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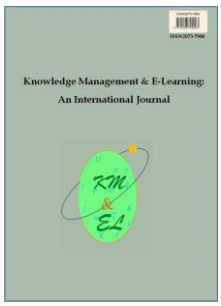

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Investigating the effectiveness of blended learning in reading proficiency: Evidence from intermediate EFL learners

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Abstract: As an alternative solution to solve different reading comprehension problems in learning English as a foreign language (EFL), it is necessary to implement a blended learning model that combines both online and face-to-face (f2f) teaching modes. This study aimed at investigating the impact of blended learning on Iranian intermediate EFL learners' reading proficiency. Sixty EFL learners were chosen based on their performance on Oxford Placement Test. Then, they were divided into two groups (an experimental and a control group). The experimental group received reading materials through blending learning techniques and the control group received training in the traditional way. During treatment, the teacher designed and assigned activities for students to read the text effectively and reinforce their comprehension. The activities were designed to teach reading like scanning, skimming, and reading for accurate comprehension. Afterward, both groups participated in the reading post-test at the end of the study. The results showed that the experimental group outperformed the control group in the post-test of reading comprehension and the intra-group progress was higher for the experimental group than the control group.

Keywords: Blended learning; Reading proficiency; EFL

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1. Introduction

Many researchers consider reading to be an essential skill for academic success in any field (Johnson & Giorgis, 2002). Carrell et al. (1988) describe reading as the most important language skill in learning English as a Second Language (ESL) or English as a Foreign Language (EFL). Reading is an important source of comprehensible input and plays an important role in understanding a written message accurately and effectively. It is vital for teachers to use effective methods of teaching that enhance students' ability to understand ideas and feelings through reading.

According to Bolandifar (2017), the development of information and communication technology (ICT) in language teaching has led to the design and implementation of new methods in the teaching and learning process. Using traditional face-to-face (f2f) forms of learning or teaching cannot meet the needs of the ICT age. Traditional f2f classes are replaced by levels of computer-assisted instruction, making it a trend in EFL/ESL classes. Recent research indicates that technology is useful in language teaching and learning, because it creates real contexts, provides language information, and facilitates the learning of four language skills (Bataineh & Bani Hani, 2011; Bataineh & Mayyas, 2017; Blake, 2013; Stanley, 2013). Picciano and Dziuban (2007) assert that when we integrate f2f classes with online computer activities, we conduct our class with a technique called blended learning.

Motivated by the need to create engaging learning environments, new technologies in language teaching are being introduced. This process leads to the emergence of a new learning environment called blended learning (Sharma & Barrett, 2007). Blended learning (BL) involves combining f2f learning using technology applications.

One important reason for using BL is to improve learners' motivation and persuade them to take a more active rather than passive approach to learning, which is difficult in large classrooms. Many students are less prepared and less willing to attend class. They sit passively and wait for information when asking for information. In this difficult situation (lack of space and time, lack of motivation to learn, and lack of learning opportunities), blended learning can a solution to the test (Sabah, 2018). Another important advantage of using a blended approach is overcoming the space and time constraints imposed by the classroom environment. Because of the time constraints in f2f learning, learners do not have enough time to think about a specific learning part. Learners should be given many opportunities to participate in the reading process. This is hardly performed in language classes. On the other hand, due to space constraints, learners receive restricted chances to get feedback from their teachers and peers. Due to space and time constraints and teachers' complaints about students' poor progress in tests and exams, it makes sense to implement BL in the teaching process (Hilliard, 2015).

While some studies (Behjat et al., 2012; Kheirzadeh & Birgani, 2018) have been conducted to examine the impact of BL on different language skills, a comprehensive study has not been conducted to investigate the impact of BL on Iranian intermediate learners at the language institute level. Reading skills can be improved by using effective instructions such as BL. For this reason, the present study tried to indicate the effectiveness of BL in improving the reading comprehension of Iranian intermediate EFL learners. It is worth noting that the intermediate-level teaching method has been neglected. In this regard,

comprehension problems among intermediate learners are a constant concern. Because comprehension is so closely linked to achievement, the gap in achievement among students can be bridged when the gap in reading skills is bridged. Researchers believe that the problem of the present study is due to the low success of students in reading skills in achievement tests, lack of motivation, and poor participation in the classroom.

Although our students have good access to modern technologies, they do not use them in learning English in general and reading skills in particular. Hence, it is important to use a blended learning program to develop students' reading skills as a proposed solution, where the use of various multimedia can help students apply reading skills to daily reading tasks that may help students to become more effective communicators through reading. The mentioned gap encouraged researchers to conduct the study. Regarding the problems mentioned above and the novelty of BL in Iranian educational education, it is worthwhile to test the new concept in terms of its effectiveness in improving Iranian learners' reading proficiency. Therefore, the purpose of the present study is to investigate the effect of BL on the reading proficiency of Iranian learners.

