and its free of cost availability (Cafolla & Knee, 1999). Reading practice with this type of exercises has been found helpful in reading comprehension (Irshad & Ghani, 2011; Rodrigues & Martins, 2008; Tabatabaei, 2012; Zoi, Bellou, & Mikropoulos, 2011). Apart from these exercises glossed vocabulary cards were presented as part of intervention. The

glossed vocabulary cards were presented along with reading comprehension exercises as vocabulary pre teaching activity. These cards, which had L1 and L2 translation, a sample sentence and a relevant picture, were also sent to students on their mobile phones through a web application WhatsApp. The students were taken into language laboratory twice a week for sessions of one and half hour. They were trained to use the material. First they reviewed vocabulary which was also sent to their mobile phones prior to the session in the lab. Then they proceeded to practice reading with the help of cloze exercises. The exercises were presented in an increasing level of complexity which is in line with Bloom's revised taxonomy(Forehand, 2010). Screenshots of these activities are presented in (Figure 1).

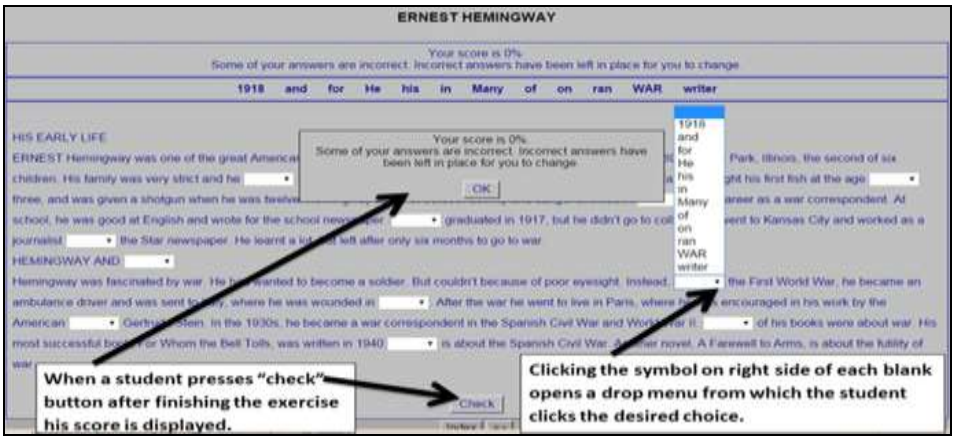

Figure 1. Screen shot of a level one exercise

(Figure 1) shows a level one exercise where every twentieth word is gaped. The students were required to fill the gaps using a drop down menu or from a list at the top. After the completion of task the students were asked to press 'check' button at the bottom of the page which displayed the obtained score. The option of instant feedback is valuable as it keeps learners engaged and focused (Murphy, 2010).

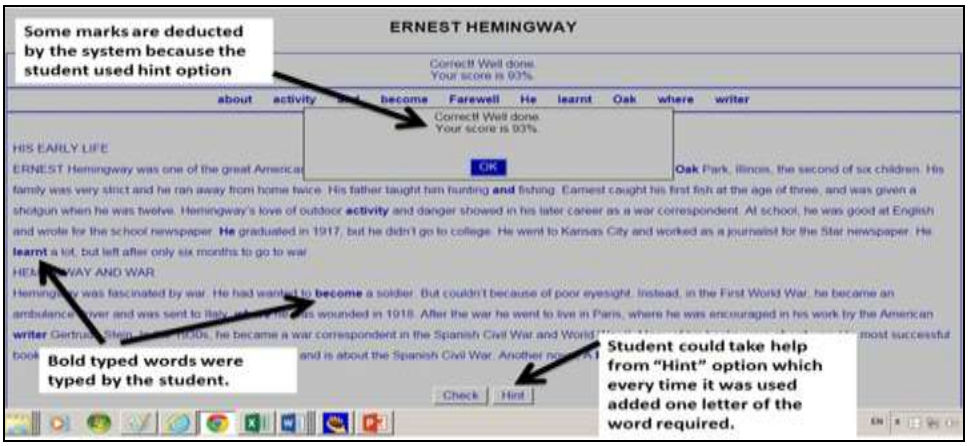

Figure 2. Screen shot of a level two exercise

Level two exercise as presented in (Figure 2) was a little more demanding. The students needed to type in the gaped words. "Hint' option was provided as a scaffold. However, to discourage them to look for too much help from this feature some marks were deducted upon every use of the option.

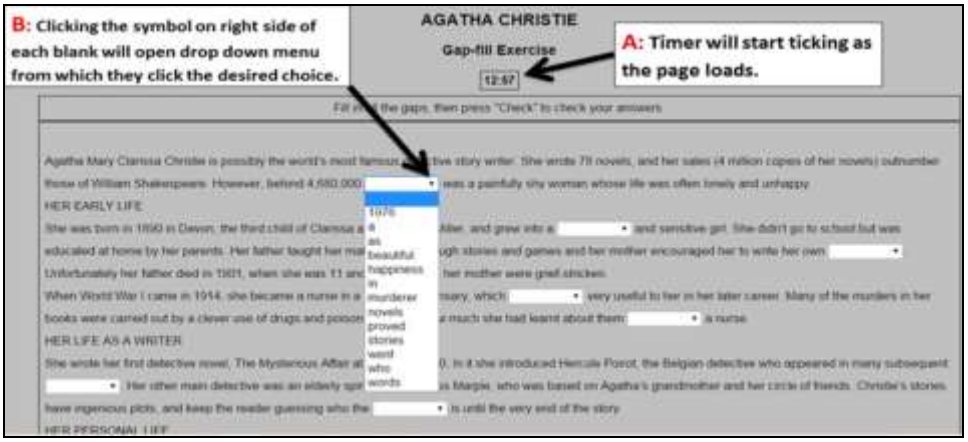

Figure 3. Screen shot of a level three exercise

Third level exercises were even more complex as shown in (Figure 3). To improve their reading fluency (Birch, 2014; Hirsch, 2003) feature of time constraint was added. The timer shown in the figure was set according to the difficulty level of the text. Students were required to choose from a drop menu the correct option. These exercises were followed by two quizzes. First quiz was a free practice but second one was timed.

