

Research Article

The Effectiveness of Hybrid and Pure Problem-Based Learning in the Productive Skills and Critical Thinking of Iranian Undergraduate Students through MALL Application

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Hybrid problem-based learning (HPBL) as a learner-oriented method involves learning through collaboration while finding solutions to real-world problems. It has been employed in the education of English as a foreign language (EFL) students recently. Implementation of it in an EFL classroom, though might be a challenging task, has been approved a useful method for improving learning of the students. The current study, using a quasi-experimental design, IELTS pretests-posttests, and Honey's critical thinking questionnaire, attempted to find out the effectiveness of HPBL method in the productive skills and critical thinking of the students by implementing it in an EFL classroom using eight teacher's made problems through Mobile Assisted Language Learn (MALL) application. The subjects were 60 Iranian undergraduates grouped as one control group (CG) being instructed based on the traditional lecture-based method and two experimental groups being instructed based on HPBL and Pure Problem-Based Learning (PPBL) methods conveniently. Findings of one-way MANOVA, one-sample, and paired-samples *t*-test revealed that HPBL students had significantly higher mean scores than the PPBL students who were in turn superior to their CG counterparts in terms of productive skills and critical thinking. This study has the potential to advance new ideas and perceptions which can be implemented by EFL learners in improving the productive skills and critical thinking of the learners. Therefore, the findings might bear implications for students, teachers, university curriculum designers, and decision-makers to design more effective curriculums for the teaching of productive skills to the students.

1. Introduction

Generally, in the area of the productive skills of the students, a good means of communication requirements is prerequisite, among which is the knowledge of writing, speaking, grammar, and vocabulary, as well as the knowledge of transversal skills and competencies such as critical thinking and problem-solving skills. Earning such skills seems compulsory for the case of students that learn English as a foreign language and are not exposed to English language in the society or their environment, and they are required to learn such language in order to get academic degrees or achieve profession accomplishment.

Accordingly, quite a lot of different methods and approaches have come into being in order to answer such a

question as how transversal skills such as critical thinking can best be achieved. In this regard, Torp and Sage [1] believe that the ability to solve problems, to think critically, and overall language skills can be learned through the involvement of undertaking and would not be taught through direct instruction. Among the several different approaches of teaching the language through doing, solving problems, and collaborative learning, the approach of problem-based learning (PBL) has come into existence at the end of the 1990s in the area of medicine, as well as medicinal education. As Larsson [2] mentions, PBL, being originated from Canada, has been used mostly in medicine and business and not in the teaching of humanities, especially languages. As it was the case about twenty-some years ago, it is not the same now, because nowadays it has found its way among other

disciplines such as geography, biology, history, physics, and chemistry as well as humanities [3]. For instance, since 2004 it has been used to instruct biology in the European Higher Education Area (EHEA) by means of problems.

Just in accordance with how Kassem [4] puts it, such diverse methods and approaches have been initiated and shaped based on the constructivist methods of education, which has led to the creation of methods like problem-based learning, cooperative learning, task-based learning, and project-based learning. He believes that such approaches and methods have been created in contradiction to the approaches that their focus has been relocating knowledge from teachers to learners such as rote education or teacher-oriented methods.

Regarding teacher-oriented approaches, in which the teacher is in the center of consideration and all the teaching happens directly, Salari et al. [5] believe that recently the lecturing method has been the dominant method of instruction in the area of nursery teaching. In contradiction to the lecture-based method, PBL is an approach in which the learning and the scope of attention swing from teacher to learner. In this regard, Jonassen [6] believes it is an innovative teaching method in the line of history, while Li [7] states that, in this approach, the learner is encouraged to engage in the process of education, and it also makes the acquisition of language skills simplified. In accordance with the scope of this study, Lian and He [8] mentioned that learners with poor language skills can be helped with such approach and their productive skills would be improved.

Regarding PBL, Neville and Britt [9] put emphasis on their belief that in a PBL classroom problems are utilized in order to develop the ability to solve them and mentioned that, in a traditional lecture-based classroom, problems are just used as a criterion to assess. Just in accordance with their opinion regarding PBL, Aydinli [10] states that such an approach not only helps the students to learn the content and language but also helps them in learning the essential way of studying.

Throughout the last ten years in which the researchers of the current study have had the experience of teaching to the students of language centers and universities, the most important problem and barrier which restrain the students from making progress are their shyness and lack of self-confidence. Accordingly, it can be claimed that the current methods of teaching to the students, especially the ones which are used in Payame Noor University, would not be very useful in improving the students' performance in their struggle against lack of self-confidence, critical thinking, and encountering their fear of participating in a classroom discussion. Consequently, the teacher-oriented teaching methods as well as the traditional lecture-based methods would be of little use in this regard. That is why the need for a method of teaching which helps the students to encounter their fear of lack of self-confidence in preparing and participating in classroom discussions and teaching material would seem totally inevitable.

Moreover, there seem to be no or few studies regarding the implementation of HPBL and PPBL in a classroom in comparison to a traditional lecture-based method through

MALL applications. According to Baden [11], since the initiation of PBL in the 1980s, it has been widespread throughout the world in different ways, but its theories, practice, and disciplinary differences have been considered very little. As Carrio et al. [12] put it, very little consideration has been devoted to hybrid PBL (HPBL) curricula, in addition to the fact that the results of a hybrid curriculum for students are unclear. Additionally, lack of such research endeavors to find out the relationship between HPBL, PPBL, and lecture-based methods regarding students' critical thinking in an EFL setting led to conducting this study.

2. Literature Review

Problem-based learning, known by the acronym PBL, has been explained by different experts, having this core characteristic as being a student-oriented approach in which real-world problems are given to the learners, and through solving these problems the learning happens [1, 13–15]. Mayo et al. [15] define it as an instructional strategy using real-world problems, instructing the learners as well as improving their problem-solving skills, and content knowledge. Barrows [13], by stating that this is a learner-oriented method targeting improving self-directed learning, teamwork, and problem-solving skills, mentions that in this method real-world problems are used in order that the learning happens and learner gains knowledge.

Torp and Sage [1], in the same line, define it as a practical method concentrating on solving real-world problems and mention that, by using such real-world problems and challenging the students thinking, the learning happens. Silver [14] on the one hand defines it as an educational method in which the learning happens collaboratively among learners by finding out the solution to a complex problem and states that the teacher is not supposed to provide any knowledge to the students and is just a facilitator. On the other hand, Savery [16] defines it as an approach that is learner-centered, in which learning happens through finding a worthwhile solution to a distinct problem.

