



# Fostering critical thinking, creativity, and language skills in the EFL classroom through problem-based learning

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## Abstract

Although problem-based learning (PBL) approach in L2 classrooms might enhance students' critical thinking and creativity while contributing to their language development, its role in these classrooms has not been fully explored. Therefore, adopting a mixed method approach, this study aimed at exploring the changes in 68 Turkish tertiary-level EFL students' critical thinking and creativity in addition to their language abilities before and after participating in a PBL program. Convenience sampling was used in the research and students were sampled simply because they were convenient sources of data. Quantitative data gathered through the 21<sup>st</sup> century skills scale and pre and post language tests were analyzed through both descriptive and inferential analysis for comparison. Since the data were normally distributed, a paired t-test was conducted to compare the scores for the language achievement tests and the scales. The qualitative data gathered through an open-ended questionnaire were analyzed through a constant comparative data analysis method. The researchers coded the qualitative data set by identifying categories, patterns and codes. The findings indicated a statistically significant increase in students' level of critical thinking and creativity and improvement in their language scores. Hence, this paper might provide a model for English teachers to integrate PBL in their classrooms to promote their students' language skills as well as their critical thinking and creativity.

**Keywords:** PBL; critical thinking; creativity; EFL; language development

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## 1. Introduction

Rapid breakthroughs in technology and social development has changed the dynamics of the working and social environment which eventually called for a paradigm shift in education. In order to equip students with the necessary skills and competencies so that they can easily adapt to the new requirements of the fast-changing social, educational, and work environments, educators have started to rethink the theoretical basis of students' learning needs (Dufya, 2013). Problem-based learning (PBL) which was

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formulated in medical education during the 1960s has been a commonly used teaching method to help students tackle the necessary requirements of the 21st century. This increased focus on preparing students for the 21st century skills has also led the language educators to embed PBL into language curriculum (McDonough, Crawford & Mackey; Rao, 2007; Yeh 2017). Although it has been increasingly employed in language classrooms, little research has investigated the influences of PBL on L2 learners. Thus, the present study explores the impacts of PBL on the critical thinking, creativity, and language development of Turkish learners of English at tertiary level.

## **2. Literature Review**

### *2.1. PBL*

PBL refers to “meaningful and experiential learning and students learn by solving problems and reflecting on their experiences” (Ansarian, Adlipour, Saber & Shafiei, 2016, p. 85). In PBL, students go through several stages of learning which are: being introduced to the real-world problem, doing research, making use of various resources, working collaboratively, proposing a solution, presenting a solution, reflection and evaluating learning (Tan, 2004). It differs from the traditional teaching approaches in the sense that the roles of students and teachers are different from those of their traditional counterparts. PBL approach “involves a shift in three loci of educational preoccupation: (1) from content coverage to problem engagement, (2) from lecturers to coaches in the role of teachers, and (3) from passive learners to active problem solvers in the role of students” (Tan, 2004, p. 203). Within this framework, students are taught to exert control over their learning environment and learning outcomes while going through the stages of learning and teacher’s role is guiding them. As Tan (2003) suggests in PBL classes teachers are facilitators, metacognitive coaches, resources, and models while enabling their students to be self-directed.

Studies in 1990s comparing traditional and PBL learning were mostly in favor of the former; learners engaged in traditional learning approaches are found to be better than their PBL counterparts in terms of short-term knowledge retention. The results of Albanese and Mitchell (1993)’ review within the domain of medical education revealed that conventional students performed better on the standardized tests. The authors attributed these results to the fact that there was inadequate cognitive scaffolding development on the part of PBL students and that PBL students may not have adequate exposure to a range of content like their counterparts in traditional classrooms. Similarly, having reviewed 22 studies, Vernon and Blake (1993) found that students engaged in the traditional learning approach significantly outperformed their counterparts in PBL settings in academic achievement tests that focus more on recognition rather than application of knowledge. Having done a narrative review of 10

pre-1992 studies, Berkson (1993) also observed similar evidence. She reported that academic achievement and knowledge assessment test scores of students educated with the traditional approach are higher. She attributed this to the fact that students in PBL classes focus more on meaning rather than reproduction which requires using memory actively and concluded that it is not surprising to see that their performance in academic tests is affected adversely. Since students who were engaged in traditional learning methods used their memory actively, they were more successful in academic achievement and knowledge assessment.