Figure 4. Screen shot of a comprehension exercise

Exercise shown in (Figure 4) was presented alongside multiple choice questions. To discourage blind guessing the exercise had an important feature that the options for each question were automatically shuffled every time the page reloaded. Multiple choice tasks like these are found useful in improving reading comprehension (Milton, 2009).

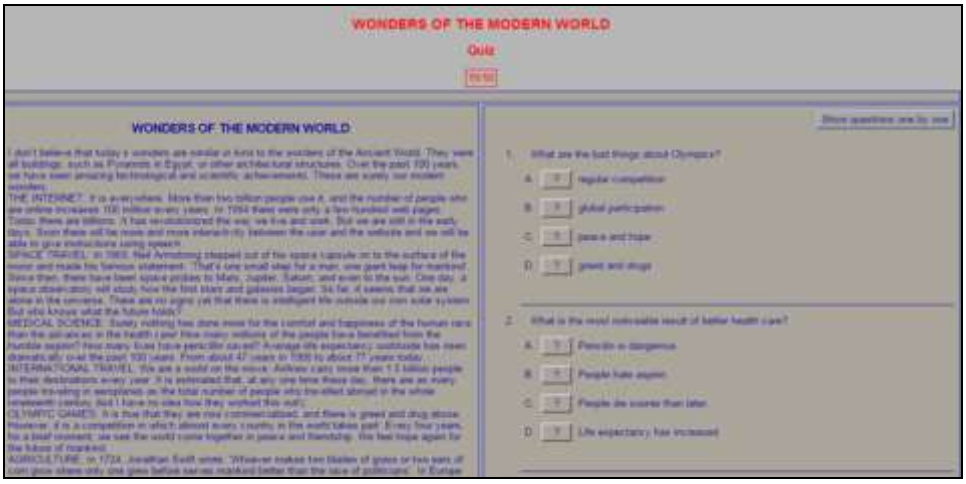

Figure 5. Screen shot of a timed comprehension quiz

Last activity as presented in (Figure 5) was similar to previous one but it had new questions and it was timed as well. The students were set the target of achieving 80% score on each exercise before moving on to the next level.

On the other hand, control group was taught same texts through traditional methods. These methods, typically in Saudi Arabia, are more teacher centered (Elyas & Picard, 2010). Students are first given a pre-reading activity prescribed in the course book to connect to the topic. New vocabulary is pre-taught through use of whiteboard and accompanied by teacher led drills. Students are given some time to read the text. Then they are introduced to the reading comprehension questions which is followed by the second reading. At the end they are given a short quiz as a productive activity which is marked by the teacher and returned the following day.

7. Data Collection Instrument

Data collection instrument was an achievement test which was developed by the researcher. In the absence of an appropriate instrument it is recommended to make one (Ary, Jacobs, Sorensen, & Walker, 2013; Brislin, 1986). Its preparation comprised three steps. Firstly, thirty multiple choice items (Basoglu & Akdemir, 2010; Milton, 2009) were written. Secondly, help was solicited from ten expert EFL teachers who had vast experience in teaching and testing. It was revised to incorporate the suggestions of the experts. Ten items were dropped and the final test had twenty items. Thirdly, it was piloted on 31 students whose proficiency (Fraenkel et al., 1993) in English was at the similar level as the subjects of the study. The test was given twice to the same group with a break of two weeks. The results of pilot study (Van Teijlingen & Hundley, 2001) are presented below in detail.

8. Pilot Study

Since the study used a researcher developed instrument it had to be pilot tested. To ensure its reliability and validity it was thoroughly tested. In this section the results of this analysis are reported.

Table 1
Descriptive Statistics of Pilot Study

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
First Test	31	1	16	7.68	3.911
Second Test	31	4	18	9.29	3.900
Valid N (listwise)	31				

As described in previous section the test was administered twice. Table 1 shows the mean score of the group (N = 31) was 7.68 when the test was administered first time (M = 7.68), equal to 38.4 % of the full score of 20 marks. Minimum score was 1, equivalent to about 5 % of full score and maximum score was 16, which is 80 % of the full score. Standard deviation was 3.91 (SD = 3.91). The students produced better scores when the test was given again after two weeks. The mean score of the group was 9.29 (M = 9.29) which is 46.5 % of the full score of 20 marks. Minimum score was 4, equivalent to 20 % of full score and maximum score was 18, which is 90% of the full score. Standard deviation was 3.90 (SD = 3.90). Better performance in the second attempt may be attributed to the fact that it was their second attempt to do the same test in two weeks. Higher standard deviation indicated that the group was a mixed-ability group.

Table 2
Pearson Correlation Results

Correlations

		First Test	Second Test
First Test	Pearson Correlation	1	.985**
	Sig. (2-tailed)		.000
	N	31	31
Second Test	Pearson Correlation	.985**	1
	Sig. (2-tailed)	.000	
	N	31	31

**. Correlation is significant at the 0.01 level (2-tailed).

Pearson product-moment correlation coefficient presented in table 2 was calculated to ensure the consistency and reliability of the test. A positive correlation between the two test scores, (r = 0.923, n = 31, p = 0.000, $p<0.05$) was found.