PBL has been divided into two diversions recently, pure problem-based learning (PPBL) and hybrid problem-based learning (HPBL). At the time that it comes to the definition of PBL, as it was mentioned before, it is a learner-oriented method targeted at improving the self-directed learning, teamwork, and problem-solving skills of the learners using real-world problems, which is in line with the definition of PPBL [1, 13–15]. However, on the other hand, HPBL, initiated and invented at Harvard Medical School by Armstrong [17], has been mentioned as a new pathway curriculum of Harvard as hybridization. She believes that the new method which comes to the being should not sacrifice the good characteristics of the old methods; that is, the HPBL method must be a mixture of the old traditional lecture-based method and the new PBL method, emphasizing that just passive attendance in the classroom would not lead to learning [17]. Novel, innovative, and unclear at the beginning of its path, HPBL would be defined more clearly and precisely by [18]. In this approach, “the teacher presents the problem case-scenario contextually, delivers lectures to

explain basic concepts, defines its theoretical perspectives, and divides students into groups requested to determine the problem(s) based on the facts, as well as identifying the issues and proposing the best solutions based on their newly acquired knowledge and skills [18].” In order to discriminate, though the two approaches of PBL are parallel and go hand in hand, in PPBL, only the problem is given to the students, and the teacher acts as a facilitator not allowing the students to use their native language, while in an HPBL method the problem is given to the students, and the teacher gives lectures on the important issues which are necessary for the students and lets them employ their native language. What is significant to be noted is the fact that, currently, the concentration in EFL classroom is not and should not just be limited to the learning of the language but also learning of skills like problem-solving and critical thinking as Jaleniauskiene [19] puts it. She also believes that such skills must be learned along with learning the language, mentioning PBL in an excellent approach to be implemented in EFL contexts to reach such purposes.

It has been approved by many studies that the implementation of PBL in the language classroom is a challenging task [2, 20–22], but no challenge or ways to face such challenges or limitations have been given. Some other studies have approved that the appropriate implementation of PBL in a language classroom, in comparison to a classroom in which a traditional lecture-based method is used, would lead to the learning of valuable skills which increase the learners’ efficiency and motivation [14, 23–25]. However, no distinction has been made as regards whether HPBL or PPBL is more useful. Some other studies have concluded that PBL greatly has improved the students’ speaking ability, while in the same line it has improved the students’ achievement of long-term knowledge, basic competence, problem-solving, and self-confidence skills [12, 26–31]. Two other studies done recently have approved that PBL improves foreign language learners reading, strategies, and grammar competence [32, 33]. Nevertheless, to the best of the researchers’ search and knowledge, there has not been any study investigating the impact of HPBL on the productive skills and critical thinking of the students and its comparison to a PPBL and traditional lecture-based method in the area of EFL teaching. However, in the education of medicine, it has been approved as a better approach in comparison to traditional methods [34].

In Iran, there have not been many studies regarding PBL and EFL. Doing a simple search on the net would reveal that the number of studies done in the area of foreign language education using a problem-based method would be very little. Movafegh and Azimaraghi [35] state that PBL recently has achieved popularity but still has got a long way ahead. Among Iranian studies, Ansarian et al. [36], in a recent attempt to find out about the effect of PBL on Iranian EFL learners’ speaking proficiency using cognition-based tasks in comparison to objective-based tasks on 95 language learners, using a true experimental research design, IELTS listening and speaking test, and prepost *t*-test, came to the conclusion that implementation of PBL using cognition-based tasks has enhanced the speaking proficiency of students. In another

study, Mohammadi [37], having administered a Nelson vocabulary test to 64 Iranian EFL learners, has attempted to create authentic problem-based tasks by using learners’ cognitive and metacognitive skills to solve real-life vocabulary tasks. Her study findings have revealed that in both tests of vocabulary recall and retention, the experimental group participants outperformed those in the control group.

The above-mentioned studies have attempted to include PBL in the language classroom; although these studies have included thorough enlightenment of using PBL in diverse language classrooms, the shortcoming with such studies is that the impression of PBL on language learning in a language classroom had not been studied comprehensively in any one of them. Moreover, even though few studies might have been done regarding the use of PBL in different communities, for sure the findings of such studies cannot be generalized to the Iranian community and HPBL.

As stated in [38], MALL refers to any formal or informal way of learning a second or a foreign language through using mobile devices. Even though it has led to positive findings regarding learning language skills, it has challenged the teachers and learners through the process of language learning because of the diverse approaches that it has [38]. Therefore, it is essential to find out what alterations or benefits MALL can have for the improvement of the productive skills and critical thinking of the students in a problem-based context. However, drawbacks such as limited or no exposure to the English language in the environment and traditional teaching methods that in some cases decrease the motivation of the language learners have been recommended to be overcome by the use of MALL and in the teaching of productive skills [38].

2.1. Purpose of the Study. Accordingly, the main objectives of this study can be summarized as following. The first was to find out whether the students who were exposed to the HPBL method could improve in terms of their productive skills or not. The second was to find out whether the three instructional procedures implemented in the HPBL, PPBL, and CG group (lecture-based method) brought about significant changes in their productive skills or not. Subsequently, as the third objective, it was attempted to find out whether the students in the HPBL, PPBL, and CG could undergo changes in their critical thinking as a result of being exposed to the different treatments or not. Consequently, the following research questions and hypotheses were raised:

RQ1. To what extent does implementation of HPBL in an EFL class have significant effects on the students’ productive skills?

RQ2. Is there any significant difference among HPBL, PPBL, and traditional lecture-based method regarding improving the learning of the students’ productive skills through MALL application?

RQ3. While comparing a traditional lecture-based method with HPBL and PPBL in terms of efficiency of improving productive skills, which one is more effective regarding the students’ critical thinking?

H01. Implementation of HPBL in an EFL class does not have any significant positive effects on the students' productive skills.

H02. The students who have undertaken an HPBL approach instruction will not show any eye-catching improvement regarding their productive skills, in comparison to students who have been instructed based on a traditional lecture-based or PPBL method.

H03. There are no significant differences among the three groups of participants in this study in relation to their critical thinking based on the type of instruction that they have received.