1.1. The significance of this study

This research emphasizes using blended learning as a useful tool to improve Iranian intermediate EFL learners in reading proficiency. Newly developed technology in language teaching and learning provides new teaching techniques in an educational setting. The findings of the present study will make contributions to the field of Computer-Assisted Language Learning (CALL), Teaching English as a Foreign Language (TEFL), and the area of blended language learning.

English language teachers may take advantage of the results from this study, which can make them aware of the blended method of teaching. By using the blended learning method in their teaching process, they can have a noticeable improvement in their students' reading comprehension skills. Through the implementation of a blended method of learning, teachers can provide their learners with more student-centered learning in which they can easily think and discuss, which helps students to have control of their reading process as independent learners and to control their own reading time (Fakhir, 2015). Furthermore, by improving learners reading skills through the blended learning method, they will have positive views toward the learning environment. In addition, educators can develop effective instructional methodologies with great certainty.

1.2. Research question

This research attempts to investigate the effect of blended learning on Iranian intermediate learners' reading proficiency. To meet the objectives of this study, the following research question was addressed:

- Does blended learning have any effect on Iranian intermediate EFL learners' reading proficiency?

1.3. Research hypothesis

To fulfill the goals of the present study through the above-mentioned research question, the following null hypothesis was considered:

H1: Blended learning does not have any effect on Iranian intermediate EFL learners' reading proficiency.

2. Literature review

2.1. Theoretical framework

Blended learning is based on John Dewey's progressivist theory of the language learner (Dewey, 1910). The progressivist theo1ry stated that the teacher should be the mentor, but learners should be more independent in the classroom, have a voice in their learning, and manage their time. Teachers who initiate this release of control in a blended learning classroom give more responsibility to students who begin the tasks of thinking, goal setting, and decision-making about their learning (Tiedemann, 2020).

Vygotsky's (1978) beliefs about the importance of social interactions that occur during guided learning also support blended learning. Teachers who implement the blended learning approach find that this kind of classroom environment allows for different learning rates and different amounts of help as learners learn. The teamwork needed to make blended learning more effective and the relationship that learners build while working on problems with classmates is essential to the long-term success of learner interactions and the quality of their learning (Tucker, 2012).

Vygotsky's (1978) constructivist theory is also the basis of blended learning instruction. Learner-centered learning in a blended learning classroom is based on constructivism as a learning theory, based on the notion that learners need to construct and reconstruct knowledge to learn effectively, that learning is more effective when the learner experiences constructing a meaningful product (Attard et al., 2010). Blended learning is a combination of f2f learning, social interactions with peers, and online learning. During these different activities, learners are provided with material and opportunities to develop their understanding (Tiedemann, 2020).

2.2. Blended learning

Technological tools are considered as a valuable complement to support reading skills (Cheung & Slavin, 2012; MacArthur et al., 2001). With the rise of cost-effective new technologies, along with reduced educational budgets, teacher shortages, and a focus on learners' development, the BL concept has received more attention in language learning (Staker & Horn, 2012). Instead of focusing just on the impact of teacher-led instruction or technology-based intervention programs, BL is an innovative method that combines student-centered online with teacher-led offline instruction and reveals a fundamental change in language classes (Staker, 2011). BL is an independent activity that cannot be provided in a traditional classroom without technology support (Johnson et al., 2010).

BL approach to foreign teaching language has become a significant issue for language teachers around the world. BL reinforces traditional f2f teaching and learning environment with various types of technology-based teaching (Tosun, 2015). There is an urgent need to create a new method that shows the current learning needs of learners and keeps up with the evolution of technology. It is the teacher's responsibility to figure out how to use different technological resources and to direct their use towards a more educational orientation. Alongside these perspectives, BL is emerging in educational

environments as a new good learning guide. The main reason for the importance of this approach is that it has a philosophy that doesn't aim to completely replace traditional f2f and e-learning, but to complement or overcome some of their shortcomings (Sabah, 2018).

Blended learning is defined as combining f2f instruction with online learning. Learners have flexibility in accessing digital tools in different places and times, and teachers can use online activities to adapt their instruction to the needs of students (Macaruso et al., 2020; Pytash & O'Byrne, 2018). BL enables communication among learners and between learners and teachers. Effective integration of traditional classroom teaching with e-learning supports cooperative learning among learners (Geng et al., 2019; Vanslambrouck et al., 2018). BL using digital technology and teacher-centered training provides an opportunity for learners to experience individual learning (Geng et al., 2019; Horn & Staker, 2011). In a blended learning method, learners spend their time working independently with online activities and receive training tailored to their level (Horn & Staker, 2011).

Despite the positive impacts of using blended learning on learning and teaching language skills, its usage has challenges for teachers and learners. The first challenge for learners' participation in the online part of the course is to see more value in f2f sessions (Lopez-Perez et al., 2011; Shand & Farrelly, 2018). This was supported by the findings of Jeffrey et al., (2014), which indicate that there is more value in the f2f part of a blended course, and teachers prefer it to the online part. The second challenge is the long time it takes to learn new technology tools, the lack of support for learning their vital functions, and the discomfort of understanding and implementing effective online learning (Mozelius & Rydell, 2017). The third challenge is the complexity of the work, where students are expected to be disciplined in their online activities and to grapple with technology issues (Gedik et al., 2012).