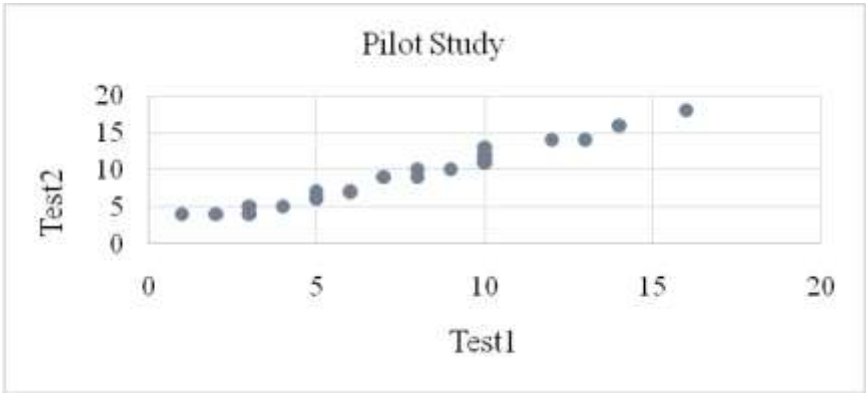

Figure 6. Scatter chart of pilot study

A scatterplot as shown in (Figure 6) summarizes the results. It depicts a strong, positive correlation between two test scores. Because of MCQ format where 1 credit was allocated for each correct answer and 0 for wrong answer the result lent itself to be analyzed through Kuder and Richardson Formula 20 test. The results were ρKR20 = 0.710. It confirmed that test was reliable. The study went ahead after assessing the instrument to the next phase. Results of the pretest and post-test are reported below.

9. Results and Discussion

9.1. Pretest Results

The study used pretest post-test control group design. So the pretest was given before the start of intervention to see whether the experimental and comparison groups were at the same level of proficiency or not. Participants were in four groups, two groups from males and two from females. Two groups, one group each from males (*N* = 31) and females (*N* = 30), were assigned to experimental condition. Two groups, one group each from males (*N* = 30) and females (*N* = 31), were used as comparison group.

Table 4
Descriptive Statistics of Pretest

Group Statistics

	Students ID	N	Mean	Std. Deviation	Std. Error Mean
Pretest Comprehension Score	Comparison Group	61	7.02	1.803	.231
	Experimental Group	61	7.54	1.577	.202

As presented in table 4 mean score of comparison group (*N* = 61) was 7.02 (*M* = 7.02) which was 35.1 % of the maximum score of 20 marks. Standard deviation was 1.80 (*SD* = 1.80) and standard error of means was 0.23 (*SEM* = 0.23). Mean score of experimental group (*N* = 61) on the other hand was 7.54 (*M* = 7.54) which was 37.7 % of the maximum score of 20 marks. Standard deviation was 1.57 (*SD* = 1.57) and standard error of means was 0.20 (*SEM* = 0.20). Standard deviation is a measure of dispersion of scores from mean score.

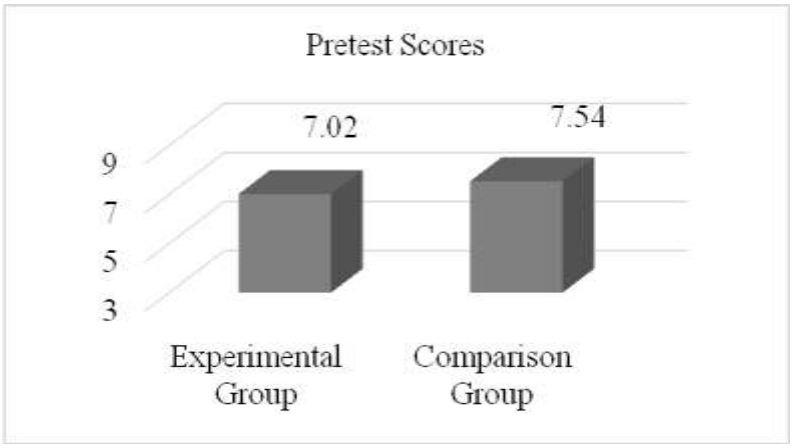

Figure 7. Graph of pretest scores

As shown in (Figure 7) the scores of experimental group and comparison groups were almost similar. However, there was a small numerical difference in the mean scores of two groups. Independent samples t-test was run to see whether the difference was statistically significant. The results are presented in table 5.

Table 5
Inferential Statistics of the Pretest

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Pretest Comprehension Score	Equal variances assumed	.067	.796	-1.711	120	.090	-.525	.307	-1.132	.083
	Equal variances not assumed			-1.711	117.908	.090	-.525	.307	-1.132	.083

Levene's test associated with the equality of variances was run to evaluate differences in variances. The results show (p = .796, with α = 0.05) which confirms the homogeneity of variances. Independent samples t-test with (α = 0.05) returned the p value of 0.90 (p = 0.90) which indicate that difference between the mean scores of experimental group and comparison group was not statistically significant. The result was very important for the study as it authenticated the assumption that two groups were at the same proficiency level of language prior to commencement of the study. It provided the bench mark from which the differences in the performances of the experimental group and comparison group at the conclusion of intervention were measured. Post-test was administered at the end of intervention period. The results are presented below.