However, the findings of recent studies that compared PBL and traditional learning approach have demonstrated that PBL can be more advantageous in effectively boosting students' critical thinking and creativity. In a study with medical students, Hmelo (1998) found that there are important cognitive benefits of the PBL approach since PBL students produced more coherent explanations using a hypothesis-driven reasoning strategy and tended to use more science concepts as a tool in constructing their explanation. In their meta-analysis of nine articles in order to investigate the effectiveness of problem-based learning in developing nursing students' critical thinking, Kong, Qin, Zhou, Moub, and Gao (2014) found similar results. All studies in their review utilized PBL as the educational teaching method in the intervention group and traditional lectures in the control group. The results of the review indicated that nursing students' critical thinking was improved with the use of problem-based learning, compared with traditional lectures. Similarly, the findings of Tseng et al.'s (2011) study with 120 Taiwanese registered nursing students, showed that PBL was more effective developing students' critical thinking skills than concept mapping. The authors adopted a quasi-experimental design with experimental and control groups to evaluate the effectiveness of PBL-CM. Finding showed that the experimental group had higher scores than the control group for the Critical-Thinking Scale. The findings of Ozturk, Muslu and Dicle's (2008) study in which they compared levels of critical thinking among 147 senior nursing students in two educational programs, one of which used a PBL model while the other used a traditional model, also provided additional support that PBL is an effective model for promoting critical thinking skills. The authors attributed this positive impact to the emphasis in PBL on developing students' questioning and information-seeking skills and their discussion and application of new learning within the tutorials. Since PBL students are required to be cognitively involved in learning experience by seeking out information and adopting higher level processing strategies (Blumberg, 2000).

A number of studies have also indicated the benefits of PBL in promoting students' creative thinking and product creativity. In her study with 107 fourth-grade students in Taiwan, Chang (2013) investigated the effects of online creative problem-solving (CPS) activities on student creativity. In the study, the experimental groups received instructions for online problem solving and had the opportunities to refine and adjust others' thoughts, with lots of discussion or interaction while the control groups received

traditional instruction, which included lecturing, designing, and making. The findings revealed that the technological creativity of the online-CPS students was better than that of the traditional group. Similarly, Awang and Ramly's (2008) study with 60 students of Diploma in Civil Engineering in Malaysian Polytechnics indicated that PBL approach could promote the creative thinking skills of students more compared to traditional learning approach. In PBL class, students were grouped, and each group had a group leader, assistant, and members. The PBL model started with an unstructured problem that given to the group of students and students were expected to come up with many ideas that might solve the problem by identifying the problem, framing it, breaking it down in its component elements, gathering information from the available resources and creating the final presentation of their solutions. The findings indicated that PBL approach could raise-up the creative thinking skills of students compared to conventional learning approach. Based on the findings of her study investigating the impacts of a creative problem-solving model, which required students to create a variety of creative products, including advertising slogans, scripts for video resumes, and scripts for radio commercials, on 64 students at a public high school in Taiwan, Wang (2019) also concluded that students demonstrated better ideational originality after participating in the four problem-solving tasks. This positive impact on creativity might be due to the fact that PBL requires learners to go through the main processes involved in creativity which are task presentation, task preparation, idea generation, idea validation, and outcome assessment (Amabile, 1988). They are expected to propose a creative solution, present it in a creative way and reflect on and evaluate their learning outcome.

## *2.2. PBL in language education*

As mentioned before, the PBL approach formulated in medical education gradually spread to many other fields of education such as architecture, business, law, engineering and recently language learning due to its positive impacts on learning (Lin, 2017). However, it has not been widely applied in the EFL context. Though limited in number, studies have revealed positive impacts of PBL on long-term retention and application of knowledge compared to traditional approach have been reported (Gijbels, Dochy, Van den B & Segers, 2005). In her study conducted with English major students in Bangkok, Jiriyasin (2014) found that English oral performances of PBL students were more fluent and accurate than those of students in traditional settings. This result was attributed to the different roles that teachers adopted in PBL such as facilitating, supporting, and scaffolding their students to optimize the quality of learning. The findings of Lin's (2017) study with two English classes in a Taiwanese university also indicated a positive impact of PBL on foreign language learners' "reading comprehension ability, strategy use, and their active learning attitudes" (p. 109). The PBL curriculum designed in her study exposed students to a broad range of English reading texts both inside and outside of the classroom to search for information to solve a problem collaboratively. The participants

in the PBL curriculum made greater improvement in their reading comprehension than the participants learning with the teacher-centered curriculum. Similarly, having adopted problem-based learning through cognition-based tasks in EFL classrooms Ansarian et al. (2016) reported a positive impact on Iranian intermediate participants' speaking proficiency. In the experimental and control groups, Top Notch English series whose focus of the series is on communication was used to be taught. In the control group, each lesson consisted of two types of conversations (standardized and natural), grammar, pronunciation, vocabulary sections, and an extra page at the end of each unit which asked students to produce conversations based on a photo. However, in PBL class in order to make the materials more compatible with cognition-based teaching approach, they were adapted. The main difference was omission of conversations and adding problem-scenarios instead. Having analyzed the results of the pre and post IELTS speaking test, the authors found that PBL approach had a significant positive effect on speaking proficiency of intermediate Iranian EFL learners, the results of Kumar and Refaei's (2017) study with second-year students in a two-year college also indicated that PBL approach helps improve student writing. The students in the study were introduced to PBL through a series of in-class exercises, were divided into groups, and given problems, which required students to apply the critical thinking course concepts to their writing. Students became more adept at critically analyzing their rhetorical context since they were required to think more critically about their work as writers and focus on audience and purpose more than traditional teacher-driven assignments.

