

Designing and Implementing an Innovative Problem-Based Teacher Education Course

Yasemin Kirkgoz*

Teacher Education Department, Faculty of Education, Çukurova University, Sarıcam, Adana, Turkey

Abstract

Recent educational reform movements emphasize preparing teacher candidates for pedagogical problem solving in the classroom. This study aims to design and implement an innovative teacher education course *Materials Evaluation and Adaptation* based on the principles of problem-based learning (PBL) for the prospective teachers of English in the teacher education department of a state university in Turkey. The participants were 28 teacher candidates. To determine teacher candidates' perception of their experiences of this innovative approach, data were obtained from reflective journals, problem-based projects, and end-of-the-year interviews. Teacher candidates' responses indicate promising results because PBL promoted teacher candidates' construction of the problem, relating their solution to the problem and using multiple sources to solve the problem. The implications of these results for the teacher education are discussed.

Keywords

Materials Evaluation and Adaptation, Problem-Based Learning (PBL), Problem Solving Skills, Teacher Candidates, Teacher Education

Received: May 21, 2015 / Accepted: June 5, 2015 / Published online: October 16, 2015

© 2015 The Authors. Published by American Institute of Science. This Open Access article is under the CC BY-NC license.

<http://creativecommons.org/licenses/by-nc/4.0/>

1. Introduction

Problem-based learning (PBL) emerged primarily in medical education as a valuable pedagogical strategy to help overcome students' extensive memorization of disciplinary knowledge without any sufficient change in their ability to use the information to diagnose diseases (Gijbels et al., 2005; Barrow and Tamblyn, 1980). In due course, it has become an increasingly popular teaching strategy in courses from other disciplines.

Problem solving may pose difficulties for practicing teachers due to the complexity of the problems they encounter ranging from managing the classroom, assessing learning, meeting individual differences, and establishing parent-teacher relationships (Putman and Borko, 2000; Zeichner and Conklin, 2005). Hence, following many educational reform movements, calls have been made for preparing teacher candidates to work through the diverse and complex

problems emerging in the classroom (Biggs, 2003; De Simone, 2008). As a result, PBL has become increasingly popular in teacher education, particularly after the 1980s (Barell, 2007; Cotton et al., 2006; Merseth, 1996).

PBL is generally aligned with the constructivist framework that considers learning and teaching as the active and meaningful inquiry and building of knowledge by learners (Leedy, 1997; Stetton, 1985). The principal idea underlying PBL is that the starting point for learning should be a problem, a query, or a puzzle that the learner wishes to solve (Duch, Groh and Allen, 2001). Prior knowledge and experiences are viewed critically in helping learners find meaningful entry points into the problem. Unlike traditional teacher-centered classroom where the course content is commonly presented in a lecture format, in a PBL course, learners are expected to take an active part in the learning process. As such, PBL contrasts with the traditional university course work, in which the usual teaching practice

* Corresponding author

E-mail address: ykirkgoz@cu.edu.tr

of presenting concepts takes the form of a lecture format.

PBL fosters both inquiry and knowledge-based approaches to solving a problem. As an inquiry-based approach, it focuses on helping professionals such as teachers work through authentic, complex problems or cases (Hmelo-Silver, 2004), which simulate real-life classroom decision making (Brown, Collins and Duguid, 1989). Problem solving requires identifying a problem, considering multiple perspectives, arriving at solutions, assessing consequences, and reflecting on the decision (Harrington, 1995; Hmelo-Silver and Barrows, 2006; Mayer and Wittrock, 2006). Teachers need strategies that link theory with practice (Schwartz, Bransford and Sears, 2005). As noted by Boud (1985), in the absence of such strategies, problems in the real classroom context become insurmountable.

As well as the practicing teachers, the PBL process helps prospective teachers develop a broader and more principled understanding of classroom and pedagogical issues. According to Spiro et al., (1992) this approach helps prospective teachers form networks of ideas and see patterns across problems and issues so that they can transfer their thinking from what they encounter in the university to their work as teachers. Thus, PBL prepares prospective teachers for their future learning by letting them create a rich foundation for solving similar or more serious problems in the classroom.

PBL offers other benefits: It prepares prospective teachers to construct a principled understanding of the issues in the problem case, so that they learn to apply principles to problems of varying complexity (Bereiter and Scardamalia, 2006) as opposed to merely tackling individual problems or problems that can easily be solved. As such, it prepares teacher candidates for professional practice.

PBL requires working cooperatively in groups so that group members identify learning issues, that is, what needs to be learned to resolve the problem (Hmelo-Silver, 2004; O'Donnell, 2006). The group engages in a problem-solving sequence of seeking information from multiple sources, justifying their decisions, discussing findings, and considering consequences to construct a viable solution. It is essential that prospective teachers base their decisions in the literature in addition to any information that they can get from their own experiences (Hmelo-Silver and Barrows, op. cit.). Guided by a mentor, members of problem-solving groups work on identifying the central issue in the case, which constitutes an essential initial phase in the problem-solving process. That is, they define the problem and the basis for its identification as a problem. These skills and processes are considered vital in helping prospective teachers to build their knowledge base and see the underlying patterns

and issues in their classrooms. Otherwise, it is argued that they will deal with issues in isolation and, eventually, experience difficulty in their classrooms (Shulman, 1987).