3. Method

3.1. Research Design, Setting, and Context. Considering the fact that several questions were asked in this study, it was conducted using a quasi-experimental design. In the first phase of this study, three groups of students were chosen conveniently, one group as the control group and the other two groups as the treatment groups. At this phase, in order to make sure that all the students are in the elementary level of English learning, as they have entered the university based on Konkoor entrance exam, a researcher-made test based on IELTS speaking and IELTS writing test was given to the students in order to make sure about their level and also homogenize the students as undergraduate language learners. It must be mentioned that the IELTS test is a valid English test managed by Cambridge University all around the world, which was chosen as the pretest and posttest for the students. Then, in the second phase of the study, Honey's [39] Critical Thinking Questionnaire was given to the students as pretest and posttest to find out about the effectiveness of treatments on the students.

The study was conducted in the English Department of Abadan's Payame Noor University (PNU) in which the researchers have been teaching different courses of English in the last decade; this experience helped the researchers a lot in choosing such a university for conducting the research, and it also helped them a lot in getting the approvals from the administration to run the study in there. The participants in the control group were instructed based on the traditional lecture-based method during Top-notch, while the two experimental groups went through different procedures of PPBL and HPBL.

3.2. Participants. The students were undergraduate students of English language who had been studying in the second semester of the academic year of 2019. The control group participants were 22 students: 14 female students and 8 male students. The first experimental group which went through HPBL had 18 students: 8 male and 10 female students, while the second experimental group which undertook PPBL included 20 students: 4 males and 16 females. The demographic background of the participants is given in Table 1.

3.3. Instruments. In order to conduct the study, different instruments were used, including researcher-made IELTS pretest and posttest and critical thinking questionnaire.

3.4. IELTS Speaking Pretest and Posttest. In order to find out about the level of the students and homogenize them into control and experiment groups, an IELTS speaking test was given to them as a pretest including three parts. The first part started with a brief introduction of themselves and greeting as warmup. Secondly, they were asked to talk about their hometown, village, and accommodation, and then, as the third part, they were asked to describe something they own which is valuable to them. As a posttest, another parallel IELTS speaking test was given to the students, completely equal in value in order to prevent any practice effect. This posttest also included three parts starting with introduction and greeting as warmup; then, as the first part, they were asked to describe a place they had visited as a child. In the second part, they were asked to talk about how easy it is to travel in their country and methods of traveling overall, and thirdly they were asked to talk about how to have a healthy lifestyle. They were given enough time to talk about this subject, through WhatsApp application.

3.5. IELTS Writing Pretest and Posttest. In order to find out about the effectiveness of the treatment for the two experimental groups in the productive skills of the students, an IELTS writing pretest was given including two parts of topics: the engagement of children in paid work and the benefits of international tourism. In accordance with the pretest, and in order to prevent practice effect, another parallel IELTS writing test was given as the posttest including three parts. The posttest writing test included three subjects: the first one is how the increase in the use of mobile phones has transformed our lives, the second one is how a person's worth nowadays is judged by social status and material possessions, and the third one is how the responsibility of bringing up children should be shared between parents. All the students were asked to write their opinions by sharing them with their partners, collaboration, and participation first and then writing on their own. In order to find out about the efficacy of the treatment, their received hand-written notes through WhatsApp were scored based on the IELTS band descriptor by the teacher and another colleague who had been teaching IELTS for five years.

3.6. Critical Thinking Questionnaire. In order to find out about the effectiveness of the treatment on the students, Honey's [39] Critical Thinking Questionnaire was used to measure the participants' critical thinking abilities. It was once given to the students as the pretest before conducting the study and then was given to the students once again as the posttest after conducting the study. This questionnaire includes 30 Likert scale questions, in which the first 25 questions were used for the sake of the current study, with each of the questions having five options: never, rarely, sometimes, after, and always. Regarding the scoring system, the range of the score of each participant was between 30 and 150. For Iranian learners, the reliability of this questionnaire has been estimated as 0.86 by [40]. Moreover, it has been

TABLE 1: Participants of the study.

| | |
|------------------------------------|------------------------------------|
| No. of students | 60 (undergraduate) |
| Gender | 40 females and 20 males |
| Native language | Persian |
| Major | English literature |
| University | PNU Abadan branch |
| Academic year | Listening and Speaking, Fall 2019 |
| Length and frequency of experiment | One term, 8 ninety-minute sessions |

approved as a valid questionnaire for Iranian EFL settings by [40].

3.7. Treatment. In order for the treatment to be applied very well, all the different characteristics and aspects which must be taken into account were considered. First, it was the grouping of the students. How to group the students, how many students each group would have, what the students had to do, and how they should have done it were of prime importance as well. Consequently, the teacher chose the students first conveniently and then grouped them based on their score and performance in their pretest, in which each group included two students of the same level. Then the way that students were allowed to communicate with each other and the other classmates, being able to use native or target language, the role of the teacher, and the way he could guide the students and facilitate the process of the treatment were explained to the students as well. The teacher had prepared eight problems, in which the first four problems have been prepared based on the students, educational, social, and environmental circumstances based on the seven-step model by Barrett and Cashman [41], while the rest of problems were chosen from the book of Barell [42]. Moreover, it was assured that all the problems were chosen simple and ill-structured as was mentioned and as Barrett and Cashman [41] put it, ill-structured in the way that the problems might have different possible answers and solutions, instead of the well-defined problem which has a specific precise answer like how much fuel does a car consume in 100 kilometers. The researcher chose simple, ill-structured problems and prepared them in the best way for implementation of PBL in the treatment. The treatment took eight sessions for all the three groups.

3.8. Data Collection Procedure. In order to collect the necessary data for the current study, firstly the ethical approval was taken from the head of the English Department of PNU; then the ethical approval of the participants was taken, after giving explanations about HPBL and PPBL and their efficacy for the students. Afterward, in order to homogenize and group the students, the scores of their IELTS pretest which were rated based on IELTS Band Descriptor were taken into consideration. The students were grouped conveniently, as on the control group being instructed based on the traditional method and two experiment groups being instructed based on HPBL and PPBL. The study took one whole PNU semester including 8 sessions once every week, which although it was not supposed to be online, all the classes were

held online through Skype and WhatsApp thanks to the outbreak of COVID-19.

Skype application was used since through it the teacher can provide mentoring to the learners and they can read, present, or perform for other students. Moreover, they can simply work together with other students as mentioned by [43].

Eight problems, in which the first four were prepared based on the work by Barrett and Cashman [41] and the rest were taken from Barell's [42] book, were given to the students and the students of the experimental groups were asked to find possible solutions through cooperating with their partners. An IELTS speaking and writing test was given to the student for the efficacy of the treatment of the productive skills of the students. Choosing equal IELTS pretest and posttest was attempted in order to reduce the practice effect or test bias. In the end, Honey's [39] Critical Thinking Questionnaire with a reliability of 0.86 according to [40] was given to the students to find out the efficacy of the treatment on their critical thinking.