Although a growing body of literature has suggested that the implementation of a PBL model in education can improve students' critical thinking and creativity, this issue is still insufficiently explored in the EFL context. Therefore, this study aimed to identify the pre and post differences in the level of critical thinking and creativity in addition to language performance among students after participating in a PBL program in a language preparatory school, an issue which has not been investigated before.

### **3. Method**

#### *3.1. Participants and Setting*

The study was conducted with 136 B1 level students in the English preparatory school of a Turkish foundation university, which aims to equip its students with the necessary language skills and competence to cope with their departmental studies. In B1 level, students take 25 hours of instruction in a semester. In addition, students are offered two different types of extra-curricular activities which are speaking classes and the PBL class for 12 weeks. All the classes are conducted by experienced EFL instructors in the same institution. During the lessons, students read and/or listen to some texts to get some

input. They write their ideas and as the main production activity, they are involved in speaking activities such as presentations, discussions, or role-plays. The PBL class, on the other hand, aims to improve students' 21st century skills in addition to improving their language skills. Students are informed about this difference at the beginning of the academic year and they make their preferences based on their weaknesses and needs. Convenience sampling was used in this research. Students were sampled simply because they were convenient sources of data. After students were informed about the purpose and the details of the research, the ones who volunteered to take part in the research were included in the sample.

### *3.2. The PBL Course*

As part of the course requirements, students are supposed to attend two-hour sessions each week and complete all the tasks in and outside the class to improve their language, critical thinking, and creativity. As the first step of PBL, students are introduced to the real-world problem, challenges of teaching the new generation, at the beginning of the course. Then, they do research about the causes and results of the issue. There are a variety of tasks which require them to make use of various resources and practice different skills (e.g. conducting interviews, preparing and doing an oral presentation, note-taking, group discussion, reading articles and so on). In all the tasks, students are asked to work collaboratively. The end product of the course is proposing a solution in a short movie. Students are also encouraged to reflect on their experience and evaluate learning throughout the course.

In order to facilitate critical thinking, the materials and tasks were designed considering Bloom's taxonomy (1956). The primary learning objectives were not only acquiring the knowledge and comprehension of the content but also engaging analytical thinking beyond knowing, understanding, and applying a concept. Thus, the activities and the materials developed reflect both the lower and the higher stages of Bloom's taxonomy. Students are supposed to compare information from different sources, draw their own conclusions based on analysis of the information, summarize, or create their own interpretation of what they have read, analyze competing arguments, perspectives, or solutions to the problem, develop a persuasive argument based on the supporting evidence and finally come up with solutions.

The tasks and materials were also designed based on Guilford's (1975) model of creativity in order to improve students' creativity. As Sternberg and Grigorenko (2001) states, Guilford (1975) regards creativity as a form of problem solving and there are four main kinds of abilities students need to possess: sensitivity to problems (the ability to recognize problems), fluency (the ability to produce a variety of ideas, words, expressions that fulfill stated requirement) and flexibility (the ability to demonstrate flexibility and to produce responses that are novel and high in quality) (p. 310). The tasks in the PBL

course were designed considering these processes involved in creativity. Students are exposed to different creative modes and ways of expressing themselves orally, visually, or kinesthetically through various tasks such as inventing a solution to a complex problem, creating presentations to share research results, and creating an original product to express their ideas in order to foster learner creativity (Appendix 1). Group interactive brainstorming is one of those creative modes utilized to enable students to generate new ideas because interaction in groups and teams can be an important source of creative ideas and innovations (Paulus, 2000). Creating a role-play and acting out is another method used in the PBL class since role-playing promotes the learner creativity (Craciun, 2010). These tasks promote sensitivity to problems, fluency, and flexibility, which fosters creativity.