9.2. Post-test Results

Table 6

Descriptive Statistics of the Post-test

Group Statistics

	Students ID	N	Mean	Std. Deviation	Std. Error Mean
Posttest Comprehension Score	Comparison Group	61	9.39	1.584	.203
	Experimental Group	61	10.25	1.312	.168

Table 6 shows the mean score for the comparison group (N = 61) was 9.39(M = 9.39) which is 46.9 % of maximum score of 20 marks. Standard deviation was 1.58 (SD = 1.58) and standard error mean was 0.20 (SEM = 0.20). Experimental group (N = 61) had a mean score of 10.25 (M = 10.25) which is 51.2 % of maximum score of 20 marks. Standard deviation was 1.31 (SD = 1.31) and standard mean error was 0.16 (SEM = 0.16).

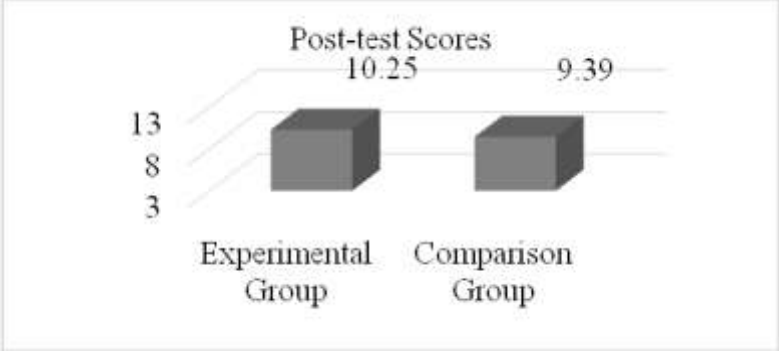

Figure 8. Graph of post-test scores

Graph in (Figure 8) shows the mean scores of two groups. Experimental group registered better scores as compared to comparison group. As depicted in (Figure 8) there was a numerical difference in the scores of the groups. Levene's test was done to verify assumption of equal variances. Independent sample t-test was run to see if the mean difference was significant. Results are presented in table 7.

Table 7

Inferential Statistics of Post-test Scores

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Posttest Comprehension Score	Equal variances assumed	2.041	.156	-3.237	120	.002	-.852	.263	-1.374	-.331
	Equal variances not assumed			-3.237	115.983	.002	-.852	.263	-1.374	-.331

Levene's test associated with the equality of variances was performed to see whether the group variances were equal or not. The results show (p = .156, with α = 0.05) which confirms the assumption that variances were equal. In t-test the value of p was 0.002 (p = 0.002, α = 0.05). The p value is less than 0.05 ($p = 0.002, \alpha = 0.05$) which means that the difference between the mean scores of comparison and experimental groups was statistically significant. Cohen's d for effect size was estimated at (d = 0.59) which according to (Jacob Cohen, 1992) suggests a mediumto large effect size. Therefore, in the light of this result, null hypothesis (H_0) technology enhanced language input has no effect on reading comprehension of students on PYP at university level is rejected. The alternate hypothesis H_1, technology enhanced language input has no effect on reading comprehension of students on PYP at university level, is accepted.

The results of this study were similar to the study by Tabatabaei (2012). In this study 80 EFL students took part. The treatment included practice with cloze type exercises for reading comprehension. The study lasted for five weeks. Findings of the study revealed that practice with cloze type exercises helped the experimental group. Like the experimental group in the present study their performance was better than the students in control group. The results are also in line with the meta-analysis by Soe et al. (2000) in which computer-assisted reading comprehension instruction was found valuable across 17 studies that were included. It can be argued that computer-based exercises helped the participants in the present study because the exercises were approached in an environment that was stress free. It allowed the subjects to work on their own pace. It also freed precious teacher time which was used to help those students who needed help the most.

Is technology enhanced language input gender neutral in its effect on reading comprehension of students on Preparatory Year Program (PYP) at university level? It was the second question in the study. The post-test scores of males' experimental group and females' experimental group were compared. The results are presented in table 8.

Table 8

Descriptive Statistics of Treatment Groups

Group Statistics

	Students ID	N	Mean	Std. Deviation	Std. Error Mean
Posttest Comprehension Score	Boys Experimental Group	30	10.33	1.348	.246
	Girls Experimental Group	31	10.16	1.293	.232

Results of the post-test of boys' and girls' experimental groups are presented in table 8. Boys' experimental group (N = 30) had a mean score of 10.33 (M = 10.33). Standard deviation was 1.34 (SD = 1.34). Standard mean error was 0.24 (SEM = 0.24). Girls' experimental group (N = 31) showed a mean score of 10.16 (M = 10.16). Standard deviation was 1.29 (SD = 1.29). Standard mean error was 0.23 (SEM = 0.23).

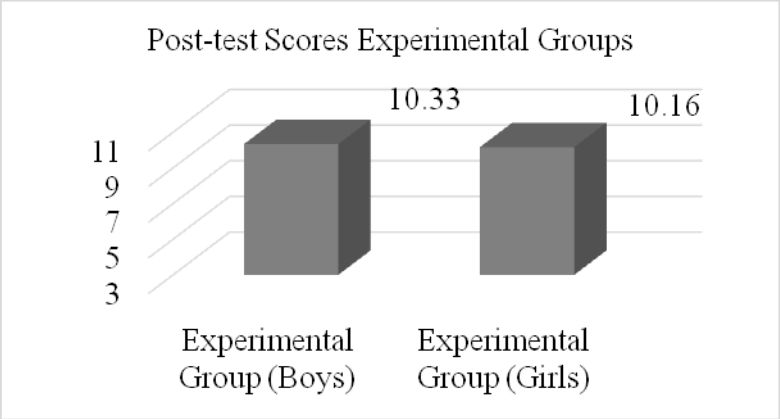

Figure 9. Graph of treatment groups' post-test scores

(Figure 9) displays the performance of both groups in the post-test which was quite similar. Difference in mean score was very small. However t-test was conducted to ascertain that it was statistically significant or not. Table 9 presents the results of the inferential statistical measures.