3.9. Data Analysis Procedure. In order to analyze the data and scrutinize the results which have been collected, different statistical tests such as one-sample *t*-test, paired-samples *t*-test, and one-way MANOVA were conducted. The reason behind using two paired-samples *t*-tests was to see whether the learners in the HPBL group improved significantly from pretest to posttest with regard to productive skills or not. Considering that type of instruction was the independent variable of the study including three values of HPBL, PPBL, and traditional instruction, and writing and speaking were the dependent variables in this analysis, one-way MANOVA was conducted to capture any significant differences that could possibly be attributed to the type of instruction. Finally, the results obtained from the three groups were analyzed by the latest version of Statistical Package for the Social Sciences (SPSS).

4. Results

After collecting the necessary data from the 60 EFL learners who were selected and grouped into the three groups of hybrid problem-based learning (HPBL, $n=18$), pure problem-based learning (PPBL, $n=20$), and control group (CG, $n=22$), the scores of the pretest and posttest writing, speaking, and critical thinking which were gained from the students in the three groups were scrutinized through different statistical tests such as paired-samples *t*-test, one-way MANOVA, and one-sample *t*-test.

4.1. Preliminary Analyses (Tests of Normality). Before conducting any parametric analyses, in order to make sure that the distributions of scores on both pretest and posttest of the HPBL, PPBL, and CG learners were normal, Shapiro-Wilk test of normality was conducted.

In Table 2, the p values under the Sig. column for all the three groups had to be checked; p values larger than the alpha level of significance (i.e., $p > 0.05$) would reveal normal distribution. Taking a look at the p values lined up under the Sig. columns shows that, for all the pretests and posttests of the three groups, the assumption of normality has been met. Considering that the assumption of normality has been met, the researchers could conduct the parametric tests of t -test and MANOVA to find answers to the research questions and test the hypotheses.

4.2. HPBL's Improvement from Pretest to Posttest. The first aim of the study was to find out whether the students in the HPBL could improve in terms of their productive skills or not. To this end, the pretest and posttest scores of writing and speaking obtained from the HPBL students were compared using two paired-samples t -tests, the tables of which are merged for reasons of space here. This was done to see whether the learners in the HPBL group improved significantly from pretest to posttest with regard to writing and speaking. The results are as follows.

In Table 3, the pretest and posttest scores of writing and speaking for the HPBL group are displayed. As is shown above, for both writing and speaking, there were improvements from pretest to posttest. This means that exposure to HPBL positively affected Iranian EFL learners' productive skills. Whether these improvements regarding writing and speaking reached statistical significance or not could only be determined by examining the results of the paired-samples t -test presented in Table 4. Nonetheless, before examining the t -test results, one should make certain that the assumptions underlying the t -test are met. One of these assumptions is the assumption of normality, for which the results of skewness and kurtosis in Table 3 should be checked. Under skewness and kurtosis columns, values larger than ± 2 indicated that the distribution is skewed or peaked, respectively. Because there were no values larger than ± 2 under these two columns, it could be inferred that all the four distributions for the pretest and posttest scores of writings and speaking were normal. Thus, the researcher could consult the paired-samples t -test results presented in Table 4.

The p value was compared with the significance level (i.e., 0.05) to see if the difference between the posttest and pretest scores had been statistically significant or not. A p value less than 0.05 specifies a significant difference between the two sets of scores, and a p value more than 0.05 shows a difference that did not reach statistical significance. Considering that the p values under the Sig. (two-tailed) column in Table 4 were both less than the significance level, it could be inferred that the difference between the pretest and posttest scores of the learners in the HPBL group in terms of both writing and speaking was statistically significant.

Accordingly, the first null hypothesis of the study stating that exposure to HPBL does not affect Iranian EFL learners' productive skills could be rejected. In other words, exposure to HPBL did in fact positively and significantly affect Iranian EFL learners' productive skills (i.e., writing and speaking).

4.3. Productive Skills: HPBL and PPBL vs. CG. Another objective of this study was to find out whether the three instructional procedures implemented in the HPBL, PPBL, and CG groups brought about significant changes in the students' productive skills or not. To fulfill this aim, first, the pretest scores of the students were subtracted from their posttest scores to come up with gain scores, which could be compared more safely, since if the posttest scores had been compared, chances were that any differences among the three groups could have been due to the probable disparities which preexisted among them. To control this effect, gain scores were calculated and compared. Due to the fact that type of instruction was the only independent variable of the study (with the three values of HPBL, PPBL, and traditional instruction) and writing and speaking were the dependent variables in this analysis, one-way MANOVA was conducted to capture any significant differences that could possibly be attributed to the type of instruction. The results of the analysis are provided in the following tables.

In Table 5, it is shown that, with respect to writing, the students exposed to PPBL ($M = 1.90$) outperformed the ones who received HPBL ($M = 1.38$) and traditional instruction ($M = 1.00$). However, concerning speaking, the mean score of the learners who experienced HPBL ($M = 1.11$) was greater than that of the learners in the PPBL ($M = 1.10$) and CG ($M = 1.00$). To figure out if the type of instruction significantly affected the productive skills of the students, the results of the MANOVA analysis in Table 6 should be consulted.

In Table 6, the p value under the Sig. column in front of Wilks' Lambda (which is the most frequently reported test) is less than the significance level ($p < 0.05$), indicating that there was a significant difference in the productive skills scores of the learners in the three groups. The effect size shown under the rightmost column of the table shows that there was a very large effect (based on Cohen (1988), as cited in the work of Pallant [44]) for the type of instruction as far as the students' productive skills were concerned since Cohen believed that 0.01 = small effect, 0.06 = moderate effect, and 0.14 = large effect. Whether the type of instruction significantly affected writing, speaking, or both could be determined in Table 7.

The results presented in Table 7 reveal that the type of instruction had significant effects on both writing and speaking owing to the fact that the p values under the Sig. column for both writing and speaking were found to be smaller than the significance level. The partial eta-squared column showed that the effect sizes were very large for both of the productive skills. To pinpoint the exact locations of the differences among the three groups with respect to their writing and speaking scores, the post hoc test table should be examined (see Table 8).