The brief description of the tasks completed in the course, how they meet the requirements of PBL and how each of these tasks are connected with the critical thinking and creativity and language skills can be seen in Appendix 1. The following is an example of activities on one day:

- As the pre-task of the lesson, student conduct interviews with their teachers in order to learn about the problem- the challenges of teaching the new generation and they bring their findings to the classroom. As the first activity, within their groups, the students discuss their interview findings. They rank, in order of importance, the challenges teachers experience while teaching the new generation and decide on the three most important challenges.
- Next, the students form progressively larger groups which requires each grouping to reach agreement before joining another group. Each group takes turns to report and present their stand to the other group(s) on what their top-ranked challenges are and justify their decisions. When listening to the other groups' ideas, the students will have an opportunity to rethink their ideas. If they disagree, they state their own view with reasons. After listening to each other, they have to reach an agreement again. The discussion goes so on until the whole class is involved in one discussion. During this time, the teacher moves around the room, monitors the students, and provides assistance when or where it is necessary through asking questions, directing discussion, and checking for understanding.
- After the whole class is joined up in one large discussion and agrees on the most important three challenges, the students are asked to do mini-research about the ways to overcome these challenges individually. They use their mobile phones/laptops to access the online resources.
- Once students complete their research, they report to or share their ideas with other through a speaking activity. The students are made to sit in two parallel rows and in the given seating arrangement, each member seated in a row faces another member of the other row. Each time, the teachers gives one problem to discuss and asks the

students to share their research results and personal views to solve that problem with the person that faces him/her in the other row in 2 minutes. Then, the teacher rings the bell and asks the students to move one chair to the right so that they can have a different partner to discuss. This activity goes on like this until the students discuss all the three challenges. While the students are discussing issues with their partners, the teacher moves around them listening to their discussion and taking notes for delayed feedback.

- Finally, the teacher conducts a whole class discussion and asks students to summarize what they have learned from their research or peers and reflect on the effectiveness of these solutions.
- The teacher sets the oral presentation task for the following class. In small groups, students are asked to choose one of the challenges discussed, do a more comprehensive research about the causes, results and the solutions of that challenge and create an oral presentation to share their findings with the other groups.

### 3.3. Research Design

This study employs a mixed method approach which involves an experimental method accompanied by a qualitative approach in order to identify the changes in students' language abilities and the skills of critical thinking and creativity before and after participating in a PBL program. The main research questions that were addressed in the study are as follows:

1. Is there a significant difference between EFL learners who were involved in a 12-week extracurricular PBL class and the control group in terms of their
  - a) English performance?
  - b) their level of critical thinking skills?
  - c) level of creativity?
2. What are students' opinions about the PBL program that they participated in?

### 3.4. Data Collection Tools

Quantitative data were gathered through institutional language achievement test as and the 21st century skills survey prepared by Ravitz, Hixson, English, and Mergendoller (2012). Both were given before and after the treatment in order to identify the changes. The achievement test used in order to measure the language skills of the students included the following sections: listening, reading, writing, grammar and vocabulary. The details of the sections are given below (Figure 1):

Parts	Specifications
Part 1: Reading	Length of Texts: 600 words



(2 texts)	Number of questions for each text: 10
Part 2: Listening (1 lecture and 1 while listening task)	Length of the lecture: 6 minutes Number of questions for the lecture: 7 Length of the while listening task: 5 minutes Number of questions for the while listening task: 5
Part 3: Grammar and Vocabulary	Grammar: Cloze test (10 items) Vocabulary: Section 1 filling in the blanks (5 items) Section 2: word formation (5 items)
Part 4: Writing	Writing an opinion paragraph of 200 words

Figure 1. Specifications of the language achievement test

The 21st century skills survey contained eight subcategories and a total of 48 questions each of which is a Likert scale item with five possible selections. However, for the purposes of the present study only the results for the critical thinking and creativity will be discussed. Participants were instructed to make their selection, ranging from the least (1) to the most (5) considering the match between their behavior and the item. In order to better understand students' experiences in regards to PBL, data were gathered through an open ended questionnaire, which included open-ended questions to learn about the opinions of students regarding the course.

### 3.5. Data Analysis

The quantitative data gathered from the survey and the language tests were analyzed through both descriptive and inferential analysis for comparison. The items were analyzed using SPSS with summary measures such as means and standard deviations. After descriptive analysis of the responses, the Cronbach's alpha value was calculated to determine if the tools were reliable. To explore the internal consistency of the survey, Cronbach's alpha coefficient scores were calculated and both tools were found to be highly reliable since they were above .71. Since a Shapiro-Wilk's test ( $p > .05$ ) and a visual inspection of its histogram, normal Q-Q plots and box plots showed that the data were approximately normally distributed, a paired t-test was conducted to compare the scores for the language achievement tests and the scales.

As it can be seen in Table 1, the pre-language test results revealed that control group performed slightly better than the experimental group; however, since convenient

sampling had to be used for this research, the research was conducted with these two groups and the gain scores were analyzed.