Table 9

Inferential Statistics on the Pretest Scores of Boys' and Girls' Experimental Groups

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Posttest Comprehension Score	Equal variances assumed	.328	.569	.509	59	.613	.172	.338	-.505	.849
	Equal variances not assumed			.508	58.676	.613	.172	.338	-.505	.849

Levene's test was associated with equivalence of variances. The results indicated (p = .569, with α = 0.05) which verifies the assumption that variances were equal. In t-test the value of p was 0.613 (p = 0.613, α = 0.05). The p value is greater than 0.05 ($p = 0.613$, $\alpha = 0.05$) which means that the difference between two experimental groups' mean score was statistically not significant. The results confirm the null hypothesis that technology enhanced language input is gender neutral. It is concluded that intervention seemed beneficial for both genders. No study could be located that exclusively investigated the question of gender neutrality.

However, the results of the gender neutrality can be compared with the results of Motallebzadeh and Ganjali (2011). The subjects of that study were all female and they were taught EFL vocabulary through mobile phones which like the present study resulted in the improved reading comprehension and vocabulary learning of the control group. Similarly, the study by Underwood, McCaffrey, and Underwood (1990) reported no significant difference in the performance of the participants on the basis of gender when they worked separately on a cloze type task presented in computer-assisted environment. However, the study reported differences in performance when the subjects worked on the task in mixed gender groups. It is

pertinent to note that in the context of the present study the participants worked on the tasks segregated gender wise because of gender segregation laws in the Kingdom.

To sum up the model created with the affordances of computer and mobile phone helped the participants to overcome anxiety related to foreign language learning. Once affective filter could be pushed down, an environment was created that allowed reading process to proceed smoothly. Also the pre-teaching of vocabulary through WhatsApp proved valuable as the students were introduced to the new vocabulary long before they reported for reading lessons. This multi-modal and multiple exposure to target vocabulary seemed to help improve their reading comprehension.

10. Implications

Pedagogical implications of the study are that well planned and well-designed tasks presented in a low filter environment do promote not only language learning but can also promote love for learning process. Technology cannot produce miracles which was suggested in early euphoric claims about it but its potential as assistant to the process of learning has been proved yet again. Teachers need training in use of technology that is easily available in improving "what they do the best"(Romano, 2003) that is teaching.

Implications for the administrators are that they need to encourage teachers to use available technology instead of spending resources on fancy systems which the software publishers tout as ultimate answer to all teaching learning problems.

The study has important social implications. The kind of intervention used in the study can be used for distance learning courses. It can help dispensation of knowledge over great distances circumventing the issues related to infrastructure and issues related to social and religious traditions. Used innovatively the technique has the promise of changing the very way people learn.

11. Limitations

Like all other investigations in the field of humanities where subjects are real students the present study has some limitations. Firstly, a true experiment could not be done because the administrative constraints disallowed random sampling and pre-formed groups of students had to be used. A randomized sample could have yielded more reliable results. Secondly, sample size was small and restricted to one campus. Thirdly, it was conducted at one location. Fourthly, it used a researcher developed instrument for data collection because no standardized instrument compatible with the context of the study could be located. The instrument was piloted but piloting over a bigger number of students might help to further refine it. There was a possibility of contamination as the vocabulary was sent to students on their mobile phones and the reading exercises were also made available to them on a CD for practice at home. They could easily share those with students in the comparison group. Although they were explicitly told not to do that but there was no mechanism to ensure compliance.

12. Future Research

The study might be replicated with bigger and if possible randomized sample. Data collection instrument may be piloted more extensively. Efforts may be made to develop

standardized instruments for this type of studies. Research is needed in identifying critical vocabulary for pre-teaching. The model used in study may be applied online to study its efficacy in distance learning environments. Ways of incorporating other skills like writing and listening may be explored.

13. Conclusion

The present study was undertaken to evaluate the use of technology in instruction of reading comprehension at a public university. Reading comprehension is a problematic and complex skill to acquire. We cannot be sure how exactly a reader, with his/her unique knowledge base, interacts with a text. There seem to be no single measure good enough to tell us the extent one understands or comprehends a text. The present study was conducted on the assumption that technology enhanced language input has the promise of delivering valuable help in softening EFL reading comprehension challenge. The literature reviewed presented enough evidence in support of this assumption. A model of intervention was created by using freely available technical resources. The tasks were delivered in a low filter environment; in the language lab and on the mobile phones of the learners. The findings of the study were encouraging. They are in line with a growing body of evidence that such interventions have potential to promote learners' EFL reading comprehension.

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References

Ary, D., Jacobs, L., Sorensen, C., & Walker, D. (2013). *Introduction to research in education* (8th ed.). Belmont: Cengage Learning.

Azizinezhad, M., & Hashemi, M. (2013). A look at the status of computer assisted language learning and its applications. *Procedia-Social and Behavioral Sciences, 93*, 121-124.

Balajthy, E. (2007). Technology and current reading/literacy assessment strategies. *The Reading Teacher, 61*(3), 240-247.

Bartlett, F. C., & Bartlett, F. C. (1995). *Remembering: A study in experimental and social psychology* (Vol. 14): Cambridge University Press.

Basaraba, D., Yovanoff, P., Alonzo, J., & Tindal, G. (2013). Examining the structure of reading comprehension: Do literal, inferential, and evaluative comprehension truly exist? *Reading and Writing, 26*(3), 349-379.