During the problem solving process, the mentor - the expert facilitator- plays a crucial role as the groups work through their learning issues. Under the guidance of the expert facilitator, group members, drawing from the literature, engage in questioning and revising various views of the issues within the case. These processes help them to connect possible solutions to the problem and evaluate those solutions, which constitute two components of problem solving process (Harrington, 1995). As students engage in solving the problem, they would also learn the processes involved in finding solutions to real life problems resulting in deep and meaningful learning (De Simone, ibid.).

There has been much discussion in the PBL literature regarding the forms of assessment and evaluation. PBL assessment contrasts with traditional assessment in that in PBL, the process is assessed as well as the content of learning and the outcome (Schwartz, Mennin and Webb, 2001).

The purpose of this study is to design and implement a teacher education course *Materials Evaluation and Adaptation* for the prospective teachers of English in the teacher education department of a state university in Turkey in order to prepare teacher candidates more effectively to deal with the real educational problems, specifically related to designing and adapting ELT materials similar to those they will encounter in their future teaching profession.

2. The Present Study

The rationale for using PBL in the present study is that most university courses adopt a teacher-centered approach to teaching *Materials Evaluation and Adaptation* course. A major criticism of this traditional approach is that prospective teachers remain unable to transfer such skills they acquired in teacher education courses to real classroom contexts in their profession.

3. Method

3.1. Participants

The participants were 28 prospective teachers undertaking the *Materials Evaluation and Application* course in the English Language Teacher Education Department of a state university in Turkey.

3.2. Designing the PBL Course

The *Materials Evaluation and Adaptation* course, offered

during the autumn term, to the last year students in the Teacher Education department, is scheduled three hours a week and it lasts 14 weeks. In the present study, the first three weeks of the course was allocated to lecture based presentation in which the teacher candidates were given theoretical information on the evaluation and adaptation of English language teaching (ELT) materials such as adding, simplifying, and deleting. They are also given some practical experience in applying theoretical ideas to evaluating ELT materials. This lecture based introduction is then continued with implementing PBL. The researcher was the assigned instructor for this course.

3.3. The PBL Training

Teacher candidates were introduced to basic principles of PBL through a training session to help them become acquainted with the process of this innovative approach. The PBL training began first by presenting the problem-based learning process. A problem scenario was discussed and PBL activities were demonstrated, helping teacher candidates to construct the essential problem, and showing them how to consider various issues as well as materials development techniques and principles discussed earlier in the course. After this PBL training, the class was divided into seven groups, each consisting of four members. Being in their last year, all participating teacher candidates were concurrently involved in the Teaching Practicum course, which was a great opportunity in that they could identify a real problem related to the use of English textbook materials from their classroom observation, and they could easily carry out a research in the school context.

Table 1. PBL Course Tasks.

Steps	PBL Tasks
1.	Defining the problem
2.	Writing a list of what you know about the problem (learning issues)
3.	Identifying what you should do in order to bring solution to the problem
4.	Doing research to solve the problem
5.	Reading the relevant literature
6.	Implementing the solution in school context
7.	Writing solution to the problem
8.	Writing a project
9.	Oral presentation of the project
10.	Reflection of one's learning in the PBL process

The teacher candidates were given an instructional plan to serve as a guide; therefore, they knew what their responsibilities were for each week in the PBL program. In each group, one student acted as a facilitator whose task was to ensure that the group kept its deadlines and performed its tasks. Teacher candidates completed weekly planning to guide their learning for the following week, and they had an

easy access to the university library as well as computer resources to carry out their PBL tasks, as illustrated below:

In each group, the participants brainstormed the problem. They wrote an individual preliminary analysis of the case or the problem related to the use of ELT materials. They discussed the individual preliminary analyses and generated the learning issues (the list of facts and concepts that needed further exploration and resources that would be needed) they intended to investigate. They, then, submitted a report on their proposed problem to seek approval from the tutor, the author of this paper, to proceed with their project. The tutor examined the problem and clarified what they knew and did not know about solving the problem.

Each group member worked on different parts of the learning issues, which they brought to class and discussed. Collectively, they constructed a workable solution. The groups then employed research strategies to collect relevant information. They discussed their findings and developed an outcome for the problem. They applied their solution to students at schools where they carried out their school practicum. At the end of the process, teacher candidates wrote problem-based project, and presented their findings to other groups in their group project presentation.