Table 1. Results of independent t-test for equality means

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Writing Pre	0,01	0,91	-0,95	134,00	0,35	-0,68	0,72	-2,11	0,75
Reading Pre	0,01	0,90	-1,64	134,00	0,10	-0,94	0,58	-2,08	0,20
Listening Pre	1,91	0,17	-2,23	134,00	0,03	-1,18	0,53	-2,22	-0,13
Language Pre	0,02	0,90	-2,30	134,00	0,02	-1,96	0,85	-3,65	-0,27
Total Pre	0,16	0,69	-2,40	134,00	0,02	-4,77	1,99	-8,70	-0,84

During the qualitative data analysis, a constant comparative method was adopted. The researchers coded the qualitative data set by identifying categories, patterns, and codes. Coding was done by two independent coders and inter-coder reliability was calculated at %90. In order to calculate this similarity rate, the formula suggested by Miles and Huberman (1994) was adopted. That is, number of agreements was divided by the total of number of agreements and disagreements. After checking the reliability, the ideas recurring in the data were identified and later they were organized into relevant themes. In particular, the data were divided into three prominent themes arising out of the survey questions: (1) impacts of PBL on the language skills of the students (2) impacts of PBL on critical thinking and creativity of the students (3) factors causing the positive impacts on students.

## 4. Results

### 4.1. Is there a significant difference between EFL learners who were involved in a 12-week extracurricular PBL class and the control group in terms of their English performance?

The results of the paired t-test that was run after the treatment indicated that both groups improved their grades and it seemed that the total grades were higher in the

control group. However, as far as the level of the improvement is concerned, the gain scores were computed, and it was found that the experimental group showed a better improvement in all the sections. The difference between the mean scores of pre- and post-tests for the experimental group was significantly higher in all the sections of the language achievement test apart from the writing section ( $p < .05$ ) (Table 2 & 3).

*Table 2. Descriptive analysis of the pre and post-test scores*

Group		Mean	N	Std. Deviation	Std. Error Mean
Exp	Reading Post	18.18	68	2.71	0.33
	Reading Pre	16.21	68	3.65	0.44
	Listening Post	15.88	68	2.67	0.32
	Listening Pre	14.68	68	3.33	0.40
	Language Post	15.43	68	4.71	0.57
	Language Pre	14.03	68	5.05	0.61
	Writing Post	19.79	68	4.23	0.51
	Writing Pre	18.42	68	4.38	0.53
	Total Post	69.28	68	10.37	1.26
	Total Pre	63.33	68	11.67	1.42
Con	Reading Post	17.42	68	2.67	0.32
	Reading Pre	17.15	68	3.05	0.37
	Listening Post	16.15	68	2.59	0.31
	Listening Pre	15.85	68	2.81	0.34
	Language Post	17.01	68	4.73	0.57
	Language Pre	15.99	68	4.91	0.60
	Writing Post	20.65	68	4.10	0.50
	Writing Pre	19.10	68	4.05	0.49
	Total Post	71.23	68	10.85	1.32

Total Pre 68.10 68 11.49 1.39

Table 3. Results of paired-sample t-test for language skills

Group		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Dev.	Std. Error	95% Confidence Interval of the Difference				
					Lower	Upper			
Experimental	Reading Post - Reading Pre	1.97	1.50	0.18	1.61	2.34	10.88	67	0.00
	Listening Post - Listening Pre	1.21	1.15	0.14	0.93	1.49	8.62	67	0.00
	Language Post - Language Pre	1.40	0.93	0.11	1.17	1.62	12.35	67	0.00
	Writing Post - Writing Pre	1.37	0.85	0.10	1.16	1.57	13.28	67	0.00
	Total Post- Total Pre	5.95	2.45	0.30	5.35	6.54	19.98	67	0.00
Control	Reading Post - Reading Pre	0.27	0.62	0.08	0.12	0.42	3.59	67	0.00
	Listening Post - Listening Pre	0.29	0.93	0.11	0.07	0.52	2.60	67	0.01
	Language Post - Language Pre	1.02	1.17	0.14	0.74	1.30	7.22	67	0.00
	Writing Post - Writing Pre	1.54	0.97	0.12	1.31	1.78	13.14	67	0.00
	Total Post- Total Pre	3.13	2.23	0.27	2.59	3.67	11.59	67	0.00

The analysis revealed that PBL can offer benefits to the learners in terms of language development. The difference between the pre and post language achievement test scores in reading, listening, grammar and vocabulary sections was significantly higher for the experimental group which showed that the PBL group made a better progress in reading, listening, grammar and vocabulary sections compared to the control group. However,

although the PBL group showed improvement in the writing skill, the progress of the experimental group was slightly better.