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.

Behjat, F., Yamini, M., & Bagheri, M. S. (2012). Blended learning: A ubiquitous learning environment for reading comprehension. *International Journal of English Linguistics, 2*(1), 97-106.

Biancarosa, G., & Griffiths, G. G. (2012). Technology tools to support reading in the digital age. *The Future of Children, 22*(2), 139-160.

Birch, B. M. (2014). *English L2 reading: Getting to the bottom*: Routledge.

Boulware-Gooden, R., Carreker, S., Thornhill, A., & Joshi, R. (2007). Instruction of metacognitive strategies enhances reading comprehension and vocabulary achievement of third-grade students. *The Reading Teacher, 61*(1), 70-77.

Brislin, R. W. (1986). The wording and translation of research instruments. In W. J. Lonner & J. W. Berry (Eds.), *Field methods in cross-cultural research* (pp. 137-164). Beverly Hills, CA: Sage.

Burgess, M. L., Price, D. P., & Caverly, D. C. (2012). Digital literacies in multiuser virtual environments among college-level developmental readers. *Journal of College Reading and Learning, 43*(1), 13-30.

Bush, M. D. (2008). Computer-Assisted Language Learning: From Vision to Reality? *CALICO Journal, 25*(3), 443-470.

Cafolla, R., & Knee, R. (1999). *Adding interactivity to web based distance learning*. Paper presented at the Society for Information Technology & Teacher Education International Conference (February 28-March 4), San Antonio, TX.

Cameron, K. (1989). *Computer assisted language learning: Program structure and principles*. Noorwood, NJ: Intellect Books.

Carroll, J. B. (1971). Defining language comprehension: Some speculations. In J. B. Carroll & R. O. Freedle (Eds.), *Language comprehension and the acquisition of knowledge* (pp. 1-30). Washington: V.H. Winston and Sons.

Chan, T.-W., Roschelle, J., Hsi, S., Kinshuk, Sharples, M., Brown, T., . . . Norris, C. (2006). One-to-one technology-enhanced learning: An opportunity for global research collaboration. *Research and Practice in Technology Enhanced Learning, 1*(1), 3-29.

Chapelle, C. A. (2001). *Computer applications in second language acquisition*: Cambridge University Press.

Chapelle, C. A. (2010). The spread of computer-assisted language learning. *Language Teaching, 43*(1), 66-74.

Chen, C. M., Wang, J. Y., & Chen, Y. C. (2014). Facilitating English language reading performance by a digital reading annotation system with self-regulated learning mechanisms. *Educational Technology & Society*, *17*(1), 102-114.

Chen, C. N., Chen, S. C., Chen, S. H. E., & Wey, S. C. (2013). The effects of extensive reading via e-books on tertiary level EFL students' reading attitude, reading comprehension, and vocabulary. *Turkish Online Journal of Educational Technology-TOJET, 12*(2), 303-312.

Chickering, A. W., & Ehrmann, S. C. (1996). Implementing the seven principles: Technology as lever. *AAHE bulletin*, *49*, 3-6.

Clark, J. M., & Paivio, A. (1991). Dual coding theory and education. *Educational Psychology Review, 3*(3), 149-210.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155-159.

Cohen, J. (2011). Building fluency through the repeated reading method. *English Teaching Forum, 49*(3), 20-27.

Davies, G., Walker, R., Rendall, H., & Hewer, S. (2011). Introduction to computer assisted language learning (CALL). Module 1.4. In G. Davies (Ed.), *Information and Communications Technology for Language Teachers (ICT4LT)*. Slough: Thames Valley University.

Dreyer, C., & Nel, C. (2003). Teaching reading strategies and reading comprehension within a technology-enhanced learning environment. *System, 31*(3), 349-365.

Dulay, H., & Burt, M. (1978). Remarks on creativity in language acquisition. In W. C. Ritchie (Ed.), *Second language acquisition research: Issues and implications* (pp. 65-89). San Diego, CA: Academic Press.

Eaton, S. E. (2011). Alternative and Asset-Based Evaluation and Assessment in Language Teaching and Literacy: Resources for Research, Classroom Instruction and Evaluation of Language Competence. *Online Submission*.

Elyas, T., & Picard, M. (2010). Saudi Arabian educational history: impacts on English language teaching. *Education, Business and Society: Contemporary Middle Eastern Issues, 3*(2), 136-145.

Forehand, M. (2010). Bloom's taxonomy: Original and revised. In M. Orey (Ed.), *Emerging Perspectives on Learning,Teaching, and Technology* (pp. 41-47). Zurich, Switzerland: CreateSpace Independent Publishing Platform.

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (1993). *How to design and evaluate research in education* (Vol. 7). New York: McGraw-Hill.

Garrett, N. (2009). Computer-Assisted Language Learning Trends and Issues Revisited: Integrating Innovation. *The Modern Language Journal*, *93*, 719-740.

Ghasemi, B., Hashemi, M., & Bardine, S. H. (2011). The capabilities of computers for language learning. *Procedia-Social and Behavioral Sciences, 28*, 58-62.

Gilakjani, A. P., & Leong, L.-M. (2012). EFL teachers attitudes toward using computer technology in English language teaching. *Theory and Practice in Language Studies, 2*(3), 630-636.

Güneyli, A., Özgür, B., Zeki, C. P., & Örnek, K. K. t. B. (2009). Computer use in foreign language teaching: a case study from North Cyprus. *Eurasian Journal of Educational Research, 34*, 37-54.

