Original Article

The impact of extensive reading using ankidroid and readeracer software packages on learners' reading speed, reading comprehension, and english vocabulary development: A quasi-experimental study

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Abstract

Background & Objective: As science Advances, academicians, specifically learners are to peruse a great deal to keep abreast. The present study investigated the effect of using AnkiDroid and ReaderAcer software packages in the field of e-learning on learners' vocabulary, reading comprehension and speed.

Materials & Methods: The present study was a single-group pre-test post-test quasi-experimental study performed on 23 undergraduate surgical technology students. During the pre-test, the learners' lexical resource, reading speed and comprehension were measured using Vocabulary Size Test-1400, and ReaderAcer software. The learners were informed on the AnkiDroid and ReaderAcer software packages. They were taught speed reading and vocabulary during 42 twenty-minute sessions. Following each intervention (twice), the learners' lexical knowledge, reading speed and comprehension were measured. The collected data were analyzed using the SPSS (ver.26).

Results: the results of Friedman test showed a statistically significant difference in reading speed (x^2=46.30, p<0.001). Comprehension also increased significantly (x^2=516.45, p<0.001). The increase in the learners' lexical knowledge was also significant (x^2=00.46, p<0.001).

Conclusion: applying extensive reading had a positive effect on the vocabulary, speed reading and comprehension of the learners using the mentioned software packages. using these two software packages seems to be effective in improving the learners' abilities in the areas mentioned.

Keywords: Reading comprehension, Speed Reading, Vocabulary, AnkiDroid, ReaderAcer

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Introduction

Science is advancing rapidly which is manifested by a large number of publications in various fields. For this reason, academicians need to peruse vastly in their fields of study and specialization in order to update their information. The situation is essential for learners who have far less background knowledge in their field of study compared to that of lecturers and graduates in that field. Although acquaintance with and mastery over English can play an important role in overcoming this challenge, a number of studies show that no serious attention is paid to second or foreign language reading skills in learners' training courses (1 and 2). Perhaps the main reason for such ignorance is over-focus on the structure, which may eventually lead to ignoring automatic reading (3 and 4). Research has shown that learners' reading skill in a second or foreign language is slower than their mother tongue (5, 6 and 7). Slow reading may indicate low comprehension, inability of the mind to interpret meanings automatically, and lack of enjoyment of reading. Perhaps one of the reasons why Iranians avoid books is the lack of high speed in reading (8).

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Over the past few years, in the field of teaching English as a foreign or second language (TEFL / TESOL), numerous in-depth and empirical investigations have been conducted on the agreeable implications of extensive studies (9). For many English learners, the ability to read is the most important educational goal (10). Research on TESOL/ TEFL learners and teachers has also indicated that comprehension is considered to be the most valuable skill towards academic success (9 and 11). In addition, for many of these learners, reading comprehension skill is the most valuable language skill because it is one of the best ways to increase vocabulary knowledge and allows interaction with other cultures and languages; therefore, it is not surprising that reading skill is strongly emphasized in English language classes all around the world (9).

Regarding the importance of reading skill in scientific settings, the main issue is how to best develop this skill (9). Along with various suggestions, Souk (12) states that reading skill could probably be enhanced only gradually and when the learner is constantly exposed to a wealth of meaningful input (with the same extensive reading). There have been many studies over the past decade which support and confirm the effectiveness of extensive reading (e.g. 9, 10, 13). Some researchers have long believed that extensive reading courses is the only tool to improve reading and lexical skills in general. Hence, it is inferred that extensive reading is one of the best ways to achieve advanced levels of L2 skills (9 and 14). Although focused and in-depth reading is necessary to improve optimal reading skills (15), mere focus on this aspect may limit the required amount of target language to which the learner is exposed, which, in turn, may significantly reduce learners' reading speed (9).

There are many definitions of extensive reading (e.g. 16, 17, 18, 10, and 19) and the way it differs from concentrated reading (British Council, 2019). There also exist a number of studies on fluent reading or speed reading, but the positive effects reported by many of these studies on extensive reading are questionable due to the outline or drawbacks of curricula. This has undermined the effectiveness of extensive reading in the field of second language learning (9).