*4.2. Is there a significant difference between the level of critical thinking and creativity of EFL students who have participated in a PBL program and that of learners in the control group?*

The descriptive analysis that was conducted to calculate the mean and standard deviation of the scores in pre and post-questionnaire showed that the mean scores for the subscales were higher in the experimental group (Table 4). Following the descriptive analysis, the paired test that was conducted to compare the level of critical thinking and creativity in the experimental and control group conditions and to see if the difference was statistically meaningful and the results revealed that there was a significant difference in the scores for both subscales ( $p < .05$ ) (Table 5). That the values of  $t$  is larger in the experimental group conditions makes the probability that this difference occurred by small chance. The difference between the pre and post scale scores in both subskills was significantly higher for the experimental group suggesting that PBL had some positive effects on students' skills of critical thinking and creativity.

Table 4. *Descriptive analysis of the pre and post scale scores*

group		Mean	N	Std. Deviation	Std. Error Mean
experimental	CTpre	2.96	68	0.51	0.06
	CTpost	4.20	68	0.36	0.04
	CRpre	3.12	68	0.65	0.08
	CRpost	4.25	68	0.47	0.06
control	CTpre	2.87	68	0.39	0.05
	CTpost	3.00	68	0.37	0.05
	CRpre	3.11	68	0.59	0.07
	CRpost	3.24	68	0.50	0.06

Table 5. *Results of paired sample t-test for 21<sup>st</sup> century skills*

group	Paired Differences				t	Df	Sig. (2-tailed)
	Mean	Std.	Std.	95%			

		Deviatio n	Error Mean	Confidence Interval of the Difference	Lower		Upper		67	0.00
					Lower	Upper				
experimental	CTpre - CTpost	-1.24	0.50	0.06	-1.36	-1.12	-20.52	67	0.00	
	CRpre - CRpost	-1.13	0.58	0.07	-1.27	-0.99	-16.15	67	0.00	
control	CTpre - CTpost	-0.13	0.13	0.02	-0.16	-0.10	-8.36	67	0.00	
	CRpre - CRpost	-0.14	0.15	0.02	-0.17	-0.10	-7.32	67	0.00	

#### 4.3. What are students' opinions about PBL program that they participated in?

The qualitative findings gathered from the questionnaire revealed that students shared common views regarding the project they were involved in. The analysis of student answers showed that most of the participants mentioned the same central themes and similar sub-themes regarding the impacts of the project. When the students were asked about their perceptions on the impacts of the project on English language abilities, they all agreed it contributed to their language development. When the reasons were analyzed, it was found out that most of the students believed that the project mostly contributed to their vocabulary and grammar knowledge as indicated in the following quotes:

*"I had the opportunity to revise the structures I learnt in my regular classes. That's why I think I improved my English thanks to this project."*

*"I improved my grammar and vocabulary in this class because I did research, I read a lot about my problem."*

Some of the students reported that the project mainly improved their speaking skills:

*"I especially learned how to do presentation and now I am better at doing presentations."*

*"I think my speaking skills have improved because I speak more fluently. I used to be afraid of speaking in front of others but thanks to this project I now speak more comfortably."*

Some other students stated that they improved their writing skills:

*"We had to write our questions for the interviews and received feedback from our teacher. I can now write better questions".*

*"We wrote our scenarios and we had to produce our own sentences. After the first draft, we learnt about our mistakes and wrote a better scenario in the second draft".*

The main factor creating a positive impact on learners' language development was also identified during the data analysis: more involvement in the tasks. Based on the analysis of the student answers, it was found that the project affected students' willingness to

participate. The students stated that they felt the need to participate in the activities. They explained why they participated more in the project tasks by giving the following justifications:

*“I participated more in project tasks because being a member of a group required us to meet responsibilities”.*

*“The project was more different than the regular classes because students completed the tasks themselves. In normal classes they can escape their responsibilities sometimes”.*

Based on the analysis of the questionnaire, it was also found that the project affected students' critical thinking skills. Some of the students stated that the tasks that they completed in the project class helped them to be better critical thinkers by stating the following:

*“We had to think about a problem from all perspectives. This was useful not only for my English but also for my everyday life. I am a better problem-solver now”.*

*“In order to do the presentation and the final task we had to read from a lot of resources. Our teacher asked us to compare the information and bring them together in our assignment, which I had not done before. It was beneficial for me and I will also do this for my other assignments”*

Data analysis also revealed that the project contributed to the creativity of most of the students. This can be exemplified with the following excerpts:

*“We tried to look at the issues from different perspectives and had to produce new ideas. I think this contributed to my creativity”.*