2.3. Description of Touchstone

Touchstone is a four-level suite for adults and young adults that take students from elementary to intermediate levels. Touchstone delivers natural language in authentic contexts and develops conversational strategies to help learners speak fluently and confidently. While Touchstone is easy and enjoyable to learn, it offers a new way to teach and learn English. Touchstone teaches grammar, vocabulary, and conversation strategies that students require to communicate fluently and successfully. Its unique curriculum provides precise pronunciation, listening, reading, and writing activities. Using Touchstone, teachers and students are taught lessons from personal and learner-centered interaction and the development of learning strategies that they can use beyond their classrooms (McCarthy et al., 2014).

2.4. Goals of Touchstone

Touchstone integrates the best features of familiar communication techniques while providing exciting activities designed to focus on the learning process. The important goal of learning in each lesson is to motivate learners to talk to each other. This emphasis on spoken interaction helps students use language in communication with their classmates. Additionally, Touchstone is a complete lesson in each section teaching conversation strategies so that learners can learn the skills needed to communicate effectively. Touchstone presents attractive activities that persuade students to talk about their ideas

while discussing topics related to their interests and experiences. Students do activities that involve them in the learning process. Students are challenged to discover grammatical structures or English usage. Solving a problem or understanding something is a great help to comprehension. Tasks that help students understand things lead to successful learning (McCarthy et al., 2014).

Through the audio CD/CD-ROM in each Student's Book, learners can improve their speaking and listening skills work at their own pace. The CD-ROM involves a database called My vocabulary notebook, which permits learners to sort vocabulary in various ways, print word lists for different objectives, and add their own words, phrases, and sentences. Touchstone is used with large and small classes. Depending on your particular needs, the activities can be done in pairs, in groups, or as a whole class. Touchstone is compatible for different course lengths. For shorter courses, the Vocabulary notebook pages and Reading and Writing tasks are assigned for homework. For longer courses, the Workbook provides extra learning activities (McCarthy et al., 2014).

2.4. Previous studies on using blended learning in reading proficiency

Investigating the effect of blended learning on learners' reading skills is more crucial because of its rapid acceptance in higher education. Studies evaluating the differential effectiveness of teaching-learning methods have shown that the blended learning model has better results in higher education than either the online-only methods (Bicen et al., 2014) or traditional classroom learning (Bernard et al., 2014). Thus, we have seen a growing trend in the use of blended learning in teacher training programs (Emelyanova & Voronina, 2017; Garone et al., 2022; Martín-Martínez et al., 2020; Paniagua et al., 2017).

Many researchers have examined its impact from several views finding mixed results, although positive effects have been widely recognized in these cases. A number of empirical studies on BL have been conducted with various outcomes that help to better understand its nature. Literature has shown that BL can have a profound effect on learners in a variety of ways. Al-Jarf (2007) stated that the use of BL will increase the reading performance of good and average students and the lowest performance of students. Barragán (2009) acknowledged that blended course reduces time pressure during the learning and teaching process and creates learning independence for learners. Moreover, Akhras (2011) maintained BL promotes student-centered learning and enhances student interaction. Online collaboration allows learners to experiment with technology and develop their technical skills.

Soliman (2014) conducted a study on using e-learning as a BL tool to develop learner's language skills and enable their independent learning. The results showed that BL is an essential instrument that should be used to supplement traditional classroom lessons, improve learners' language skills, and promote independent learning. Djiwandono (2018) asserted that BL opens up opportunities for learners to increase communication between them, thus promising potential persuasion. As a consequence, it is assumed that (1) learners who trained in BL have a higher ability to read English than those taught in the traditional method; (2) learners who are taught by BL have more success in learning vocabulary than those who are taught by conventional methods; (3) learners trained in BL have a broader collaboration than those taught in the traditional way.

McKenzie (2011) investigated the role of BL in learners' reading performance. The results of the study indicated that BL has an impact on increasing learners' reading scores.

The effect of BL on reading comprehension was investigated by Behjat et al. (2012). Students in the control group read printed texts outside the classroom, while experimental group participants were asked to visit the blog after class to find their reading assignments. They found that reading materials on electronic tools like wikis encourage reading as they have links and are editable, and learners can access them by just clicking on a phrase or a typed phrase to enter a new web page, thus they have access to more readable resources. It was inferred that reading, regardless of what is presented in the classroom, encourages learners' independence to read more.

Madineh et al. (2013) investigated the impact of e-learning tasks on Iranian EFL learners' reading comprehension skills. Forty learners were divided into experimental and control groups, each group consisting of 20 learners. A reading comprehension test was performed for both groups as a pre-test to assess their basic knowledge of listening comprehension. The reading section of the TOEFL test was selected to test participants' reading abilities. Findings represented that e-learning has a positive impact on the reading comprehension skill of Iranian EFL learners.