The need to read and understand written materials faster is considered as an essential skill among scholars. The cornerstone of comprehensible swift reading are downstream and upstream cognitive processes (1, 20, 21). The former involves word recognition, grammatical divisions, literal meaning decoding, and short-term memory activation, which must be done quickly. These are the main foundations of fluent reading, because accurate and automatic word decoding makes readers pay more attention to comprehension (22). The latter includes comprehension or semantic construction, which, in turn, involves background knowledge, interpretation of ideas presented in a text, inference and evaluation of the presented information (1). As mentioned, one of the perquisites for enhancing learners' reading speed is to have a vast command of vocabulary knowledge, which reduces the number of references to the dictionary, as well as regressions, and, thus, increases reading speed. Fluent reading and reading speed are important factors in raising one's comprehension level (9). Slow reading may prevent information from being stored in long-term memory and may delay data processing. words that a reader comprehends quickly, accurately and automatically are defined as sight vocabulary and the ability to automatically decode words is essential to fluent reading (23). Numerous researchers recommend extensive reading as a way to increase sight or ocular vocabulary. Recently, three studies have been conducted in the field of speed reading. These studies were designed and conducted on learners of English as a foreign language. The results of these studies indicated that speed reading courses using extensive reading improved the learners' reading speed (9, 12, 24), and increased vocabulary in the experiment group (9) compared to the control group. But none of the previous studies has examined the effect of extensive reading on increasing learners' vocabulary, reading speed and comprehension.

Despite the favorable reports on the positive impacts of extensive reading on reading speed, many of these reports on extensive reading and reading speed have major design and methodological flaws that call the results of the studies into question (9).

Raising interest can boost learning and its pleasure in learners enhancing motivation and active participation (25, 26). A recent study shows that one way to encourage active participation among unmotivated learners is to provide opportunities to use digital technologies (27). Active learning methods, compared to traditional and conventional ones, may enhance pleasant experiences in learning process and success (28, 29).

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In Iranian educational system, traditional methods of studying and learning are used, where speed-reading methods are not taught. More importantly, the combination of speed reading and comprehension through electronic reinforcement of the vocabulary indicates the novelty of the present study. This can be an important factor in motivating learners. In the current era, learners are exposed to sever amotivation due to lack of job opportunities which may negatively affect their zest to approach learning activities. Therefore, any factor that can motivate education and learning could be regarded as an important component. On the other hand, the ever-increasing volume of course materials owing to latest findings in each field, mainly presented in English language, can loom as a discouraging element. This dilemma could be mitigated through taking such measures as increasing vocabulary (30), creating variety in reading approach, learning reading comprehension skills and also the speed of reading (12). This is the reason why resorting to new electronic methods such as advanced speed-reading software packages and vocabulary reinforcement regarding the present-era learners' requirements seems inevitable (31). Studies have been conducted on employing technology in language teaching which have shown the effectiveness of tools and software packages in enhancing comprehension, increasing vocabulary and other language skills. Du Liang, for example, used a speed-reading software package to improve learners' reading skill and concluded that, compared to traditional methods, using digital technology increases learners' comprehension more effectively (32).

Tozcu and Quadi used computers to increase vocabulary knowledge, comprehension, and word-recognition capability, reporting that all three mentioned attributed witnessed a considerable rise once learners were taught privately by a tutor (30). Saeedi and Yousefi showed that there was a significant difference between learners who used computers to increase comprehension and those who did not. Therefore, they recommend the use of computers in curriculum development, teaching and language teacher training programs (33). Prior investigations suggest a positive effect of using computers on learning English, especially reading comprehension (13, 34) and reading speed (9,24,34,13). Although investigations have been conducted to assess language learners' perceptions of Computer Assisted Language Learning (CALL), some researchers believe that these investigations are still insufficient (9, 35).