*“We had to be creative because especially in our last task our teacher wanted us to do everything on our own. We wrote our own screenplays and created our movie”.*

*“Writing our dialogues and acting them out was really enjoyable and I realized that I enjoy creative tasks”*



*“I really enjoyed creating our own movie to give our solution. All the group members came together and discussed the possible solutions to choose the most creative idea. And mine was chosen. I did not know that I was creative. I felt satisfied after completing the movie”.*

*“What I liked about the course is being free to do what we want. We created our own movie. Of course our teacher helped us but ideas belonged to us.”*

The analysis of the qualitative data clearly indicated that learners believe that the PBL contributed to their language development, particularly the vocabulary and grammar knowledge as well as their critical thinking and creativity. They attributed these positive impacts to the task types and materials which required active involvement of the students.

## **5. Discussion**

Although PBL programs are not common in language teaching, the findings of the study show that they can offer benefits to the learners in terms of both language development and improvement in their critical thinking and creativity. Contrary to the findings of Berkson’s (1993) review which reported that academic achievement and knowledge assessment scores are generally higher when the traditional approach is used, the pre and post language achievement test scores showed that students who were engaged in PBL methods showed a greater improvement in their language skills. Similar to the findings of Othman and Shah’s (2013) study with 128 third-year Malaysian undergraduate students enrolled in four sections of a language class that has a literature component in its syllabus, which revealed that in terms of course content, both experimental and control groups improved but the PBL group showed more improvements in terms of language, in this study the difference between the pre and post language achievement test scores in reading, listening, grammar and vocabulary sections as well as the total scores was significantly higher for the experimental group suggesting that PBL had some positive effect on students’ language development. Although the PBL group showed improvement in the writing skill, the performance of the control group was slightly better. This might be due to the nature of the tasks in the PBL group. There were few tasks completed in the project class requiring students to practice the writing skill and they were not similar to that tasks used to assess the writing skill in the language achievement test. In the test, students are given a prompt and asked to write an essay with academic rules. However, in the PBL none of the tasks required the students to write an academic essay and therefore improve their academic writing skills. Mostly, the writing tasks required students to write accurate and meaningful sentences to convey their ideas, but they were not expected to follow academic conventions as they do while writing academic essays.

Through questionnaire responses, learners also stated that the PBL contributed to their language development. The majority of the students reported that PBL mostly contributed to their vocabulary and grammar knowledge, which was also observed in the assessment task including a grammar cloze test, a vocabulary fill in the blanks task and a word formation section. As Larsson (2001) suggests, this might be due to the fact that PBL encourages students to gain a deeper sense of understanding while traditional language learning approach may lead to superficial learning when students, instead of acquiring a sense of when and how to use which word, learn the language items they need for their exams and then promptly forget them. In addition to vocabulary and grammar, there were also positive influences of PBL on the other skills that were identified in both qualitative and quantitative analysis. Based on the analysis of the students' responses, the major factor contributing to this positive influence was that the PBL required students to be active during the learning process. As Conklin (2012) states, real learning takes place when students use higher-order thinking skills through dissecting, judging, and creating. Since the PBL course provided students with these opportunities, it might have encouraged students to participate more and consequently develop their language abilities more.

The analysis of both the quantitative and the qualitative data also indicates that the PBL course had a positive impact on the students' critical thinking and creativity, which is similar to the findings of previous studies (Ball & Knobloch, 2004; Saka & Kumas, 2009; Yusof et al., 2012). The difference between the pre and post scale scores demonstrated that PBL had some positive effects on students' skills of critical thinking and creativity. This might be attributed to the fact that the methods that were used with the PBL group specifically aimed to develop the abilities to think critically; to analyze and solve complex, real-world problems; to search for, evaluate, and utilize appropriate learning resources; to work cooperatively, to communicate effectively, and to use intellectual skills to become self-directed life-long learners. Therefore, it is not surprising to see a positive impact on these skills after the treatment.

With the light shed by these results, it can be concluded that despite the common belief that PBL programs are generally effective in the field of medicine, language learners might also benefit from these programs by developing their language skills and critical thinking and creativity. Through PBL, language schools can teach and embed critical thinking and creativity. skills into their core curriculum instead of teaching the language exclusively as a foreign language. Learner motivation and success might be affected positively since learners will be the active players in the learning process and use the skills necessary for real and everyday life.