Tosun (2015) examined the impact of BL on the vocabulary achievements of 20 college students. Compared to another group receiving traditional vocabulary teaching, the experimental group did not achieve higher scores in the post-vocabulary test. The results demonstrated that BL did not have a significant effect on their vocabulary learning. Ghazizadeh and Fatemipour (2017) investigated the impact of BL on Iranian EFL learners' reading proficiency. Sixty Iranian intermediate EFL learners participated in this study and were randomly assigned to two groups. The control group received traditional classroom teaching in General English, whereas the experimental group received blended instruction in reading skills. The results revealed that BL has a statistically positive and significant impact on the reading skills of Iranian EFL learners.

Kheirzadeh and Birgani (2018) explored the effectiveness of BL in improving reading comprehension among Iranian EFL students. Sixty EFL students were divided into experimental and control groups of 30 students. The experimental group received reading passages from the "Selected Readings" book. For the control group, the passages were taught based on traditional teaching methods, and materials, instructions, and feedback were presented based on the "Selected Readings" book. Findings showed that blended learning has a positive effect on reading comprehension. Macaruso et al. (2019) found that low SES background students made significant reading gains when using a fully-blended learning program. Students could reap the benefits each year as teachers became proficient in implementation.

Macaruso et al. (2020) evaluated the impacts of blended learning for elementary students through fifth grade in a charter school network. Principals at three schools decided to adopt a blended learning program during the 2016-2017 school year. There were 2217 students in treatment schools. Treatment students were compared with 1504 students in three control schools where the standard form of instruction was maintained. Before the implementation of blended learning, treatment students performed significantly lower than control students on a standardized reading test. At the end of the school year, treatment students showed more progress in the reading test than control students and the group differences disappeared. The results also represented that reading achievement was similar across grades and ethnic groups.

Yudhana (2021) investigated the impact of a blended learning approach to develop undergraduate students' reading skills. The participants were 60 Thai students who were

divided into experimental and control groups. The post-test of each group was used as the main method of collecting the data, and the *t*-test was used to examine the differences between the post-test scores. Statistically significant differences (t = 32.098; sig = .000) for effect size were analyzed using a Cohen'd test. The results showed that the effect size is significant (Cohen's d = 3.937). The results also displayed that the implementation of blended learning can significantly improve English reading skills in undergraduate EFL students.

Zhao (2022) examined the cognition of blended learning and made a questionnaire survey and interviews with students and teachers from 10 universities and colleges in Anhui Province. The researcher designed a Rain blended classroom learning model that uses modern network technology and mobile terminals to link pre-class and after-class learning to classroom instruction through the use of the WeChat terminal. A quasi-experiment was performed between two groups of students. The results revealed that students have more interest in and accept blended learning, but the various online resources and excessive interference information have a negative effect on students' participation behavior in online learning. The results also showed that perceived ease of use, perceived usefulness, and learning environment are significant factors that influence the acceptance of blended learning by learners.

A review of the literature indicated that a great deal of research has examined the effect of BL on learners' language skills (Ghazizadeh & Fatemipour, 2017; Kheirzadeh & Birgani, 2018; McKenzie, 2011; Sardegna & McGregor, 2013; Tosun, 2015). However, to the best of researchers' knowledge, little research has been carried out on the impact of BL on EFL learners' reading comprehension at the language institute level. It is hoped that the findings of this study will help to investigate the impact of BL on EFL learning in Iranian language institutes. Reviewing the work of previous researchers, the authors of this study came to the conclusion that the blended method of teaching can be useful if it is implemented systematically with sufficient time. As seen in previous research on the two concepts of blended learning and reading proficiency, few works have been done on the effect of BL on the reading comprehension skills of Iranian intermediate EFL learners. As a result, this study was conducted to investigate this area with the aim of filling this gap.

3. Methods

3.1. Research design

The researchers adopted a quasi-experimental, pretest-posttest control group research design. The reason for choosing such a design was that it was not desirable to randomly assign treatments individually to participants. According to Shadish et al. (2002), the randomization of samples is suitable for fully-experimental designs in which samples are randomly chosen for control and experimental groups. Therefore, the researchers considered one class as the experimental group (30 learners) and the other class as the control group (30 learners).

3.2. Participants

The statistical population of this study included 90 female intermediate-level students enrolled in two language institutes in Urmia, Iran. In order to homogenize the participants,

the Oxford Placement Test (OPT) was administered and 60 intermediate students were selected as the main participants of the study. The researchers chose the participants based on the convenience non-random sampling method. They were assigned into experimental and control groups. Participants were female, aged between 15 to 18 years, and they were all native Persians. It was not possible to divide learners randomly into experimental and control groups. Consequently, one class was considered as the experimental group and another as the control group. All participants were native Persian speakers with the minimum opportunity to communicate with native English speakers.