3.4. The Assessment Process

The participants were required to submit a weekly on-line reflective journal in which they recorded their reflections on their learning and challenges, if any, they experienced. Although the participants were permitted to work with their group members, each was required to submit his/her own journal in which they were instructed to reflect on their weekly experiences within this innovative approach. In addition, the participants were provided with weekly tutorials in which they were supplied with the necessary support and guidance. At the end of the PBL course, they were interviewed individually to elicit further on their learning process and to capture additional aspects of learning through problem-based process.

The participants were assessed through a group oral presentation and a written report about their project. The group oral presentation consisted of both the individual and group assessment. It was essential that problem scenarios were clearly related to materials used by the students, and an explicit decision to provide a solution to the problem was provided.

Participants were scored on their ability to

- (a) identify the central problem,
- (b) state the problem definition,
- (c) generate varied questions,

- (d) relate the solution to the problem,
- (e) provide a feasible solution,
- (f) use the literature and other resources to support their solution,
- (g) evaluate the solution.

3.5. Data Collection and Analysis

Data were collected using reflective journals the teacher candidates submitted every week, interviews held at the end of the PBL course, an examination of the written PBL projects, and oral presentation of the projects.

The reflective journals and interviews were analyzed qualitatively with an interpretative phenomenological approach (Patton, 1990), focusing on the individual participant's reflections of his/her experiences within the PBL program. Wiersma and Jurs (2005) point out that analysis in qualitative research is "a process of successive approximation towards an accurate description and interpretation of the phenomenon" (p. 206). The process of qualitative data analysis involved organization of information, categorization, obtaining data reduction by means of coding, description and synthesis. The interviews were transcribed.

The data from interviews and journals were read a number of times "to have a sense of the scope and holistic nature of the data" (ibid., p. 259). Following the strategy of analytic induction (Creswell, 2006), salient comments with regard to teacher candidates' experiences of PBL were repeatedly read through the completed interview transcripts or journal entries. At the end of this process of reading, some preliminary ideas for developing a coding system emerged, which provided a meaningful separation of the information, and was used to develop the starting description of categories.

In addition, teacher candidates' written projects on PBL were evaluated to determine the extent to which they were able to carry out their studies within the PBL course.

4. Findings

The PBL project groups focused on different aspects of materials evaluation and adaptation: one PBL group focused on grammar-related problem, one listening-related problem, one group writing-related problem, one speaking-related problem and three groups focused on reading-related problems. The original data excerpts from teacher candidates' projects, reflective journals and interviews were extracted in the teacher candidates own words, as illustrated in the following section.

4.1. Sample 1: PBL Group Focusing on Grammar-Related Problems

The PBL group who focused on investigating grammar-related problems stated the problem as follows:

The reason why we decided to focus on problems related to grammar activities is because we interviewed students and asked questions about the difficulties they face while learning English. They firstly complained about the grammar, stating that they did not like grammar because they got bored in the lesson. They additionally expressed that the grammar activities in the textbook were boring and did not attract their attention. Hence, they were looking for more enjoyable and colorful activities. As for the teacher, he confirmed that the book was not suitable for effective language teaching; especially the grammar parts contained boring and ordinary activities for high school students. After the interviews, we arrived at the decision that our problem should focus on adapting grammar activities in the course book.

The group decided to omit the repetitive grammar exercises, and add original and pleasurable communicative activities using adaptation techniques.

4.2. Sample 2: The PBL Group Focusing on Writing-Related Course Book Materials

The PBL writing group expressed their problem as follows:

According to our observation of intermediate level high school students and the interview with the teacher, we identified the main area where students have difficulty was in terms of productivity in writing. The productivity problem can be avoided by combing writing with other skills. The main reason why the students have trouble in writing is the fact that they are exposed to free writing without being given sufficient guidance. The teacher's expectation becomes an obstacle for students' productivity and creativity. To illustrate, the book presents a specific topic and students are asked to write about it without being provided any guidance or directions. As a result, students' writing lacks in creativity.

Following the steps described in the preceding section, and relating to the relevant literature, this PBL group, as a solution to the problem, added some guided writing tasks, and observed its effects on the student's writing. By focusing on the most problematic writing tasks in one unit in the textbook, the PBL writing group members decided to add a guided writing. This adaptation involved explaining clearly the organization of a paragraph; namely, starting with a topic sentence, supporting the topic sentence and concluding a paragraph in an outline form to help students get the maximum benefit from their writing.

4.3. Sample 3: PBL Groups Focusing on Reading-Related Course Book Materials

Three PBL groups, after a preliminary investigation to identify the problem, decided to focus on reading related problems existing in the course book of grade nine students. The rationale for focusing on adopting the reading materials is explained in the problem statement of the following group:

We concluded that the reading skill is not focused on adequately. The pre and post reading activities are poor. The instructions are not clear. No information is given about what the students are expected to do during the reading process. As there is no pre-reading information, students read the text without a clear aim. As a group, we consider that it is very crucial to make students conscious about what they are going to read by using adaptation techniques.