TABLE 2: Results of Shapiro-Wilk test of normality.

| Tests/groups | HPBL | | | PPBL | | | CG | | |
|----------------------------|--------------|----|-------|--------------|----|------|--------------|----|------|
| | Shapiro-Wilk | | | Shapiro-Wilk | | | Shapiro-Wilk | | |
| | Statistic | df | Sig. | Statistic | df | Sig. | Statistic | df | Sig. |
| Writing pretest | 0.90 | 18 | 0.08 | 0.91 | 20 | 0.16 | 0.98 | 22 | 0.94 |
| Writing posttest | 0.95 | 18 | 0.49 | 0.90 | 20 | 0.09 | 0.96 | 22 | 0.38 |
| Speaking pretest | 0.91 | 18 | 0.14 | 0.93 | 20 | 0.22 | 0.96 | 22 | 0.49 |
| Speaking posttest | 0.95 | 18 | 0.32 | 0.90 | 20 | 0.10 | 0.96 | 22 | 0.36 |
| Self-confidence pretest | 0.94 | 18 | 0.31 | 0.95 | 20 | 0.44 | 0.95 | 22 | 0.32 |
| Self-confidence posttest | 0.93 | 18 | 0.26 | 0.94 | 20 | 0.38 | 0.96 | 22 | 0.41 |
| Critical thinking pretest | 0.91 | 18 | 0.16 | 0.95 | 20 | 0.51 | 0.94 | 22 | 0.15 |
| Critical thinking posttest | 0.93 | 18 | 0.241 | 0.90 | 20 | 0.11 | 0.95 | 22 | 0.12 |

TABLE 3: Descriptive statistics comparing the pretest and posttest scores of the HPBL learners.

| Tests | N | Mean | Std. deviation | Skewness | Kurtosis |
|-------------------|----|------|----------------|----------|----------|
| Writing pretest | 18 | 5.22 | 1.16 | -0.48 | -0.19 |
| Writing posttest | 18 | 6.61 | 1.41 | -0.60 | -0.86 |
| Speaking pretest | 18 | 5.38 | 1.24 | -0.64 | -0.32 |
| Speaking posttest | 18 | 6.50 | 1.15 | -0.65 | -0.25 |

Regarding the students' writing scores, the difference between PPBL ($M = 1.90$) and HPBL ($M = 1.38$) was statistically significant. Moreover, PPBL and HPBL learners' writing scores were significantly higher than the writing scores of the CG learners ($M = 0.00$). With respect to their speaking scores, there was no significant difference between HPBL ($M = 1.11$) and PPBL ($M = 1.10$), yet these two groups had significantly higher speaking scores compared to the students in the CG ($M = .00$). All in all, the obtained results boil down to the rejection of the second null hypothesis of the study, which presumed that there was no significant difference among the three groups of students regarding their productive skills, comparing and considering the type of instruction that they were exposed to.

4.4. Critical Thinking. The final aim of this study was to figure out whether the students in the HPBL, PPBL, and CG would undergo changes in their critical thinking as a result of being exposed to their differential treatments or not. For this reason, the data obtained from the critical thinking questionnaires handed out to the students at the beginning and at the end of the intervention were used, and their gain scores were computed. Subsequently, the gain scores of the students were compared using a one-way ANOVA, since there was one independent variable (i.e., type of instruction) and one dependent variable (i.e., critical thinking) involved in this part of the study. The results of the comparison are provided in the following tables.

As is shown in Table 9, regarding critical thinking, the mean score of the learners who received HPBL ($M = 10.33$) turned out to be larger than that of the learners who were given PPBL ($M = 4.70$) or traditional instruction ($M = 1.00$). In order to find out whether the type of instruction had significant effects on critical thinking, the ANCOVA analysis results in Table 10 had to be checked.

Table 10 demonstrates that the p value under the Sig. column across from Wilks' Lambda was smaller than the significance level ($p < 0.05$), implying that there was a significant difference in the critical thinking scores of the learners in the three groups. The partial eta-squared index in the rightmost column of the table reveals that there was a very large effect for the type of instruction as far as the critical thinking was concerned. To locate where exactly the differences lay among the three groups with respect to their critical thinking, the post hoc test table had to be consulted (see Table 11).

Concerning critical thinking, the difference between HPBL ($M = 10.33$) and PPBL ($M = 4.70$) was significant and so was the difference between HPBL and CG. Additionally, PPBL outperformed the CG in this regard. All in all, the results obtained above led to the rejection of the third null hypothesis of the study, which mentioned that there were no significant differences among the three groups of participants in this study in relation to their critical thinking, according to the type of instruction that they were exposed to.

5. Discussion

In this study, a quasi-experimental method was used to reveal the significance of the HPBL method as an innovative teaching method in order to improve the productive skills of the learners and their critical thinking. Therefore, three research questions were asked, and, accordingly, three hypotheses were made. The hypotheses were tested separately, and the results of the study were presented. The results achieved regarding the first research question revealed that the students who were instructed based on the HPBL model improved significantly from the pretest to the posttest. It was found that being exposed to HPBL method positively affected Iranian EFL learners' productive skills considering the fact that the differences between the pretest and posttest scores of the learners in the HPBL group in terms of both writing and speaking were statistically significant, which meant that, for both writing and speaking, there were improvements from pretest to posttest.

The results are in accordance with the findings of Hoidn and Kärkkäinen [28] who found out that being exposed to PBL is effective for improving the learning of the students in higher education. The results are also in agreement with the

TABLE 4: Paired-samples *t*-test comparing the pretest and posttest scores of the HPBL learners.

| | Paired differences | | | 95% confidence interval of the difference | | <i>t</i> | <i>Df</i> | Sig. (tw-tailed) |
|----------|--------------------|----------------|-----------------|---|-------|----------|-----------|------------------|
| | Mean | Std. deviation | Std. error mean | Lower | Upper | | | |
| | Writing | -1.38 | 0.60 | 0.14 | -1.69 | | | |
| Speaking | -1.11 | 0.32 | 0.07 | -1.27 | -0.95 | -14.57 | 17 | 0.00 |

TABLE 5: Descriptive statistics for the learners' writing and speaking gain scores.

| Skills | Groups | Mean | Std. deviation | <i>N</i> |
|----------|--------|------|----------------|----------|
| Writing | HPBL | 1.38 | 0.60 | 18 |
| | PPBL | 1.90 | 0.30 | 20 |
| | CG | 1.00 | 0.00 | 22 |
| | Total | 1.05 | 0.90 | 60 |
| Speaking | HPBL | 1.11 | 0.32 | 18 |
| | PPBL | 1.10 | 0.30 | 20 |
| | CG | 1.00 | 0.00 | 22 |
| | Total | 0.70 | 0.59 | 60 |

findings of Jaleniauskiene [19] who found out that PBL revives foreign language learning in higher education while helping the students learn how to solve ill-structured problems. However, the findings are in a closer line with Baresh et al. [45] who found that the speaking proficiency of Libyan EFL learners has been improved through HPBL.