3.3. Instruments

In order to determine two homogenous groups and conduct this research, a number of instruments were used to put the research into action.

3.3.1. Oxford Placement Test

The first instrument of this study was OPT. OPT was administered to 90 EFL students to determine the level of language proficiency and ensure the homogeneity of the participants. It was used to assess students' knowledge of grammar, vocabulary, reading, and writing. The test contained 50 multiple-choice questions that assessed students' knowledge of grammar and vocabulary from elementary to intermediate levels, a reading text with 10 graded comprehension questions (five true-false and five multiple-choice items), and a writing task that assessed students' ability to produce language. The researchers used this instrument to collect information about students' proficiency.

3.3.2. Pre-test

The second instrument was a pre-test reading. Touchstone 4 reading section was used to achieve students' reading comprehension. The Preliminary English Test (PET) is designed to demonstrate an authentic language in which students must use their receptive and productive skills for communicative situations. It assesses four language skills involving reading, writing, listening, and speaking. It is a standardized test developed by Cambridge ESOL test and the test analysis indicated the test is functionally reliable and valid. The reading section measures students' ability to comprehend various factual and descriptive texts and passages. Students are evaluated on how they can realize the main idea, main points, important facts and details, and vocabulary in context. Students are assessed to see if they can deduce what is a text and can combine information from longer texts or various parts of the text. Students answered the test individually for almost 40 minutes, after which their copies were gathered for analysis. Then, as a treatment, the students in the experimental group received reading materials based on the principles of blended learning, and students in the control group were exposed to reading the text based on the traditional method. The reliability of the pre-test was calculated through a pilot study and it was met according to the Cronbach Alpha formula as $r = .79$. In addition, two Associate Professors of Teaching English as a Foreign Language (TEFL) confirmed the validity of the pre-test.

3.3.3. Post-test

The third instrument of this study was a post-test reading. The researchers distributed the Touchstone 4 reading section to students to assess their reading comprehension after

treatment and to measure the impact of utilizing blended learning techniques on their reading comprehension. It was also found that this test is reliable and valid in terms of its functionality. The reliability of the post-test was calculated through the Cronbach Alpha formula as (r = .80). Additionally, two Associate Professors of TEFL confirmed the validity of the post-test.

3.4. Data collection

3.4.1. Pilot study

Prior to the main research, the researchers conducted a pilot study to examine the internal consistency and reliability of the reading instrument. The test was distributed among 37 EFL students who were chosen by random sampling method to show the total sample of participants selected for the main research. The reliability coefficient of the test was calculated through the reliability of KR-21 equal to 0.82, which showed that the test had a reliable index of reading ability. The validity of the instrument was also evaluated by two Associate Professors of Teaching English as a Foreign Language (TEFL). They confirmed the validity of the test.

3.4.2. Main study

This research involved three main parts: (1) pre-test, (2) training in blended learning, and (3) post-test. After the OPT, both groups were given a reading test as a pre-test to evaluate their reading comprehension ability. In the second stage, the control group did not receive any blended learning instruction, but only received reading instruction without the mediation of blended learning. The experimental group participated in a weekly study session at the Audio-Visual Center of the Language Institute for twelve-week sessions. During the treatment sessions, the students in the experimental group received instruction in the form of blended learning. The activities in the treatment sessions are as follows:

Pre-reading activities. This was the first step in the teaching process, aimed at activating students' background knowledge, stimulating their interest in reading the text, making predictions about the subject, and creating vocabulary. The aim was to provide students with an opportunity to activate their existing knowledge and use their imagination to predict. This was a preparation phase, and the activities in this stage helped students engage in purposeful active interaction, which enhanced their motivation to read texts. Students were persuaded and prepared for the reading activity, and when they read the text carefully, they learned more about it.

During-reading activities. During this stage, the teacher designed and assigned activities for students to read the text effectively and reinforce their comprehension. The activities were designed to teach students' reading skills to students like scanning, skimming, and reading for accurate comprehension. Many reading activities were suggested to the class such as reading for specific information, reading for the main points of the text, inferring the meanings of words from a particular text, and identifying the author's purpose to the class.

Post-reading activities. The purpose of post-reading activities was for learners to practice communicative outputs. These activities provided communicative opportunities for students to use language communicatively in a real-life situation. Group work made

reading more relevant and placed students at the center of activities as active readers in reading activities. The teacher acted as an organizer, a facilitator, and a mentor. Every session consisted of 50 minutes of reading activities combined with blended learning, followed by twenty minutes of explanation in groups of four or five at the end of every session. The teacher provided students with a variety of resources like online magazines, news podcasts, online vocabulary, multimedia software, and synchronous/asynchronous electronic communications, and helped solve technical problems such as software installation if necessary. In each session, students selected whatever they liked to work on.