This PBL group supported their research with schema theory. Using the adaptation technique *adding*, the group added as a pre-reading activity to the reading text about traffic rules, four traffic signs and some questions, illustrated below:

Look at the signs below. Do you know about their meaning? Try to guess what they can be?

Why do you think the traffic signs are necessary?



Figure 1. Traffic Signs as a Pre-Reading Activity.

The post-reading activity produced by the teacher candidates for the same reading text was the following matching the words and pictures activity:

ARAÇ DURDURMA İŞARETİ "SOLA"



()

a) Driving license

d) Do not park here



()

b) Policeman

e) Taxi driver



()

c) Do not enter

f) Passport

Figure 2. Matching Activity as a Post-Reading Activity.

Another pre-reading activity was to add a spider diagram and some key words relevant to the reading text to raise students' prediction of the text and give them a purpose for reading by adding the following questions:

Table 2. Key Words Used in the Pre-Reading Activity.

What do you think the passage is about?	
*describe	*humorous
*best friend	*blue eyes
*brown hair	*tall

As the original text lacked appropriate post-reading activities, the following post-reading activity is added.

Look at the key words below and match them with the items in the chart.

Table 3. Post-Reading Activity.

1. lovely face	2. brown hair	3. outgoing person
4. watching films	5. serious	6. doing puzzles

(a) physical appearance _____

(b) hobbies _____

(c) personality _____

As reported by the PBL group below, the students' response to each activity was highly positive:

Students enjoyed pre-reading activities because the visuals attracted their interest and they became motivated. The traffic signs and the diagram were found amusing. Nevertheless, it was not the same for post-reading activities. For the reason that the students were not accustomed to doing different kinds of activities they had a little confusion, but they quickly adapted to the situation. Despite being unfamiliar to such activity types, they were rather successful. The teacher also thanked us for our efforts.

4.4. Sample 4

The last PBL group's reading related project identified lack of authenticity as a problem, as stated below by the group members:

The reading texts in the book do not include authenticity. The topics are not about current events to engage students' interests, and the texts are boring. Also, they lack interesting and attractive visuals to draw students' interest to the text.

In working towards solution to the problem, the group worked on one of the reading texts, which is about Hong-Kong. The problem is further specified as:

The original reading text was about Hong-Kong's climate with its hottest and coldest temperatures. We did not find anything in the passage to address students' interest and reflect authenticity, so, we changed the subject from climate in Hong-Kong to climate in Turkey and added the effect of global warming which has recently come to the world's agenda. We thought that by adaptation, we would be able to help students understand the passage better in addition to increasing their interest in the world's climate issues. We applied our adapted materials to the students in 9th class.

The PBL group also decided to add drama, as described below:

We wanted to integrate students' reading skill with speaking. We bought a puppet to the classroom, named it 'Puppy' and we encouraged students to talk with Puppy about the climate in Turkey and the global warming. They asked Puppy some questions, and shared their opinion with Puppy. After eliciting their background information about the topic through speaking, we delivered the reading passage about the climate in Turkey and global warming which we adapted according to the level of the students, using the adaptation techniques modifying, adding and simplifying. The original and adapted text differed from each other. The adapted one is more actual and interesting with its interesting picture. After the students read the passage, they answered three questions:

The adapted text is illustrated below:

The Climate of Turkey and Global Warming

Turkey is one of the major centers in the world. It is a popular tourist attraction. In Turkey, the summer lasts from April to September. It is hot and arid. August is the hottest month of the year. The winter shows itself from October to March. It is cold and rainy in the winter. January is coldest month of the year. Recently, there has been a global warming which has also influenced Turkey as well as the world. It has caused the weather to be either very hot or very cold, because it causes the world to warm day by day. According to the reports which are given recently, if we don't solve this problem, there will be no rainy day in the world and we will suffer with drought.

- 1 When does the summer come to Turkey?
- 2 How is the winter in Turkey?
- 3 Global warming causes the world to warm day by day. What can we do to impede drought caused by global warming?

After delivering the adapted text in the class, the PBL group stated that feedback they received from the students was highly positive. As one of the group member reported:

I found it very useful to sensitize the students with a current topic. By making them aware of global warming, we managed to get them to think about 'how we can fight against global warming'.

Another group member confirmed that

In this adapted text, students found something from their real lives more than they would find in the original text about Hong-Kong's climate. The puppet we used for speaking section about the topic was also very useful. It leads the students to enjoy the lesson and keep their attention on the topic.

5. Discussion

Based on the qualitative analysis of the reflective journals and interviews eliciting the perceptions of the teacher candidates on the PBL course, several major themes were identified indicating the benefits offered by the PBL programme, as illustrated below:

5.1. Benefits Offered by the PBL Course

All teacher candidates stated that they clearly benefited from the PBL course; the course prepared them for teaching profession, it enabled them to put theory into practice, provided them with opportunities to identify realistic problems relevant to the ELT profession, equipped them with the strategies to solve the problem, promoted research skills, and collaboration to work in a group. Findings from the interviews confirm findings from the reflective journals. Sample extracts are included to demonstrate teacher candidates' experiences of this innovative approach.