AnkiDroid and ReaderAcer are two free-of-charge software packages that can be downloaded and installed through the Play Store or through the soft98.ir (36, 37). The first software package is for learning words using Leitner system, which provides words to the leaner in ready-made packages at regular intervals, and increases the learning of words and their memorization in the long run with systematic reviews. Because of using ready-made vocabulary packages, the learner is able to save a lot of time and energy which would otherwise be spent on looking each word up, writing their pronunciations, definition, etc. on paper flash cards. Instead, learners will spend their resources on learning and memorizing activities properly. Also, the feature of specific-distance tests of this software package makes it a very suitable tool for learning. The second software package is to increase reading speed. This software package enjoys a very interesting feature: different types of texts can be given to the software by which single, couple, triple or more words may be displayed on the screen with a pause of less or more than a second. This way, the reader does not have to move her or his body and eyes at different angles and, thus, the fatigue is prolonged. This software automatically gives learners a test and announces their scores, providing their reading speed based on their performance period.

Regarding the use of words in language learning, teachers should provide assignments that motivate learners; this can increase the learners' participation inside and outside the classroom, which is also increased by using computer systems that have a dynamic and participatory nature (37). Despite the widespread acceptance for these tools, there is still a need for further investigations in this area due to the relative infancy of computer use and advanced electronic tools in learning compared to traditional tools, such as books and other traditional paper tools (38). The present study helps to complete the study picture in the field of vocabulary teaching, comprehension, and speed reading by computers and electronic tools. The purpose of this study is to investigate the potentials of computer-designed courses in language learning from the perspective of lexical, speed reading and comprehension capabilities. Due to a paucity of investigations and in order to increase awareness about the impact of using computers and digital tools in education, the aim of this study is to

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determine the effect of extensive reading using AceReader and AnkiDroid software packages on undergraduate surgical technology students' reading speed, reading comprehension, and vocabulary in English.

In order to improve English reading skills, learners are to be trained, study materials and curriculum should be altered or adapted to make sure that the educational activities are compatible with learners, and the texts used are effective and in line with capacities and interests of learners. This investigation evaluates the effect of incremental extensive reading approach in improving the participants' English reading speed. Therefore, this is one of the research questions of this study.

Similarly, extensive reading by which fluency is intended requires a reasonable lexical knowledge. Since the new generation can identify well with computers and electronics in general, digital technology should be optimally employed in their education as well to make their learning as similar to and integrated with today's real environment as possible.

This investigation was a single-group pre-test post-test quasi-experimental study that was performed on the freshers for two semesters in 2016. The study sample was 23 undergraduate surgical technology students studying at Zanjan University of Medical Science. Convenience Sampling method was opted for due to the existing limitations. The present study was designed and conducted in two main phases of the first and second semesters, each in several separate steps of teaching vocabulary, speed reading training, extensive and intensive reading practices. The criterion for the learners' entry was having no participation experience in speed reading and vocabulary training courses, and the criterion for their exclusion was being at an advanced level of English language proficiency and having previous experience in the areas mentioned. Then, grammar, reading speed, and reading skills were measured respectively using Oxford Level Test, ReaderAcer software package, and Preliminary English Test. It turned out that none of the learners were at an advanced level. Individuals were categorized at the pre-intermediate level, according to which the texts presented were selected, prepared and provided.

In order to conduct the study, prior to embarking on the intervention, a comprehension test was administered on the learners without prior notice. This comprehension test was adapted from the international PET test for schools. Obtaining 50% of the score in this test is considered as a passing mark for an individual. The reliability of this test in the overall score is 0.93 and has an acceptable validity (23). The complete score in this test indicates the Pre-intermediate level. Then, their reading speeds were measured before the intervention using AceReader software package. In order to measure the learners' lexical resource, Vocabulary Size Test-1400 was used, which has been designed by Nation (6) and is available for free on the Lextutor website (20) for both teachers and learners.