Reading techniques were taught to both groups based on textbook reading activities (Touchstone 4 by McCarthy et al. (2014)). The experimental group, however, received additional training in BL. After the lesson, the teacher posted a blog online that included parallel reading comprehension, testing learners' comprehension using the following techniques: Answering questions, summarizing, expressing reactions, matching concepts from the text, making predictions, generating questions, and finding the roots of words.

The experimental group performed reading tasks online and out of class. Topics related to online reading were matched with the topics presented in the course book and the control group reading comprehension exercises. Learners were asked to discuss relevant topics online, or to comment on topics for asynchronous interaction online. Students shared their ideas in a briefing session, and emailed their learning memories, with opinions on different parts of their learning like the content they learned, how they learned it, what specific software they applied, and a self-evaluation of their progress compared to previous sessions. At the end of the training course, the same reading comprehension pretest was administered as a posttest for both groups.

3.5. Data analysis

Raw data were collected and sent to SPSS 26.0 for statistical analysis. First, descriptive statistics (such as mean, standard deviation, kurtosis, skewness, and frequency) are needed to show general information about OPT, pre-test, and post-test scores. The study participants were randomly divided into two groups and an independent sample *t*-test was performed to show that there was no significant difference between learners in terms of reading proficiency at the beginning of the study. Another independent sample *t*-test was performed between their scores in the post-test.

4. Results

In this section, based on the research hypothesis, its rejection or confirmation was clarified. This clarification happens through the detailed data of the study results that are provided. Initiation of the present study hypothesis required that the data be analyzed and descriptive and inferential statistical methods are used to show the variance between the mean scores of the pre-test and post-test. Descriptive statistics will be practically the same as the criteria of the average trend coverage and inferential statistics will be used to calculate the *t*-test. To homogenize participants, the researchers administered OPT to 90 EFL learners. The results obtained in OPT are given in Table 1. According to Table 1, the mean, median, and mode of OPT scores are 34, 33, and 35, respectively. These central parameters are close to each other and indicate that OPT scores are usually distributed around the mean.

Table 1
Descriptive statistics for OPT

N	Mean	Median	Mode	SD	Skewness ratio	Kurtosis ratio
90	34	33	35	1.89	– .417	– 1.129

According to the results of OPT, 60 learners whose scores were one standard deviation plus and minus the mean (34) were chosen as the participants for the main study. Besides, according to Table 1, the ratios of Skewness and kurtosis relative to their respective standard errors are not beyond the range of ± 1.96 showing that the OPT scores are normally distributed. Table 2 displays the mean, standard deviation, and number of students in the experimental Group ($\bar{x}$ = 19.97, SD = 3.65, *N* = 30) and control group ($\bar{x}$ = 20.53, SD = 4.19, *N* = 30) on the pre-test of reading performance.

Table 2
Descriptive statistics of experimental and control groups' reading performance scores on the pre-test

Group	*N*	Mean	SD
Experimental	30	19.97	3.647
Control	30	20.53	4.191

In this study, an independent sample *t*-test was used to compare the scores of the two groups. The results of the independent samples *t*-test are presented in the following Table 3 by comparing the reading performance scores of the experimental and control groups in the pre-test.

Table 3

Independent samples *t*-test for comparing two groups' scores of reading performance on the pre-test

Levene's test for variances			*t*-test for means			
Factor	*F*	Sig.	*t*	*df*	Sig. (2-tailed)	Mean Diff.
Equal variances assumed	.329	.568	– .563	59	.575	– .566
Equal variances not assumed			– .562	57.318	.576	– .566

Table 4 manifests the mean, standard deviation, and the number of students in the experimental and control groups in the post-test of reading performance.

Table 4
Descriptive statistics of experimental and control groups' reading performance scores on the post-test

Group	*N*	Mean	SD
Experimental	30	42.53	7.448
Control	30	38.96	6.642

Independent samples *t*-test was used to compare the results of students' scores in the post-test. Table 5 below summarizes the results of the independent samples *t*-test, which was conducted to compare reading performance scores for the experimental and control groups.

Table 5

Independent samples *t*-test for comparing two groups' scores of reading performance on the post-test

Levene's test for variances			*t*-test for Means			
Factor	*F*	Sig.	*t*	*df*	Sig. (2-tailed)	Mean Diff.
Equal variances assumed	.125	.715	2.595	59	.012	4.695
Equal variances not assumed			2.600	58.617	.012	4.695

Table 5 indicates that the significance level (.71) related to Levene's value is higher than the selected significance level (.05). In addition, the independent samples *t*-test reveals that there is a statistically significant difference in reading performance measures for the experimental group who experienced the implementation of BL in their reading proficiency learning, and the control group who received instruction in a conventional way.

According to the results of the independent sample *t*-test in this Table, the *t*-test showed that there is a significant difference between the experimental group and the second group in this study. The results presented that the treatment used for the experimental group was effective for the learners. The results of post-test scores showed that there is a crucial difference between learners' performance in post-test. As the table above demonstrates, there was a significant difference ($p = 0.000 < 0.05$) between the performance of the experimental group in the pre-and post-test groups, which indicates that the treatment period was effective for the experimental group.