In order to answer the second research question regarding the significant differences between HPBL, PPBL, and traditional lecture-based method in terms of improving the learning of the students' productive skills, and in order to compare the performance of these three groups who went through three instructional procedures, an IELTS speaking and writing test was given to them before and after conducting the treatment. The findings revealed that there were significant differences among the HPBL, PPBL, and CG groups concerning their writing and speaking. To be more precise, the difference between PPBL, HPBL, and CG learners was statistically significant in favor of the former.

The results approved the findings of More et al. [34] who found that outcomes achieved through HPBL in comparison with those achieved through conventional teaching were slightly better. The results are also in accordance with most of the studies done in the area of PBL regarding productive skills, as speaking and writing. The results confirm the findings of Azman and Shin [23] who found that PBL has positive effects on the students' skills, especially on their speaking. This study's results also confirm the findings of the study conducted by Coffin [46] who found out that implementation of PBL for EFL writing students has been effective regarding improving both students and teachers, and they vastly prefer PBL. The findings are also in agreement with Khotimah [29] who found that the application of this method could improve students' speaking ability and achievement. Just in the same line, the findings of the current study also confirm the findings of Ghufroon and Ermawati [27] who found in an EFL writing class that it leads to

declining students' nervousness, inspires the students, and improves their writing. The findings of this study are also in close line with Ansarian et al. [36] who found that implementation of PBL using cognition-based tasks has enhanced the speaking proficiency of Iranian EFL students. This study's results are also in close accordance with Baresh et al. [45] who found out that Libyan EFL learners' speaking proficiency has been improved greatly through HPBL, mentioning that being under the exposure of HPBL improves the students' grammar, fluency, vocabulary, confidence, pronunciation, and intonation.

Accordingly, it could be claimed that implementing PBL methods in language classrooms through online applications such as Skype led to improving the productive skills of the students, and these methods were more appropriate and useful methods of teaching in comparison to TLB method.

The findings of the third research question aiming at finding any significant differences among the three instructional methods regarding the improvement of the critical thinking of the students showed that the HPBL students had a significantly higher mean score than the PPBL students, who were in turn superior (though not significantly) to their CG counterparts. The findings are in accordance with Leong [22] who found that using PBL in the classroom stimulates the students to use more English in their speaking and helps them develop problem-solving and critical thinking of the students. The results are also in agreement with Tick [25] who found that implementation of PBL in the classroom improves the skills of problem-solving and critical thinking of the learners. This study also confirms the findings of Bashith and Amin [47] who found that PBL has positive effects on the students' learning outcomes and critical thinking, and such methods should be implemented in the classroom to improve the critical thinking of the students.

Thus, the implication could be made that PBL methods showed more effectiveness than traditional lecture-based method regarding improving critical thinking of the students. Accordingly, the findings of this study emphasized the fact that instruction in a traditional lecture-based method is static in a way that the students feel urged to keep memorizing lists of words and lectures while instruction based on PBL methods requires the students to be more dynamic and active. Such findings lead to the fact that implementing teaching strategies that trigger the cognitive and critical thinking of the students while trying to find solutions to different problems is indeed a more useful method for teaching productive skills to the students.

TABLE 6: MANOVA results for the learners' writing and speaking gain scores.

| Effect | | Value | F | Hypothesis df | Error df | Sig. | Partial eta-squared |
|--------|--------------------|-------|--------|---------------|----------|------|---------------------|
| Groups | Pillai's Trace | 1.04 | 31.01 | 4.00 | 114.00 | 0.00 | 0.52 |
| | Wilks' Lambda | 0.07 | 74.96 | 4.00 | 112.00 | 0.00 | 0.72 |
| | Hotelling's Trace | 10.95 | 150.56 | 4.00 | 110.00 | 0.00 | 0.84 |
| | Roy's Largest Root | 10.80 | 307.93 | 2.00 | 57.00 | 0.00 | 0.91 |

TABLE 7: Results of tests of between-subjects effects for the type of instruction.

| Source | Dependent variable | Type III sum of squares | df | Mean square | F | Sig. | Partial eta-squared |
|---------------------|--------------------|-------------------------|----|-------------|--------|------|---------------------|
| Type of instruction | Writing | 40.77 | 2 | 20.38 | 143.85 | 0.00 | 0.83 |
| | Speaking | 17.02 | 2 | 8.51 | 135.59 | 0.00 | 0.82 |

TABLE 8: Results of post hoc test for the type of instruction.

| Dependent variables | I groups | J groups | Mean difference (I - J) | Sig. | 95% confidence interval | |
|---------------------|----------|----------|-------------------------|------|-------------------------|-------------|
| | | | | | Lower bound | Upper bound |
| Writing | HPBL | PPBL | -0.51* | 0.00 | -0.81 | -0.20 |
| | | CG | 1.38* | 0.00 | 1.08 | 1.68 |
| | PPBL | HPBL | 0.51* | 0.00 | 0.20 | 0.81 |
| | | CG | 1.90* | 0.00 | 1.60 | 2.19 |
| | CG | HPBL | -1.38* | 0.00 | -1.68 | -1.08 |
| | | PPBL | -1.90* | 0.00 | -2.19 | -1.60 |
| Speaking | HPBL | PPBL | 0.01 | 0.99 | -0.19 | 0.21 |
| | | CG | 1.11* | 0.00 | 0.91 | 1.31 |
| | PPBL | HPBL | -0.01 | 0.99 | -0.21 | 0.19 |
| | | CG | 1.10* | 0.00 | 0.90 | 1.29 |
| | CG | HPBL | -1.11* | 0.00 | -1.31 | -0.91 |
| | | PPBL | -1.10* | 0.00 | -1.29 | -0.90 |

TABLE 9: Descriptive statistics of the learners' critical thinking scores.

| | Groups | Mean | Std. deviation | N |
|-------------------|--------|-------|----------------|----|
| Critical thinking | HPBL | 10.33 | 6.37 | 18 |
| | PPBL | 4.70 | 2.90 | 20 |
| | CG | 1.00 | .00 | 22 |
| | Total | 4.66 | 5.68 | 60 |

TABLE 10: Results of tests of between-subjects effects for critical thinking.

| Source | Type III sum of squares | df | Mean square | F | Sig. | Partial eta-squared |
|-----------------|-------------------------|----|-------------|---------|-------|---------------------|
| Corrected model | 10195.123 ^a | 3 | 3398.374 | 277.475 | 0.000 | 0.937 |
| Intercept | 308.447 | 1 | 308.447 | 25.184 | 0.000 | 0.310 |
| CT pretest | 4456.867 | 1 | 4456.867 | 363.900 | 0.000 | 0.867 |
| Groups | 1194.404 | 2 | 597.202 | 48.761 | 0.000 | 0.635 |
| Error | 685.860 | 56 | 12.248 | | | |
| Total | 456535.000 | 60 | | | | |
| Corrected total | 10880.983 | 59 | | | | |

^aR-squared = 0.740 (adjusted R-squared = 0.726).