5.1.1. Preparation for the Teaching Profession

The first most commonly expressed theme was that PBL prepared them for their teaching profession, as stated by the following extracts:

The first thing I have found useful from this course is that I will benefit from the adaptations I have made in my profession as I am planning to be a challenging teacher. This course has been very good experience for me as a teacher candidate in the last year of my education. I learnt many things that better prepare me for my future teaching job. For instance, the process of achieving solutions for the students' problems of unproductively in writing makes me feel very satisfied. One of the golden things I found very useful in this project is, the lesson has made us realize the appropriate modification methods.

The following participants share the same views:

Thanks to this project, I believe that I will be able to perceive the problem in my teaching and with very few adaptations; I will make the material more effective for my students by using various adaptation techniques such as adding, deleting, modifying, simplifying, and reordering. Problem-based project was new for me, and I consider I have learned how to prepare one, and so thanks to the problem-based project I can apply material adaptation techniques in my own teaching career.

5.1.2. Putting Theory into Practice

The next benefit participants reported to have gained was that they could connect theory with practice as stated by the following extracts from reflective journals:

I learnt how to put my knowledge into practice. I know that ability to evaluate and adapt teaching materials effectively is very important for us as teacher candidates. I've learned adaptation techniques which I can effectively use according to different problems. Also we had a chance to put the adapted materials into practice to see if they work or not.

We had the opportunity of connecting our knowledge to real situation. Thanks to this project, we made an introduction to teaching in a real classroom context. Therefore, the presentation was really authentic; we strived to apply our theoretical knowledge in practice.

5.1.3. Gaining Real Life Experience

Teacher candidates acknowledged that the PBL project gave them a real life experience, as stated below by several participants:

In my opinion, this project helped us learn how to adapt materials when necessary. Also, it provided us with the necessary information about how to make an activity interesting enough for students to enhance motivation. Furthermore, as we applied it, we had the chance to evaluate the results of our adaptations on the students.

I've learnt that we don't have to stick to the materials in the course books. Instead of using materials which are not interesting or appealing for the students we can make them so by modifying them or changing them. For example, in this project we modified the texts about the Tintagel Castle and British Museum and we also used Anavarza Castle which is familiar to the students and which made the lesson more interested.

I have learned many things what I must do in real situation. I learned that I can make reading lesson enjoyable with the help of picture, pre-reading, while reading and post reading sections. I have practiced many materials adaptation techniques such as adding picture, modifying a text as appropriate top re-reading, while-reading and post-reading sections. In the future, the knowledge I have learned in this Project will be very useful in my lessons.

5.1.4. Ability to Identify Realistic Problems Relevant to ELT Profession

Teacher candidates stated that they gained the ability to identify a specific problem, as reported below:

Now, I know that I can find problem easily and adapt it according my students' necessities. This is the most beneficial thing I have found in this project. To find a problem and to determine how to solve this problem with the materials adaptation techniques I have learned and

with the suggestions of the theorists.

At the outset, I can say that I've come to a qualified level in identifying a common or specific problem that is possible to meet in a classroom context. In addition, taking into consideration the needs and interests of students, it should be the duty of teachers to adapt materials according to changing learning situations. This course has made me knowledgeable about this issue.

5.1.5. Developing Problem Solving Strategies

Similar to the comments prospective teachers made on gaining the ability to identify a specific problem in relation to the use of an ELT material, they also agreed that the PBL helped them develop their problem solving strategies, as reported by several participants:

The project has taught me how to improve strategies to solve problems by giving the maximum benefit of our materials with adaptation, how to make use of my knowledge and how to be much an effective teacher are the most visible and observable benefits of my problem solving project experience.

With the help of this project, I can state that I have learned the necessary strategies to make adaptations in order to trigger the critical thinking skills and productivity of students as a solution to students' writing problems. It is worth bearing in mind that effective adaptation is a matter of making the material more relevant to students.

No book is perfect; all books have some deficiencies in some aspects. Hence, a good teacher must be able to adapt the book according to his or her students' needs, interest, level and background knowledge, and I believe that Material Adaptation and Evaluation Course equipped me with the necessary skills to solve the problems that are related to all language skills. Now, thanks to this course I know how to modify, simplify, and re-order, etc. Moreover, the course requirement us apply our solutions in real classroom situation helped me combine my classroom learning to real life. I contemplate this idea was very creative since we had a chance to see our solutions' reactions on pupils.