4.1. Testing the hypothesis

The existing study attempts to respond to the following research question: Does blended learning have any effect on Iranian intermediate EFL learners' reading proficiency?

According to the findings of Table 4, the answer to the above question is positive. The present research demonstrated that emphasizing the importance of employing blended learning techniques is vital not only in enhancing reading proficiency, but also that we can apply this learning technique to other skills. Therefore, the null hypothesis of the study was rejected.

5. Discussion

This quasi-experimental research investigated the effects of blended learning on reading proficiency of Intermediate EFL learners' reading proficiency. After controlling for pre-test differences between groups, the findings revealed that the treatment group had significantly higher post-test reading scores than the control group. This result gives a positive answer to the research question. The main results of the study indicated that employing BL has a great impact on the reading proficiency of Iranian intermediate EFL learners. This was confirmed by the higher mean scores obtained by the experimental group

in the post-test. In particular, the performance of the experimental group in the post-test was higher than the control group. Moreover, the pre-test results for both groups did not reveal a statistically significant difference between the two groups. This means that before the experiment, both groups had nearly the same reading level and language background.

The results of this research indicated a statistically significant difference between the mean results of the two groups in the post-test and the difference in favor of the experimental group who was taught with a BL approach. The use of the BL method plays a key role in transforming the learning environment into a creative and interactive learning environment. BL also transforms the educational process from teaching to learning and from teacher-centered to student-centered. This leads to the development of the quality of the teaching-learning process and increases learners' achievement in reading proficiency. In addition, it develops learners' skills and improves the interaction between the learner and the teacher. BL based on the interaction between teachers and learners and the freedom to learn helped the experimental group learners to participate in and answer questions, giving them self-confidence and a sense of pride in their performance as teachers' ability to answer questions. The experimental group received systematic and strategic learning. These results are in line with the findings of Harb's study (2013).

EFL learners can improve their reading proficiency through BL, as depicted in the present research, and learners can also benefit from English language instruction at their own time and place without being deprived of their teacher's help while studying in the same classroom environment. The findings of the present study could support Pujola (2002), who used web-based multimedia videos for Spanish L2 learners. The results indicated that web-based media improves learners' reading skills. Furthermore, this finding confirmed the results of a study by Hsu and Chang (2010) who developed content-based reading through multimedia, and showed that it is effective in further understanding reading. The findings of this study are consistent with Santoso's findings (2010), who investigated the effect of BL on foreign language learners' reading. The results indicated that students' reading abilities were enhanced.

It is clear that the experimental group used blended materials, because it surpassed the other group that only experienced regular classroom training. The explanation is that blended content inspires learners to learn and many get involved, and this goes with Jin (2014), who found that learners who use a mobile app in BL are successful in learning grammar skills and their engagement in learning activities increased greatly. Besides, the use of BL reduces the problem of lack of time in the classroom to practice and perform more activities about what students are learning, as it gives them the opportunity to concentrate on what they have learned and to work harder on the challenges they are still struggling with. This coincides with Gilbert (2013), who claims that a blended model helps f2f teachers while also creating versatile platforms to reflect what learners have learned. The other consideration is that BL content enables learners to retain data while also providing them with new materials. This argument is compatible with Melton et al. (2009), who showed that the blended content displayed in WEBGRAM allows learners to perform additional activities to examine pre-learned grammatical structures. It also allowed them to constantly review the structures themselves.

Based on the obtained results, a significant increase in vocabulary was observed in the experimental group. This group benefitted greatly from their additional reading in online sessions. Experimental group learners may have increased their reading level much higher than their peers in the control group. Their additional reading tasks during the sessions may expose them to new words that enable them to learn vocabulary. This finding

is in line with Nadarajan's study (2007) that learners' interaction with various texts increases the random learning of new vocabulary. The control group's reading experience was restricted to the textbooks used in the classroom, and it deprived itself of additional reading that could enhance vocabulary learning. In fact, they improved in post-test scores, but the learning rate of the experimental group was significantly higher than the control group (Djiwandono, 2018).

The above finding is supported by the findings of Madineh et al. (2013) who examined the impact of e-learning tasks on the reading comprehension ability of Iranian EFL learners. The results represented that the post-test scores of the experiment group were higher than the post-test scores of the control group. There was a significant difference between the experimental and control groups. Therefore, it can be concluded that e-learning affects learners' reading comprehension. This was congruent with the study of Al-Jarf (2007), which indicated that using BL increases the reading performance of good and average learners. The above finding contrasts with Tosun's study (2015), which found no significant difference in vocabulary learning between learners taught by BL and those taught by the traditional method.