TABLE 11: Results of post hoc test for the type of instruction and critical thinking.

| Dependent variables | I groups | J groups | Mean difference (I - J) | Sig. | 95% confidence interval | |
|---------------------|----------|----------|-------------------------|------|-------------------------|-------------|
| | | | | | Lower bound | Upper bound |
| Critical thinking | HPBL | PPBL | 5.63* | 0.00 | 2.47 | 8.78 |
| | | CG | 10.33* | 0.00 | 7.24 | 13.41 |
| | PPBL | HPBL | -5.63* | 0.00 | -8.78 | -2.47 |
| | | CG | 4.70* | 0.00 | 1.70 | 7.69 |
| | CG | HPBL | -10.33* | 0.00 | -13.41 | -7.24 |
| | | PPBL | -4.70* | 0.00 | -7.69 | -1.70 |

6. Conclusion

Considering the never-ending change in the learners' needs and abilities, teachers and language instructors are expected to have a positive approach regarding taking into consideration new and useful methods of teaching for improving the productive skills and critical thinking of the learners. It can also be claimed that such teaching methods have to gradually replace the traditional lecture-based methods in the education curriculums in order to improve their performance in learning the productive skills of the second language as well as strengthening their problem-solving and critical thinking skills. Therefore, using PBL methods is strongly recommended for implementation in more English classrooms.

This paper argued that new methods like HPBL and PPBL have been efficient in improving the productive skills and critical thinking of Iranian undergraduate students in comparison to traditional lecture-based methods. Furthermore, the most significant conclusion from this study is that using PBL methods can facilitate the learning of the students and lead to more effective instruction. Few limitations can be named for the current study; as the first one, the number of the students was 60, which can be considered a small sample, while further research can be done with larger populations. The second limitation was not having a well-prepared framework for conducting the study which the researchers overcame by preparing a framework including eight problems, four taken from Barell [42] and four prepared based on the model by Barrett and Cashman [41].

To put it in a nutshell, implementing such methods appropriately in the classroom would benefit the students in the first place and then help the university curriculum designers and decision-makers to make the necessary alterations and revisions regarding choosing the best and most appropriate methods for the teaching of university students, such as pedagogical methods which help them enrich their knowledge and improve their productive skills as well as their critical thinking skills. More studies need to be done in the area of PBL and other language skills like reading and listening, as well as language components like vocabulary.

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

References

- [1] L. Torp and S. Sage, *Problems as Possibilities: Problem-Based Learning for K-16 Education*, Association for Supervision and Curriculum Development, Alexandria, VA, USA, 2nd edition, 2002.
- [2] J. Larsson, *Problem-based Learning: A Possible Approach to Language Education*, Polonian Institute, Jagiellonian University, Kraków, Poland, 2001.
- [3] H. Lai, "Problem-based learning in chemistry," in *Proceedings of the International Problem-Based Learning Symposium*, pp. 130-131, Republic Polytechnic, Singapore, 2007.
- [4] M. A. M. Kassem, "Improving EFL students' speaking proficiency and motivation: a hybrid problem-based learning approach," *Theory and Practice in Language Studies*, vol. 8, no. 7, p. 848, 2018.
- [5] M. Salari, A. Roozbehi, A. Zarifi, and A. Tarmizi Rohani, "Pure PBL, hybrid PBL and lecturing: which one is more effective in developing cognitive skills of undergraduate students in pediatric nursing course?" *BMC Medical Education*, vol. 18, no. 195, 2018.
- [6] D. Jonassen, "Supporting problem solving in PBL," *Interdisciplinary Journal of Problem-Based Learning*, vol. 5, no. 2, 2011.
- [7] D. Li, "Facilitating motivation: implementing problem-based learning into the science classroom," Master's thesis, State University of New York, New York, NY, USA, 2013.
- [8] J. Lian and F. He, "Improved performance of students instructed in a hybrid PBL format," *Biochemistry and Molecular Biology Education*, vol. 41, no. 1, pp. 5-10, 2013.
- [9] D. O. Neville and D. W. Britt, "A problem-based learning approach to integrating foreign language into engineering," *Foreign Language Annals*, vol. 40, no. 2, pp. 226-246, 2007.
- [10] J. M. Aydinli, *Problem-Based Learning and Adult English Language Learners*, Center for Adult English Language Acquisition, Washington, DC, USA, 2007.
- [11] M. S. Baden, "Using problem-based learning: new constellations for the 21st century," *Journal on Excellence in College Teaching*, vol. 25, no. 3-4, 2014.
- [12] M. Carrió, L. Agell, J. E. Banos, E. Moyano, P. Larramona, and J. Perez, "Benefits of using a hybrid problem-based learning curriculum to improve long-term learning acquisition in undergraduate biology education," *FEMS Microbiology Letters*, vol. 363, no. 15, Article ID fnw159, 2016.
- [13] H. S. Barrows, "An overview of authentic problem-based learning (APBL)," *Authentic Problem-Based Learning: Rewriting Business Education*, Prentice Hall Asia Pte.Ltd, Jurong, Singapore, 2002.
- [14] C. E. H. Silver, "Problem-based learning: what and how do students learn?" *Educational Psychology Review*, vol. 16, no. 3, pp. 235-266, 2004.
- [15] P. Mayo, M. B. Donnelly, P. P. Nash, and R. W. Schwartz, "Student perceptions of tutor effectiveness in a problem-based surgery clerkship," *Teaching and Learning in Medicine*, vol. 5, no. 4, pp. 227-233, 1993.
- [16] J. Savery, "Overview of problem-based learning: definitions and distinctions," *Interdisciplinary Journal of Problem-Based Learning*, vol. 1, no. 1, pp. 9-20, 2006.
- [17] E. G. Armstrong, "A hybrid model of problem-based learning," *The Challenge of Problem-Based Learning*, Routledge, London, UK, 2008.
- [18] Y. Wu and R. J. Sutherland, "Hippocampal evoked potentials in novel environments: a behavioral clamping method," *Behavioural Brain Research*, vol. 172, no. 1, pp. 63-71, 2006.
- [19] Ł. E. Jaleniauskien, "Revitalizing foreign language learning in higher education using a PBL curriculum," *Procedia-Social and Behavioral Sciences*, vol. 232, pp. 265-275, 2016.
- [20] A. Bandy, "Processes correction of hybrid problem-based learning tutorial sessions," *Indian Journal of Public Health Research & Development*, vol. 11, no. 2, p. 2519, 2020.
- [21] R. V. Karthikeyan and G. Baskaran, "Using problem based learning technique in teaching English grammar," *Language*