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#### Appendix A. PBL process and tasks completed by the experimental group

PBL process	Tasks	Language skills/Subskills to be practiced	Other skills to be practiced
<b>Being introduced to the problem</b>	Asking students to solve the rebus puzzle in groups and teaching the word “generation”	Conveying messages/information in conversation/interaction (S)	Critical thinking
	Introducing the types of generations and having a whole class discussion on the generational differences in different areas	Reading for specific information and details (R)  Conveying messages/information in conversation/interaction (S)	Critical thinking
	Role play activity (students are given role-cards and some	Reading for specific information and details (R)	Critical thinking  Creativity

	<p>situations and asked to write a conversation and act out to show how generational differences cause problems in different areas. Students try to answer the questions “Which character represents which generation? Why?” And “In which aspect of life they are having problems?” while listening to their peers.)</p>	<p>Writing accurate and meaningful sentences using a range of level words, phrases, and grammatical structures to convey messages (W)</p> <p>Conveying messages/information in conversation/interaction (S)</p>	
	<p>Whole class discussion on generational differences and the problems caused by these differences</p>	<p>Conveying messages/information in individual turns (S)</p>	<p>Critical thinking</p>
	<p>Watching a short video and discussing the differences between now &amp; then in educational settings</p>	<p>Listening for specific information and details &amp; inferencing (L)</p> <p>Conveying messages/information in individual turns (S)</p>	<p>Critical thinking</p>
	<p>Doing research and creating posters to demonstrate the differences between now and then</p> <p>Presenting them to their peers</p>	<p>Reading for specific information and details (R)</p> <p>Writing accurate and meaningful sentences using a range of level words, phrases, and grammatical structures to convey messages (W)</p> <p>Conveying messages/</p>	<p>Critical thinking</p> <p>Creativity</p>

		information in individual turns (S)	
<b>Making use of various resources/doing research/working collaboratively/using technology</b>	Considering the differences in small groups students discuss what might be the challenges of teaching new generation (Each group comes up with 3 challenges and share them with the rest of the group.)	Conveying messages/information in conversation/interaction (S)	Critical thinking
	Interviewing teachers (In small groups students prepare questions to ask instructors' ideas on the issue.)	Writing accurate and meaningful sentences using a range of level words, phrases, and grammatical structures to convey messages (W)  Conveying messages/information in conversation/interaction (S)	Creativity Critical thinking
	After conducting the interviews, preparing presentations to share their survey results with the rest of the group.	Conveying messages/information in individual turns (S)	Creativity
	Agreeing on the most important 3 challenges	Conveying messages/information in conversation/interaction (S)	Critical thinking

	Doing research on the causes and results of the challenge/problem that students have chosen to address (in groups of 3/4)	Reading for specific information and details (R)	Critical thinking
<b>Working collaboratively/making use of various resources/evaluating their own learning/using technology</b>	Doing oral presentations (In groups of 3/4, students share the research results with each other and get their feedback. They are also expected to use technology while presenting their findings.)	Conveying messages/information in individual turns (S)  Listening for specific information and details & inferencing (L)	Critical thinking  Creativity
	Writing a reflection on their oral presentation experience (Students are expected to evaluate their own learning and take actions for their future presentations.)	Writing accurate and meaningful sentences using a range of level words, phrases, and grammatical structures to convey messages (W)	Critical thinking
<b>Proposing their solution/presenting their solution/working collaboratively/using technology/</b>	Filling in the project proposal (outline) and bringing it to the classroom (Students are supposed to talk about their plan about issues such as the structure of the film, characters, key scenes, crew, locations and equipment.	Writing accurate and meaningful sentences using a range of level words, phrases, and grammatical structures to convey messages (W)	Critical thinking  Creativity
	Listening to other groups' proposals and ask their questions or make their comments)	Listening for specific information and details & inferencing (L)	Critical thinking
	Reflecting on the effectiveness of their	Writing accurate and meaningful sentences	Critical



	solutions based on the feedback that they get from their peers and making necessary revisions.	using a range of level words, phrases, and grammatical structures to convey messages (W)	thinking Creativity
	Submitting the screenplays to the instructor. Revising the screenplays based on the feedback and submitting the final draft after making necessary changes	Writing accurate and meaningful sentences using a range of level words, phrases, and grammatical structures to convey messages (W)	Creativity
	Shooting their films and presenting the projects	Conveying messages/ information in individual turns (S)	Critical thinking Creativity
	Completing the peer review while watching the short movies of the other groups and sharing their feedback	Listening for specific information and details & inferencing (L) Conveying messages/ information in individual turns (S)	Critical thinking
	Completing the reflection, self-evaluation task sheets and submitting their portfolios.	Writing accurate and meaningful sentences using a range of level words, phrases, and grammatical structures to convey messages (W)	Critical thinking
** Grammar and vocabulary were not taught explicitly but throughout the course the teacher gave feedback on the language strengths and weaknesses of the students and guided them to improve their grammar and vocabulary based on their needs.			

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