Kirkgöz (2011) investigated the ability of English teachers to read in f2f instruction using video technology. At the end of the experiments, students' reading skills changed significantly and they also developed a positive attitude towards the use of technology in EFL classrooms. Zhang et al. (2011) focused on the effect of using BL on the process of reading comprehension of university students. The results suggested that the use of a blended approach (integration of technology and traditional methods) may lead to better results. Zhang et al. (2011) confirmed the effectiveness of using technology in the classroom to improve learners' ability to comprehend. The results of the present study are in tune with the findings of Kirkgöz (2011), and Zhang et al. (2011).

The findings of the present study can support the findings of Khazaei and Vahid Dastjerdi (2011), who have conducted a study to measure the application of SMS in the blended method of teaching L2 reading comprehension. The first group received instruction in the traditional way and the second group received blended teaching. The results showed that BL using SMS in learning content is effective in enhancing learners' reading comprehension. Finally, the findings of this study confirmed Gholami Pasand and Tahriri (2017) who investigated the effect of BL on EFL learners' reading essays. BL helped learners work together to tackle learning difficulties.

Overall, the findings of this study are in line with the results of studies conducted, for example, by McKenzie (2011), Sardegna and McGregor (2013), Tosun (2015), Ghazizadeh and Fatemipour (2017), and Kheirzadeh and Birgani (2018). These studies indicated that using blended learning techniques in language teaching has a great impact on improving students' language skills. They also found that blended learning programs offered benefits to EFL students. The findings are also consistent with studies such as Bataineh and Bani Hani (2011), Bataineh and Mayyas (2017), Blake (2013), Geng et al. (2019), Madineh et al. (2013), McKenzie (2011), Sabah (2018), Soliman (2014) and Stanley (2013) that have found students' ability to understand using blended learning programs. According to these studies, blended learning can significantly improve learners' reading tasks, strengthen their interactive skills, and engage them in activities that emphasize their active rather than passive involvement.

6. Conclusion

The main purpose of this study was to investigate the effect of blended learning on the reading proficiency of Iranian intermediate EFL learners. Sixty EFL learners were selected and divided into an experimental and a control group. The experimental group received twelve sessions of treatment, including teaching reading materials through blending learning techniques, and the control group was trained in the traditional way. During the treatment, the teacher designed and assigned activities for the students to read the text effectively and strengthen their understanding. These activities were designed to teach students' reading skills such as scanning, skimming, and reading for correct comprehension. To facilitate the learning process, especially the reading skill, BL can be used as a useful tool. Students can use BL by learning to read EFL or ESL in and out of the learning environment. BL can maximize learning opportunities at the student's place and time. This, in turn, increases the learners' autonomy by giving them more responsibility, thus moving away from traditional teacher-centered classes. Another positive outcome that may be obtained from using BL in English class is the increase in motivation and interest of the learner in the language learning process. Learners can enjoy using technology and learning English, so linking the two together as a more positive and desirable process. Findings show that the BL environment is better in providing a learning process than the traditional environment. Course designers and teachers need to see the value of enhancing learners' self-directed learning in more flexible learning. The effect of BL on reading skills shows the importance of learners' emotional involvement in online and offline learning processes.

Effective groups should be formed with a more specific goal of promoting positive interactions that provide similar opportunities for success in their learning efforts. It is recommended that the teacher allow learners to form their own groups, as learners can enjoy learning with the classmates with whom they have the best contact. Online BL sessions should enable learners to increase their reading experiences by reading a variety of texts. Online activities should be consistent with their reading tasks. Additionally, this online reading should be performed in groups so that they can get the most out of the interaction within the group. The results of this study demonstrated the advantages of blended learning for intermediate students. To effectively implement a BL program, a strong commitment of managers at all levels of an organization is essential to fully support all aspects of the program. Furthermore, since implementing a new training program requires time and experience to complete, investing in this program over several years makes sense, in which case there may be significant benefits.

Based on the findings of the present study, the following pedagogical implications are first discussed for learners and then teachers. The findings of this research are applicable both in the EFL classroom and outside it. Students can improve their reading skills through BL and can benefit from teaching English at the right place and time without being deprived of the help of their teachers. The results of this research confirmed that there is a significant difference between the progress and performance of learners, those who attend traditional classrooms, and those who learn in a BL environment, the latter being more significant than the previous one. Therefore, better learning outcomes with BL can be found in the classroom environment. BL increases the satisfaction as well as the motivation of the learner and the teacher. The idea of BL can be presented to English teachers who want to improve their teaching skills and stay up-to-date with new technologies and research findings.

This study has some limitations. First, this study only involved participants aged 15-18 years. Therefore, the results cannot be generalized to the other age groups. Second, the participants were limited to 60 people. So, the findings cannot be generalized due to the small sample size. Third, the time allotted for instruction was very limited. Fourth, the participants in this research were limited to intermediate-level learners. Therefore, one should be careful in generalizing the results beyond its appropriate limit. Fifth, the participants were only female learners; therefore, the results of the study may not be generalizable to male learners.

Author Statement

The authors declare that there is no conflict of interest.

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