As an intervention in this study, two software packages were used. The first software package was AnkiDroid. This software package was used in two areas of general and academic vocabulary items. During the first semester, the focus was on general vocabulary and the first sub-skill of speed reading, and during the second semester, the focus was on academic vocabulary and the second sub-skill of speed reading. This software package can be easily downloaded from the Play Store and installed on a variety of phones (36). Also, its Desktop version can be downloaded from the relevant website as well and installed on laptops and computers (37). This software package is designed based on the G5 method, or the spaced repetition test method in which each word is presented to familiarize the learner with it. If the person already knows the meaning of the presented word, the "very easy" button could be pressed to proceed to the next word without reviewing the word in the next four days. If the word is unfamiliar to learners, they may review the word and press the option "repeat in the next 10 minutes", or "repeat in the next 1 hour", and prepare themselves to learn better. The program is designed in a way that enables learners to transfer vocabulary from short-term memory to long-term memory in a well-planned process. One of the important points is the method's efficiency—learners do not need to write a card and spend time, energy and money to prepare paper flash cards, because all these are performed by the website providing the mentioned program. This program could also be manipulated by users so that they may add more cards to the card banks which are called "decks".

The second tool was ReaderAcer Software which serves two purposes. In addition to the ability of calculating the speed of the learner's word reading, it may also bring about vocabulary learning and reading speed enhancement. The mentioned software package

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may be downloaded for free from the relevant website (38). This software package can be fed by any type of PDF, TEXT and WORD file, and therefore exercises and tests can be done with any desirable genre. One of the important features of this software package is the adjustability of the word-display speed on the screen which is very useful in performing exercises and training the eyes to see and process words.

The participants were instructed by the researchers on the procedure of utilizing the software. Following Speed reading training conducted by the researchers and after providing necessary instructions, the exercises were conducted using this software package. The selected texts usually had different genres, but were graded texts (graded readers) and the level of texts was commensurate with the learners' English language proficiency level. A total of 15 minutes was devoted to this section of the lesson plan, during which the basic principles of speed reading and instructions on using word memorization software package were provided. For this purpose, ReaderAcer speed reading software package was utilized to perform controlled exercises. Since this software had the word-display-speed adjustability, users were able to perform their reading drills according to the specified speed. Because learners subconsciously tend to slow down their eye movement and have delays, separating their gaze from the previous word, and moving their gaze to the next word (called scoping) when practicing on physical paper sheets due to several reasons, their reading speed vacillates inevitably and usually declines over time. Employing the above-mentioned software package may help reduce this time and mitigate the problem.

In order to enhance learners' reading speed, the researchers planned their work based on guidelines pertaining to the augmented extensive reading design which has been introduced by Marmelstein (34, 39), approved by Mu (9). These guidelines are as follows:

- A high volume of readable texts is provided.
- Learners are given a placement exam to be classified based on their optimal levels. (learners' optimal reading levels are based on the intended learning objectives, i.e learners' reading speed, etc.)
- Learners experience longer and more balanced extensive reading time.
- Extensive reading time is reduced to 15 to 20 minutes per day.
- Fewer tasks are assigned to learners. Apart from sending a summary of what they have read orally to their instructor, learners do not have to do any additional homework relevant to their extensive reading.
- Learners are expected to read for 15 to 20 minutes each day only and out of class.
- Learners can choose any text from the materials of their respective level and leave out any text they find boring.

Through the present study, approximately a quarter of the total time of each session was devoted to the classroom intervention and learners were required to do assignments at home and report to the class representative and teacher. This two-semester program was part of the required subjects for learners and did not take any extra time from the learners to perform investigation. In order to increase learners' understanding, class was held in both Persian and English. Apart from two instructional protocols, both groups had similar curricula and syllabi. The difference between these two was applying the speed-reading training program utilizing ReaderAcer software package and word training program utilizing AnkiDroid software package. To learn basic vocabulary, a common list called New General Service List (NGSL) and a list of common scientific vocabulary named Academic Word List (AWL) were used. The learners were asked to be present in the classroom 20 minutes after the end of the sessions; 5 minutes were spent on speed reading instructions and 15 minutes on reading the texts provided in the speed-reading software package. No additional assignment on performing extensive reading was required. In addition, the learners concentrated on the introduced textbook and curriculum-related activities which included deliberate reading, performing grammar, vocabulary, and other exercises discussed in the book.