Harrington, A. M. (2010). Problematizing the hybrid Classroom for ESL/EFL students. *TESL-EJ, 14*(3), 1-13.

Hashemi, M., & Aziznezhad, M. (2011). Computer assisted language learning freedom or submission to machines? *Procedia-Social and Behavioral Sciences, 28*, 832-835.

Hirsch, E. D. (2003). Reading comprehension requires knowledge—of words and the world. *American Educator, 27*(1), 10-13.

Hoover, W. A., & Gough, P. B. (1990). The simple view of reading. *Reading and Writing, 2*(2), 127-160.

Hsu, H. Y. (2009). Preparing teachers to teach literacy in responsive ways that capitalize on students' cultural and linguistic backgrounds through weblog technology. *Multicultural Education & Technology Journal, 3*(3), 168-181.

Huang, H. C., Chern, C. L., & Lin, C. C. (2009). EFL learners' use of online reading strategies and comprehension of texts: An exploratory study. *Computers & Education, 52*(1), 13-26.

Idrus, M. M., & Ismail, I. S. (2013). Learning language through wireless technology: An impact study. *Procedia-Social and Behavioral Sciences, 90*, 381-387.

Irshad, S., & Ghani, M. (2011). *Effectiveness of computer asssisted language learning (CALL) in Pakistani ESL perspective: A qusai-experimental study*. Paper presented at the 3rd International Conference of Teaching and Learning (ICTL 2011), INTI International University, Malaysia.

Johnson, E. P., Perry, J., & Shamir, H. (2010). Variability in reading ability gains as a function of computer-assisted instruction method of presentation. *Computers & Education, 55*(1), 209-217.

Juan, E. U., & Madrid, N. R. (2009). Reading printed versus online texts. A study of EFL learners' strategic reading behavior. *International Journal of English Studies, 9*(2), 59-79.

Kenning, M. M. (2007). *ICT and language learning: From print to the mobile phone*. New York: Palgrave Macmillan.

Kerr, M. A., & Symons, S. E. (2006). Computerized presentation of text: Effects on children's reading of informational material. *Reading and Writing, 19*(1), 1-19.

Khan, I. A. (2011). Learning difficulties in English: Diagnosis and pedagogy in Saudi Arabia. *Educational Research, 2*(7), 1248-1257.

Krashen, S. D. (1981). *Second language acquisition and second language learning*: Oxford University Press.

Krashen, S. D. (1982). *Principles and practice in second language acquisition*. UK: Oxford Pergamon.

Krashen, S. D. (2011). *Free voluntary reading*. United States of America: ABC-CLIO.

Kulik, C., & Kulik, J. (1991). Effectiveness of computer-based instruction: An updated analysis. *Computers in Human Behavior, 7*(1), 75-94.

Kulik, J. A. (2003). *Effects of using instructional technology in elementary and secondary schools: What controlled evaluation studies say*: Citeseer.

Lan, Y. J., Sung, Y. T., & Chang, K. E. (2009). Let us read together: Development and evaluation of a computer-assisted reciprocal early English reading system. *Computers & Education, 53*(4), 1188-1198.

Lems, K., Miller, L. D., & Soro, T. M. (2009). *Teaching reading to English language learners: Insights from linguistics*. New York: Guilford Press.

Li, N. (2013). Seeking best practices and meeting the needs of the English language learners: Using second language theories and integrating technology in teaching. *Journal of International Education Research (JIER), 9*(3), 217-222.

Lin, C. C. (2014). Learning English reading in a mobile-assisted extensive reading program. *Computers & Education, 78*, 48-59.

Liu, P. L., Chen, C. J., & Chang, Y. J. (2010). Effects of a computer-assisted concept mapping learning strategy on EFL college students' English reading comprehension. *Computers & Education, 54*(2), 436-445.

Lysenko, L. V., & Abrami, P. C. (2014). Promoting reading comprehension with the use of technology. *Computers & Education, 75*, 162-172.

Milton, J. (2009). *Measuring second language vocabulary acquisition*. Bristol, UK: Multilingual Matters.

Montelongo, J. A., & Herter, R. J. (2010). Using technology to support expository reading and writing in science classes. *Science Activities, 47*(3), 89-102.

Morris, N. O. (2011). Using technology in the EFL classroom in Saudi Arabia. *DigitalCollections@SIT, 1*(1), 1-51.

Motallebzadeh, K., & Ganjali, R. (2011). SMS: Tool for L2 vocabulary retention and reading comprehension ability. *Journal of Language Teaching and Research, 2*(5), 1111-1115.

Murphy, P. (2010). Web-based collaborative reading exercises for learners in remote locations: the effects of computer-mediated feedback and interaction via computer-mediated communication. *ReCALL, 22*(2), 112-134.

Murray, D. (2008). From marginalisation to transformation: How ICT is being used in ESL learning today. *International Journal of Pedagogies and Learning, 4*(5), 20-35.

Nassaji, H. (2003). Higher–level and lower–level text processing skills in advanced ESL reading comprehension. *The Modern Language Journal, 87*(2), 261-276.

Ollerenshaw, A., Aidman, E., & Kidd, G. (1997). Is an illustration always worth ten thousand words? Effects of prior knowledge, learning style and multimedia illustrations on text comprehension. *International Journal of Instructional Media, 24*(3), 227-238.

Park, H. R., & Kim, D. (2011). Reading-strategy use by English as a second language learners in online reading tasks. *Computers & Education, 57*(3), 2156-2166.

Pearson, P. D. (2007). An endangered species act for literacy education. *Journal of Literacy Research, 39*(2), 145-162.