5.1.6. Developing Research Skills

Along with developing problem identification and problem solving skills and strategies, the next benefit teacher candidates reported to have gained was developing research skills. The following participant who focused on adopting a listening material stated that:

This project has contributed to my personal development in many ways. First, it helped me to develop my research

skills as I made a lot of research. I also learned a lot of useful information about listening from the articles I have read. I am sure that this knowledge will be useful for me in my future life as a teacher.

This is the first time that I have prepared a problem-based project. Now with the help of this project I have learned how to prepare one, if I'm asked to prepare one in my other courses, I can prepare it easily, and more importantly I can ask my own students to prepare one, and guide them while they are preparing their own projects.

Throughout the project, we have made a deep search for activities, strategies, adaptation techniques, etc. So, this study helped us to think both critically and creatively, to learn how to look from different perspectives. Moreover, with the help of this project, I have learnt that before making adaptations, we should take some important points into consideration such as the aim, students' level and their interests and so on.

5.1.7. Gaining Deeper Knowledge

We have broadened our knowledge about some new techniques and strategies that can be applied in the skill "listening". Furthermore, I have learnt the importance of pre, while and post listening activities and what to do or what kind of activities to apply in each stage.

This project has provided us with a deeper understanding of adaptation. All in all, with the help of this study, I have learnt many important things in detail related to material adaptation such as adding, deleting, omitting, modifying, simplifying and reordering etc.

5.1.8. Collaboration

The final benefit gained from the PBL project was collaboration, reported below:

Working in a group has given me the chance of learning about different ideas about the same problem and respecting each other's opinions, which I found beneficial for getting wider perspectives to the issues. I enjoy this process and I get the maximum level of satisfaction from this project by overcoming all the difficulties and turning all the obstacles into benefits.

As we worked in a group of four, we could discuss, share our ideas and identify the deficiency of each other. To sum up, this project is well-designed for group working and acquiring the crucial skills in adapting the materials.

5.2. Challenges Offered by the PBL Course

The PBL course posed some challenges to teacher candidates, as discussed below:

5.2.1. The Initial Challenges

As the PBL was an innovative experience for the teacher candidates, initially they reported to experience some challenges in identifying the problem, reported below:

Firstly it was quite difficult to find a problem.

Since both the students and the teacher had many problems about the course book, we could not decide on a specific problem for some time. On being asked to prepare a project based on problem-solving, I had some questions in my mind about how to start it, yet I began to get accustomed to it as it progressed.

Finding a problem is the most difficult step of this project. As a group, we had to examine the course book very carefully. Sometimes, a problem that we found was not a matter for students and teachers.

5.2.2. Challenges of the Materials Adaptation Process

Along with the challenges experienced in specifying a problem, teacher candidates stated that they also experienced some difficulties in deciding what adaptation techniques to use, as reported below in reflective journals:

At the stage of making adaptations, I faced difficulty in deciding what kinds of adaptations I could make. As my research is related to a speaking problem, it was hard for me to find appropriate activities for speaking. I had some hesitations if the students would like this activity or get involved in it.

I think the main challenge we faced was when we were adapting the original reading passage to an adapted and more actual one. Since global warming is a scientific topic it includes some academic words and phrases, it was not so easy to simplify it to students' level. However, we managed to overcome with this difficulty by mentioning only about the general points of global warming without focusing on details.

5.2.3. Challenges of Implementation

The first challenge teacher candidates experienced during this process was getting permission from the teacher. As the candidates were required to put their adapted materials into practice they had to get permission from the school teacher to allow them to teach in their lesson, as stated below by a teacher candidate:

The teacher was unwilling at first as she felt pressured to complete the school syllabus. So, it took some time to persuade her and at the end she let us present our solutions in the classroom.

The participants stated that presenting their adapted

material to the students was their first experience of teaching in real classroom atmosphere. Thus, they felt excited about it:

I got a bit excited while applying the activities. Though, we had practiced many times beforehand, I think the classroom situation is very different since the students you address to are real. They listen to what you teach, join, ask questions and so on. Because of all these reasons, I got anxious at the beginning of our lesson; but as the students began to understand what we taught and joined the lesson, I got relaxed and everything went on well.

The final challenge related to implementation was attributed to the students' initial response to the adopted new teaching materials:

I found that discrepancy between traditional and new perceptions hindered our actions. At first, students became entangled with the new methods that we used. But then, they got the aim of our method and they enjoyed the way we presented activities.

We had another minor difficulty in getting the students to talk English all the time. While they were trying to speak with Puppy, they usually attempted to use their mother tongue. We overcame this difficulty by interfering in their speech and request them to use English saying "Puppy doesn't understand Turkish".

The second difficulty was while we were getting the students to talk with Puppy. They got excited and caused a little noise to talk with Puppy. To take classroom management under the control, we wanted them to raise their hands when they want to speak, so, the difficulty was handled.