The books used for speed reading were prepared from two different sources called Oxford Bookworms and Penguin Classics (41, 40) which have been used by Mu in 2021 (9). These books are graded books that vary from levels 0 to 6. In total, 600 graded texts were available for the present study of which approximately 100 texts could be used at each level. These graded books had the lowest level of difficulty (9). Since certain words recur in each book in different sections and books, using these books in the research has the potential to improve the participants' vocabulary

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learning. Also, because these words are along with many words that the readers are already familiar with, they may enhance their vocabulary knowledge with lower efforts.

To conduct the study, the learners were taught in 42 sessions during which some materials were first presented in the conventional procedure specified by the Language Department of the university. During this process, English grammar rules were explicitly taught and some exercises were presented. 30 minutes was allotted to this activity. Subsequently, comprehension-related points were taught to the learners utilizing the book "Cover to Cover" level 1, a pre-intermediate reading comprehension book with appropriate words and structures. Teaching this book is part of the university's curriculum, which was conducted independently of the intervention of the present study in each English language course at the university where the study was conducted. During this section of the lesson plan, basic comprehension skills, consisting understanding the gist, the main idea, guessing unknown words from the context, as well as scanning, skimming, etc. were discussed. Not all the topics were discussed at each and every session; rather at least two sessions were allocated for each skill; for one session familiarization, and one for the reinforcement. This section was allotted a total of 35 to 45 minutes. Following the conventional program, the intervention would be launched using a computer set. 15 minutes were spent on sub-reading skill. These skills included enhancing the learners' visual field, eye movement speed, called scoping, (that was achieved by sweeping the eye through following the pencil's movement on the texts printed on A4 sheets and observing the words that were displayed on the video projector screen), and increasing the ability to analyze words and structures simultaneously. Five minutes were spent on reviewing and eliciting previously set words. All of the learners were required to make sentences with the specified words and perform the assigned speed reading exercises. In order to compensate for some of the drawbacks of various studies (e.g. 9 and 10), the learners were asked to submit compiled reports to the class representative and the teacher. The investigation process is shown in figure 1.

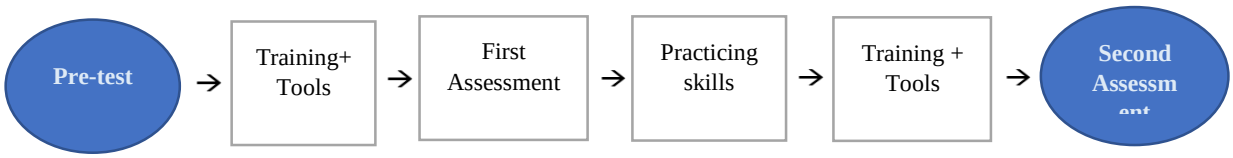


Fig. 1. Investigation process

The study commenced with an assessment (pre-test), without any prior notice to the learners. The study had two other assessments at the end of the first and second semesters to get a better picture of the learners' progress. The first test was followed by training and providing the necessary tools whereby the learners performed the assigned exercises. Necessary feedback was provided at the end of the first semester and the learners coordinated their performance according to the feedback. Training and practice also continued like the previous semester. After the third test which was administered at the end of the second semester, the results were collected and final analyses were conducted. SPSS software package (ver.26) was utilized for data analysis. Also, due to the small number of the samples (less than 30 people), non-parametric methods for data analysis were adopted. According to the mentioned cases, in order to compare the mean of the three tests performed, Friedman's test which is equivalent to non-parametric analysis of variance was used.

Friedman's test was utilized to evaluate the data obtained from reading speed, lexical knowledge and comprehension. The present study sought to find the effect of teaching methods of reading comprehension, reading speed and lexical resource utilizing computer. This means that the present study had three stages of testing in one group. Since there were three means, and the obtained data did not meet the required standards for using parametric statistical methods, Friedman test was utilized.