Ponce, H. R., Lopez, M. J., & Mayer, R. E. (2012). Instructional effectiveness of a computer-supported program for teaching reading comprehension strategies. *Computers & Education, 59*(4), 1170-1183.

Potocki, A., Ecalle, J., & Magnan, A. (2013). Effects of computer-assisted comprehension training in less skilled comprehenders in second grade: A one-year follow-up study. *Computers & Education, 63*, 131-140.

Rodrigues, M. C. A. J., & Martins, R. X. (2008). Digital media performance and reading comprehension: a correlational study with Brazilian students. *International Journal of Web-Based Learning and Teaching Technologies (IJWLTT), 3*(1), 33-42.

Romano, M. T. (2003). *Empowering teachers with technology: Making it happen*. USA: Scarecrow Press Inc.

Rydland, V., Aukrust, V. G., & Fulland, H. (2012). How word decoding, vocabulary and prior topic knowledge predict reading comprehension. A study of language-minority students in Norwegian fifth grade classrooms. *Reading and Writing, 25*(2), 465-482.

Sadeghi, N., & Soleimani, H. (2015). A description and evaluation of Hot Potatoes web-authoring software in educational settings. *Theory and Practice in Language Studies, 5*(11), 2407-2415.

Sadoski, M., Paivio, A., & Goetz, E. T. (1991). Commentary: A critique of schema theory in reading and a dual coding alternative. *Reading Research Quarterly*, 463-484.

Sahin, A. (2011). Effects of linear texts in page scrolling and page-by-page reading forms on reading comprehension introduction. *Turkish Online Journal of Educational Technology-TOJET, 10*(3), 94-100.

Slavin, R. E., Cheung, A., Groff, C., & Lake, C. (2008). Effective reading programs for middle and high schools: A best-evidence synthesis. *Reading Research Quarterly, 43*(3), 290-322.

Soars, L., Soars, J., & Wheeldon, S. (2014). *New headway intermediate student's book*: Oxford University Press.

Soe, K., Koki, S., & Chang, J. M. (2000). *Effect of computer-assisted instruction (CAI) on reading achievement: A meta-analysis*. Retrieved from http://eric.ed.gov/?id=ED443079

Son, J.-B. (2008). Using web-based language learning activities in the ESL classroom. *International Journal of Pedagogies and Learning, 4*(4), 34-43.

Sun, S. Y., Shieh, C. J., & Huang, K. P. (2013). A research on comprehension differences between print and screen reading. *South African Journal of Economic and Management Sciences, 16*(5), 87-101.

Sung, Y. T., Chang, K. E., & Huang, J. S. (2008). Improving children's reading comprehension and use of strategies through computer-based strategy training. *Computers in Human Behavior, 24*(4), 1552-1571.

Tabatabaei, M. A. (2012). The effect of practicing with cloze-elide texts on iranian intermediate monolingual and bilingual efl learners'performance in multiple-choice tests of reading comprehension. *International Journal of Academic Research, 4*(2), 118-128.

Taber, J. (2006). A brief history of ESL instruction: Theories, methodologies, upheavals. Retrieved from http://seattlecentral.edu/faculty/jgeorg/TESLSCCC/ABriefHistory.htm

Taylor, A. (2006). The effects of CALL versus traditional L1 glosses on L2 reading comprehension. *CALICO Journal, 23*(2), 309-318.

Ulmer, C., Timothy, M., Bercaw, L., Gilbert, S., Holleman, J., & Hunting, M. (2002). Creating games as reader response and comprehension assessment. Retrieved from http://americanreadingforum.org/yearbook/yearbooks/02_yearbook/html/16_Ulmer_etal_revised.htm

Underwood, G., McCaffrey, M., & Underwood, J. (1990). Gender differences in a cooperative computer-based language task. *Educational Research, 32*(1), 44-49.

Van Teijlingen, E., & Hundley, V. (2001). The importance of pilot studies. *Social research update*(35), 1-4.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*: Cambridge, MA Harvard University Press.

Walsh, M., Asha, J., & Sprainger, N. (2007). Reading digital texts. *The Australian Journal of Language and Literacy, 30*(1), 40-53.

Warschauer, M. (2000). The changing global economy and the future of English teaching. *Tesol Quarterly, 34*(3), 511-535.

Warschauer, M., & Healey, D. (1998). Computers and language learning: An overview. *Language Teaching, 31*(2), 57-71.

Willis, J. (2008). *Teaching the brain to read: Strategies for improving fluency, vocabulary, and comprehension*. USA: ASCD Publications.

Wright, S., Fugett, A., & Caputa, F. (2013). Using e-readers and Internet resources to support comprehension. *Educational Technology & Society, 16*(1), 367-379.

Yunus, M. M., Nordin, N., Salehi, H., Embi, M. A., & Mahamod, Z. (2013). Managing problems and planning activities involving ICT tools in teaching ESL reading and writing. *Asian Social Science, 9*(10), 222-230.

Zaharna, R. S. (1995). Understanding cultural preferences of Arab communication patterns. *Public Relations Review, 21*(3), 241-255.

Zhang, L. J. (2008). Constructivist pedagogy in strategic reading instruction: Exploring pathways to learner development in the English as a second language (ESL) classroom. *Instructional Science, 36*(2), 89-116.

Zhao, Y. (2003). Recent developments in technology and language learning: A literature review and meta-analysis. *CALICO Journal, 21*(1), 7-27.

Zoi, M., Bellou, I., & Mikropoulos, T. (2011). *Second language teaching in elementary school with a multimedia gloss.* Paper presented at the International Conference on Languages, Literature, & Linguistics, Singapore, IPEDR.