- in India. Strength for Today and Bright Hope for Tomorrow*, vol. 9, no. 10, pp. 12–18, 2009.
- [22] P. N. Leong, “The power of problem-based learning (PBL) in the EFL classroom,” *Polyglossia*, vol. 16, pp. 42–48, 2009.
- [23] N. Azman and L. Kor Shin, “Problem-based learning in English for a second language classroom: students’ perspectives,” *The International Journal of Learning: Annual Review*, vol. 18, no. 6, pp. 109–126, 2012.
- [24] J. Murray and A. Summerlee, “The impact of problem-based learning in an interdisciplinary first-year program on student learning behaviour,” *Canadian Journal of Higher Education*, vol. 37, pp. 87–107, 2007.
- [25] A. Tick, “Use of problem-based learning in teaching logistics and international operations,” in *Proceedings of the International Symposium on Logistics and Industrial Informatics*, pp. 81–85, Lindi, Tanzania, 2007.
- [26] G. Arjuna and J. Jufri, “The use of PBL method in teaching reading comprehension,” *Arjuna*, vol. 5, no. 1, 2016.
- [27] M. A. Ghufuron and S. Ermawati, “The strengths and weaknesses of cooperative learning and problem-based learning in EFL writing class: teachers and students’ perspectives,” *International Journal of Instruction*, vol. 11, no. 4, pp. 657–672, 2018.
- [28] S. Hoidn and K. Kärkkäinen, “Promoting skills for innovation in higher education: a literature review on the effectiveness of problem-based learning and of teaching behaviours,” *OECD Education Working Papers*, OECD Publishing, Paris, France, 2014.
- [29] S. Khotimah, “The use of problem based learning to improve students’ speaking ability,” *Journal of English Language Teaching, ELT Forum*, vol. 3, 2014.
- [30] J. Montafej, A. Lotfi, and A. Chalak, “Implementation of hybrid and pure problem-based learning in EFL context: the case of speaking skill and self-confidence of Iranian undergraduate participants,” *International Journal of Foreign Language Teaching and Research*, vol. 9, no. 35, pp. 81–94, 2021.
- [31] L. Remedios, D. Clarke, and L. Hawthorne, “Framing collaborative behaviors: listening and speaking in problem-based learning,” *Interdisciplinary Journal of Problem-Based Learning*, vol. 2, no. 1, 2008.
- [32] L. F. Lin, “Impacts of the problem-based learning pedagogy on English learners’ reading comprehension, strategy use, and active learning attitudes,” *Journal of Education and Training Studies*, vol. 5, no. 6, pp. 109–125, 2017.
- [33] M. Zuhriyah, “Problem-based learning to improve students’ grammar competence,” *Register Journal*, vol. 10, no. 1, 2017.
- [34] V. R. More, G. Singh, and K. Patwardhan, “Introducing hybrid problem-based learning modules in ayurveda education: results of an exploratory study,” *Journal of Alternative & Complementary Medicine*, vol. 26, no. 2, pp. 130–137, 2020.
- [35] A. Movafegh and O. Azimaraghi, “Problem-based learning,” *Academic Journal of Surgery*, vol. 2, no. 1-2, p. 1, 2015.
- [36] L. Ansarian, A. A. Adlipour, M. A. Saber, and E. Shafiei, “The impact of problem-based learning on Iranian EFL learners’ speaking proficiency,” *Advances in Language and Literary Studies*, vol. 7, no. 3, pp. 84–94, 2016.
- [37] F. S. Mohammadi, “The effect of authentic problem-based vocabulary tasks on vocabulary learning of EFL learners,” *International Journal of Education and Literacy Studies*, vol. 5, no. 3, 35 pages, 2017.
- [38] S. McCarty, H. Obari, and T. Sato, *Implementing Mobile Language Learning Technologies in Japan*, Springer, Berlin, Germany, 2017.
- [39] P. Honey, “Critical thinking questionnaire,” 2004, <https://www.peterhoney.com.au/>.
- [40] M. Fahim and A. Komijani, “Critical thinking ability, L2 vocabulary knowledge, and L2 vocabulary learning strategies,” *Journal of English Studies*, vol. 1, no. 1, pp. 23–38, 2011.
- [41] T. Barrett and D. Cashman, *A Practitioners’ Guide to Enquiry and Problem-Based Learning*, UCD Teaching and Learning, Dublin, Ireland, 2010.
- [42] J. Barell, “Problem-based learning: the foundation for 21st century skills,” *21st Century Skills: Rethinking How Students Learn*, pp. 175–201, Solution Tree Press, Bloomington, IN, USA, 2010.
- [43] P. Chhabra, “Use of e-learning tools in teaching English,” *International Journal of Computing & Business Research*, vol. 3, pp. 2229–6166, 2012.
- [44] J. Pallant, *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using the SPSS Program*, McGraw-Hill, New York, NY, USA, 4th edition, 2010.
- [45] E. F. Bares, S. M. Ali, and R. Darmi, “Using hybrid problem-based learning (HPBL) approach to enhance Libyan EFL students’ engagement with English language,” *International Journal of Education and Literacy Studies*, vol. 7, no. 2, 2019.
- [46] P. Coffin, “The impact of the implementation of the PBL for EFL interdisciplinary study in a local Thai context,” *PBL across Cultures*, pp. 191–197, Aalborg Universitetsforlag, Aalborg, Denmark, 2013.
- [47] A. Bashith and S. Amin, “The effect of problem based learning on EFL students’ critical thinking skill and learning outcome,” *Al-Ta Lim Journal*, vol. 24, no. 2, pp. 93–102, 2017.