In conclusion, teacher candidates sincerely expressed that students responded positively to their implementation and that they felt highly satisfied with their PBL project. The sense of satisfaction experienced by all teacher candidates is highlighted in several interview extracts below:

After we applied our adapted materials to the students in the lesson, they listened to us very carefully. When we asked the questions, they answered the questions willingly and got motivated. We had an enjoyable lesson with this adapted version of the reading paragraph. We were able to solve the problem in getting the students understand the reading text more easily. Because, we added a pre-reading section to our adapted material. So, students had pre-knowledge about the text. Then post reading questions were answered by students. So our adapted materials included many activities which made the students active. And also, the teacher liked the method and congratulated us.

Students' reactions to our adapted material have been really good. They participation makes me taste the feeling of reaching the aim of solving the problem to a significant degree.

I want to add that thanks to this project I saw the fact that the more interesting the topic is the more the students get motivated. After we prepared posters, colorful reading texts and slide shows I observed that students got more involved in the lesson. They were much more interested in the topics. To sum up, this project provides me to develop myself in many areas of language teaching.

The project was a challenging one. It was a highly effort-requiring project. We individually put lots of efforts in it and gave it great importance. I believe it has already provided me advantages. I am sure that I will use the experience I acquired from this project in my career.

This study explored the participants' perceptions about the implementation of PBL after having been involved in the *Materials Adaptation and Evaluation* teacher education course designed according to the PBL process. As revealed from the teacher candidates' responses to reflective journals and the interviews as well as their problem-based projects, participants expressed a high level of satisfaction with this innovative experience. Among several benefits, teacher candidates agreed that the PBL prepared them for teaching profession, it enabled them to put theory into practice, provided them with opportunities to identify realistic problems relevant to the ELT profession, equipped them with the necessary strategies to solve the problem. Furthermore, as the reflective journal and interview extracts indicated, involvement in the PBL course promoted deep thinking promoted research skills, and collaboration in group work. The few other studies (Schwartz, Bransford and Sears, 2005; Bereiter and Scardamalia, 2006; Hmelo-Silver, 2004) reported similar findings although the contexts of those studies differed from that of the current study.

Data collected through reflective journals are in agreement with interviews: as a result of participation in PBL, the majority of the students admitted that they became more confident in their ability to identify a problem and solve it effectively. A study on the problem based process (De Simone, 2008) reported similar findings, which suggest that PBL has an impact on promoting teacher candidates' problem solving abilities.

The findings also indicate clearly that PBL learning environment, by interlinking education and practice together, is likely to eliminate many of the current dissatisfactions in teacher education and teachers' actual teaching practices. The results of this study point to the benefits of PBL to address the problem solving skills of the teacher candidates. Teaching

is a complex enterprise and professionals, such as teachers face a real challenge in eliminating the divide between practice and theory. Based on the findings of the study, PBL, with its emphasis on both theory and practice could be one of the most appropriate vehicles for closing the gap. In PBL the interconnection between theory and practice fosters prospective teachers' problem solving, especially their ability to identify and define real problems, generate solutions and use both theoretical and practical resources to support the solution.

6. Conclusion

The main objective of this study was to examine how a PBL course can be developed and implemented in order to equip teacher candidates with the necessary skills to enable them to solve real world problems related to their subject area, and to investigate the benefits and challenges posed by this innovative approach to learning. Introducing PBL into the *Materials Evaluation and Adaptation* course has been a rewarding experience for the teacher candidates.

While the design, planning, and implementation of problem-based learning is a highly time consuming enterprise, it is a powerful strategy that can be utilized in teacher education. The main issue in this line of inquiry is the long-term use of PBL. Hence, further research is needed on the extent to which teacher candidates draw upon PBL in the longer term, particularly, when they are in practice as professionals to work through pedagogical and classroom problems, and also on what factors foster or challenge the extent of their use of PBL strategies.

This study has provided a conceptual framework which might easily be applied to any area of teacher education. PBL, which engages teacher candidates in developing a context-rich knowledge base and the skills for applying that knowledge, can be applied in a wide variety of classroom settings.

References

- [1] Barell, J. (2007). *Problem-Based Learning: An Inquiry Approach*. California, U S. Corwin Press.
- [2] Bereiter, M., and Scardamalia, C. (2006). Knowledge building: Theory, pedagogy and technology. In K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences* (pp. 97-118). New York: Cambridge University Press.
- [3] Biggs, J. (2003). *Teaching for Quality Learning at University: Second Edition*, Maidenhead: The Society for Research into Higher Education and Open University Press.
- [4] Boud, D. (1985). Problem-based learning in education for the professionals. In M. C. Wittrock (Ed.), *Handbook on research on teaching* (pp. 10-15). New York: Macmillan Publishing Company.