Ethical considerations were also considered in this study, and a letter was issued by the Vice President of Research Department of Zanjan Medical Sciences University. Also, since the training course pertained to required subjects, all of the learners attended the course. Before embarking on the study, the researchers obtained written consents from the learners. In order to

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show the study impact factor, instead of using the Effect size, the Kendall's W concordance coefficient formula was utilized. This coefficient deals with the agreement between the subjects and provides a digit between zero and 1. Digit 1 indicates that all subjects were ranked equally in all tests performed at different stages and are therefore fully consistent. Cohen's interpretive guidelines were utilized to interpret the figures obtained from the concordance coefficient (42).

Findings

Out of the 23 participating students, 13 were girls (56.5 %) and 10 were boys (43.5 %) (Table 1).

The results pertaining to reading and understanding the concepts, lexical resource and speed reading were presented respectively. According to the results of students' reading and comprehension skills analyses during the pre-test, the first post-test (the final exam of the first semester) and the second (the final exam of the second semester) were 10.65 (1±.17), 12.67 (1±.23), and 14.03 (1±.13), respectively. Examining the initial and final figures of the period showed an increase of about four points (Table 2).

Table 1. Demographic data on the learners

Gender	Number	Percentage
Female	13	56.5 %
Male	10	43.5%

Friedman's test was performed to compare the scores of the pre-test, first post-test, and second post-test. Test results showed a significant difference between scores (x^2 (2, n = 23) = 45.516, $p < 0.001$) (Table 2).

Table 2. The Mean, Standard Deviation, and Friedman's Test of the Pre-test, Post-test 1 and 2

Reading comprehension	Mean ± SD	Significance
Pre-test	10.65 ± 1.17	x^2= 45.51, $p < 0.0001$
1st Post-test	12.67 ± 1.23	
2nd Post-test	14.03 ± 1.13	
Reading speed	Mean ± SD	Significance
Pre-test	39.13 ± 3.91	x^2= 46.30, $p < 0.0001$
1st Post-test	50.12 ± 7.3	
2nd Post-test	59.21 ± 6.79	
Vocabulary knowledge	Mean ± SD	Significance
Pre-test	10.5 ± 1.23	x^2= 46.00, $p < 0.0001$
1st Post-test	12.73 ± 1.18	
2nd Post-test	15.17 ± 1.55	

To pinpoint the exact area of the significant differences, after Bonferroni adjustment, the Don-Bonferroni test was utilized, which is a better alternative than the original Wilcoxon pair test because it is more conservative and stricter. For this purpose, the results obtained in the comparative significance column should be considered. The results indicated that there was a significant difference between all three compared pairs, that is, between the first pre-test and post-test, the second pre-test and post-test, and the first and the second post-test (p=0/001).

Regarding the learners' vocabulary knowledge, Table 4 indicates that the mean increased from 10.5 at the beginning of the course to 12.73 at the end of the first semester and 15.17 at the end of the second semester.

Comparing the figures of the pre-test and post-test mean indicates an increase of approximately four and a half points (Table 2). Friedman's test was utilized for the test of the significance of means differences in lexical resources. Friedman's results indicated that there was a significant difference in the learners' lexical knowledge scores in all three time periods (x^2= 46.00, $p < 0.001$). Kendall concordance coefficient (0.93) was also high.

To find the location of significant difference, Don-Bonferroni's test was utilized. The obtained results in the comparative significance column indicated that there was a significant difference in all three pairs of compared groups.

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The last variable being measured was the learners' reading speed, which grew from an average of 39 words per minute (WPM) at the beginning of the course to 50 words at the end of the first semester and 59 WPM at the end of the second semester (Table 2).

Examining the figures of the learners' reading speed during the pre-test, the first and second post-test at the beginning and the end of course, indicates an increase of about 20 words (Table 2).

Friedman's test was utilized for the test of the significance of means differences in lexical resource. Friedman's results indicated that there was a significant difference in the scores of the learners' lexical knowledge in all three time periods ($x^2 = 46.30$, $p < 0.001$). Kendall concordance coefficient (0.91) was also high.

To find the location of significant difference, Don-Bonferroni's test was utilized. The obtained results of the comparative significance column indicated that there was a significant difference in all three pairs of compared groups.