- [5] Cotton, D., Falvey, D., and Kent, S. (2006). *Market Leader* (New Edition). UK. Pearson: Longman.
- [6] Creswell, J. W. (2006). *Research Design: Qualitative, Quantitative, and Mixed Method Approaches*. 2nd ed. Thousand Oaks, CA: Sage Publications. Barrows and Tamblyn.
- [7] Brown, J., Collins, A., and Duguid, P., (1989). Situated cognition and the culture of learning. *Educational Researcher* 18, 1, 32–42.
- [8] De Simone, C. (2008). Problem-based Learning: a framework for prospective teachers' pedagogical problem solving. *Teacher Development*, 12, 3, 179–191.
- [9] Duch, B. J., Groh, S. E., and Allen, D.E. (2001). *The Power of Problem-Based Learning*. Stylus: Sterling, VA.
- [10] Gijbels, D., F. Dochy, P. Van den Bossche, and Segers, M. (2005). Effects of problem-based learning: A meta-analysis from the angle of assessment. *Review of Educational Research*, 7, 27–61.
- [11] Harrington, H. L. (1995). Fostering reasoned decisions: Case-based pedagogy and the professional development of teachers. *Teacher and Teacher Education*, 11, 203-14.
- [12] Hmelo-Silver, C.E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review*, 16, 235–66.
- [13] Hmelo-Silver, C.E., and Barrows, H. S. (2006). Goals and strategies of a problem-based learning facilitator. *Interdisciplinary Journal of Problem-based Learning*, 1, 21-39.
- [14] Lambert, M., and Ball, D. L. (1998). *Teaching, Multimedia, and Mathematics: Investigations of Real Practice*. New York: Teachers College Press.
- [15] Leedy, P. D. (1997). *Practical Research: Planning and Design*. (6th ed.). New Jersey: Prentice-Hall, Inc.
- [16] Schwartz, P., Mennin, S., and Webb, G. (2001). *Problem-Based Learning: Case Studies, Experience and Practice*. London: Kogan Page Limited.
- [17] Stetton, A. (1985). Problem Based Learning and the Academic-Practitioner Gap. In D.
- [18] Mayer, R.E., and Wittrock, M. C., (2006). Problem solving. In P. Alexander and P. Winne (Eds.), *Handbook of educational psychology* (pp. 287–303). 2nd ed. Mahwah, NJ: Lawrence Erlbaum.
- [19] Merseeth, K. K. (1996). Cases and case methods in teacher education. In J. Sikula (Ed.), *Handbook of research on teacher education* (pp. 722–44). 2nd ed. New York: Macmillan.
- [20] O'Donnell, A.M. (2006). The role of peers and group learning. In P. Alexander and P. Winne (Eds.), *Handbook of educational psychology* (pp. 781–802). 2nd ed. Mahwah, NJ: Lawrence Erlbaum.
- [21] Patton, M. Q. (1990). *Qualitative Evaluation and Research Methods*. (2nd ed). Newbury Park: Sage Publications, Inc.
- [22] Putman, R., and Borko, H. (2000). What do new views of knowledge and thinking have to say about research on teacher learning? *Educational Researcher* 29: 4–15.
- [23] Schwartz, D., Bransford, J., and Sears, D. (2005). Efficiency and innovation in transfer. In J. Mestre (Ed.), *Transfer of learning from a modern multidisciplinary perspective* (pp. 1–52). Greenwich, CT: Information Age.
- [24] Shulman, L. (1987). Knowledge and teaching: Foundations of a new reform. *Harvard Educational Review*, 57, 1–22.
- [25] Spiro, R.J., Feltovich, P. J., Jacobson, M. J., and Coulsen R. L., (1992). Cognitive flexibility, constructivism, and hypertext: Random access instruction for advanced knowledge acquisition in illstructured domains. In T. M. Duffy and D.H. Jonassen (Eds.), *Constructivism and the technology of instruction: A conversation* (pp. 57–75). Hillsdale, NJ: Erlbaum.
- [26] Spiro, R. J., Vispoel, W.P., Schmitz, J.S., Samarapungavan, A., and Boerger, A.E., (1987). Knowledge acquisition for application: Cognitive flexibility and transfer in complex domains. In R.C. Britton (Ed.), *Executive control processes* (pp. 171–89). Hillsdale, NJ: Erlbaum.
- [27] Tabachnick, B.G., and Fidell, L. S., (2001). *Using Multivariate Statistics*. 4th ed. Needham Heights, MA: Allyn & Bacon.
- [28] Torp, L.T., and Sage, S. M., (2002). *Problems as Possibilities: Problem-based Learning for K-16 Education*, 2nd ed. Alexandria, VA: Association for Supervision and Curriculum Development.
- [29] Walton, H. J., and Matthews, M. B., (1989). Essentials of problem-based learning. *Medical Education*, 23, 542–58.
- [30] Wiersma, W., and Jurs, S. G., (2005). *Research Methods in Education*. London: Pearson Publishers.
- [31] Zeichner, K. M., and Conklin, H.G. (2005). Teacher education programs. In *Studying teacher education: The report of the AERA panel on research and teacher education*.