Discussion

Examining the data indicated that the reading speed scores improved from about 39 words to 59 words per minute, that is, an increase of about 50% in a very limited time (less than 15 hours) being spent on the activity itself over a school year. This increase is statistically significant, but according to the information available on the learners' reading speed in English in countries such as the United States, it is regarded among the medium to poor performances (22). The learners' lexical resource also increased from about 1000 words to 3000 words. This rise was slightly more than 3 points on the comprehension test. All these increases indicated a statistically significant difference in the intended sections and the effect size obtained for each test was an indicator of a very high figure.

The learners' reading speed increased significantly after the completion of the course. The results of the present study were consistent with the results of other studies (30, 43, 44 and 45). The learners' lexical resource also increased from about 1000 words to 3000 words, which was consistent with the findings of some studies (30). Their comprehension also increased significantly at the end of course. This increase was more significant especially between the second and third tests. Augmented comprehension was also observed in other studies where software packages had been used (30, 43, 44 and 45). However, the investigation performed by Bhatti (7) did not indicate the definitive superiority of CALL in improving ninth-grade students' comprehension. This contradiction might be attributed to the usage of different software packages, creating motivation and interest amongst learners, or the age of the participants in the present study. The participants in the Bhatti's study were in the ninth grade, but the participants in this study were adults who fully understood the seriousness of the sessions and made attempts to discharge their duties and assignments with remarkable commitment.

In the study conducted by Sierra and Lazagabaster (46) in 2003, the learners considered software packages as an educational supplement. In another study conducted by Hamd (45) in 2006, where both traditional and computer methods were utilized, the results of evaluating the learners' achievements level showed different results. The learners commented that physical sessions were better than on-line sessions, which can be attributed to the culture, type of curriculum, learners' mentality, teachers' mentality and their knowledge about utilizing computers in education, and even the low consistency of the usage of computers in education with other parts of curriculum planning (45).

The aim of this study was to investigate the effect of a one-year extensive reading program utilizing software packages on surgical technologist learners' reading speed, lexical resource, and comprehension. This program was implemented in two semesters and in 42 sessions. In addition to the usual class schedule, the learners received a number of additional interventions. The obtained results indicated that the learners' reading speed, vocabulary and comprehension improved significantly. On average, the learners' reading speed increased from 39 words per minute at the beginning of the course to 59. The highest increase (an average of 11 words per minute) occurred in the first semester and in the second semester, 9 words were added to the group's average reading speed. Perhaps this slight difference in increasing reading speed is the increase in the level of materials in the second semester. But over the same time, the learners' lexical resource increased as well. According to some studies (47), this makes it more difficult to explain the learners' negligible reading speed rise. The results of increasing the reading speed of the present study are in line with Mo's findings but the growth rate of the current study is much higher than the growth rate reported in Mo's study. Another reason

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for this discrepancy may be the age difference between the samples of the present study and the participants of Mo's study. Another reason for this remarkable difference could be the learners' concentration and voluntary exercises of the present study. Being mature, raising competition sense, speeding up the brain processes, and being cognizant of the necessity of speed reading amongst the learners of the present research could be the reasons for this difference. Additionally, the older age of the participants in the current study might have helped learners control their performance anxiety and improve their performance. It might be frustrating to witness an increase of only 20 words in a year. It could be said that this finding is both encouraging and discouraging. This is encouraging because the intervention of this study increased the learner's reading speed by about 50% during one year. If this increase of 50% is maintained annually, the reading speed of these students will reach over 200 words per minute by the end of their academic program. Of course, this will be the case if this program is implemented in a codified and continuous manner.

The discouraging facet of increasing the reading speed amongst the learners is that the mean reading speed of the learners in different countries is over 200 words per minute. For instance, Americans reach speed of over 350 words per minute after their first year of college. Therefore, the above-mentioned significant increase (in case of being tracked by country's educational system during 4 years of learners' training), might cover only part of the above-mentioned weakness and the profound gap between the reading speed of Iranian learners and learners of other countries. This fact underscores an urgent need of speed reading program inclusion in the freshmen's curriculum. The researchers of the current study also agree with Mo in that if the effect of the intervention becomes a permanent effect on learners and in case they can maintain improving this ability constantly, the effects will be incredible within a few years. The obtained speed reading rate would serve as a priceless edge against peers in the fittest-seeking market.

In terms of comprehension, the learner's grades increased significantly. In Iran, learners must take a comprehensive national entrance exam to be admitted into Master's and PhD programs. One of the test subjects, which is one of the most crucial components determining the success of candidates, is a good command of English. The components of the test include grammar, vocabulary and reading comprehension, implemented as a speed test. Therefore, the current program, contrary to Mo's research plan, presented comprehension questions immediately after the reading with the perspective of preparing the learners for important tests.

In many English classes in Iran held in scientific settings, the main focus is on grammar (48) and rarely on vocabulary and learners' reading abilities. English is the medium of communication between people active in the field of science in this country and the outside world (49) and most of Iranians' need for English is summed up in their ability to read well and write effectively, the most important elements of which are grammar and vocabulary. Although reading skills are sometimes emphasized (49), reading speed is almost neglected. English language learners in academic sittings in Iran are cognizant of their deficiency in advanced reading skills and this has influenced their language learning negatively, even having the potential of rendering them demotivated. Too often, learners have a very limited vocabulary resource that makes them feel serious shortcomings concerning comprehension while doing reading and comprehension activities, and practically unable to benefit from the classroom which is actually designed for their benefits and use. The unfortunate event which takes place in the English language learning settings at Iranian universities is that whenever the students come across a word unfamiliar in English text, they stop reading and look it up in a dictionary, and after finding the meaning, it is written right above or below the relevant word in the book. This method takes a lot of time and makes learners bored. The feeling of high procrastination in improving reading skill due to the lack of lexical knowledge is one of the problems faced by most learners. Despite explicit reference to this point about 40 years ago, English teachers in Iran still entangle their learners in a vicious circle (9). The scenario is that slow reading occurs due to looking up every single unfamiliar word which slows down reading. As a result, learners are not exposed to a vast volume of intelligible input, and the next time of reading, they encounter other unfamiliar words and return to the same starting point (50). This problem can be overcome by determining the level of learners at the beginning of the program and providing texts appropriate to their English language level during the augmented extensive reading program.

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The results of the current study suggest positive effects of using augmented extensive reading program and utilizing software packages on improving their lexical resource. Then again, it should be born in mind that this study was a single-group-design study, imposing certain limitations in terms of generalizing the findings. Besides, most English language classes in Iran are traditional and teacher-centered. Consequently, the positive results obtained in this study might be attributed to some extent to augmented extensive reading program implementation and the use of software package to increase vocabulary knowledge. Similarly, having the right to choose texts may have a positive effect on learners' progress because acting according to interest has a positive effect on performance (e.g. 10 and 14) for it can make the task of reading attractive and fun (9).

Regardless of achieving valuable results, this study had some restrictions in the intervention section. Implementing such a course plan in crowded classrooms is challenging, and coordination with learners is time-consuming and laborious. Its implementation requires considerable diligence and patience on the side of teachers, which could be discharged only with their accountability and professional commitment. Additionally, the study was without a control group, which made it impossible to make a comparison between the control group and the experimental group. In the field of education, in order to raise the quality level and motivation for further investigations in educational studies, special courses on learning techniques could be held, during which, courses of speed reading and increasing the lexical resource could be implemented.

Conclusion

Computers have become a reality in learning foreign languages, because by having multimedia capability, in addition to providing text, sound, image, video, etc., they have made learning interactive, endued variety and freshness to the learning environment, and helped instructors teach different skills to language learners. However, analogous to almost any aspect of technology, they come at a cost. As computers become more widespread, they are deemed to be taken into classrooms and to be utilized more than ever. It is suggested that the same study be performed in English for special purposes (ESP) courses at two levels; upper-intermediate and advanced. Examining the difference between the two traditional methods and usage of computers on the speed, quality and breadth of vocabulary learning, reading comprehension and speed of male and female learners also seems remarkable.

Conflict of Interest

The researchers had no conflict of interests at any of the stages of the study.

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