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A CONTENT ANALYSIS ON PROBLEM-BASED LEARNING APPROACH

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ABSTRACT

Problem Based Learning is one of the learning models that contain the general principles of active learning and students can use scientific process skills. Within this research it was aimed to investigate in detail the postgraduate thesis held in Turkey about PBL approach. The content analysis method was used in the research. The study sample was consisted of a total of 64 masters and PhD thesis made between the years 2012-2013 and reached over the web. A "Content Analysis Template" prepared by researchers was used with aim to examine the thesis. All the thesis were examined and classified in the computer environment. As a result of the investigation, the topics, study groups, data collection tools and data analysis methods and techniques of the thesis made in Turkey about PBL research to be similar in terms, as well as quantitative research methods and experimental models has been shown to greatly preferred.

Key Words: *Problem Based Learning, Active Learning, Content Analysis*

PROBLEME DAYALI ÖĞRENME YAKLAŞIMI ÜZERİNE BİR İÇERİK ANALİZİ

ÖZ

Aktif öğrenmenin genel ilkelerini içeren ve öğrencilerin bilimsel süreç becerilerini kullanabilecekleri öğrenme modellerinden birisi probleme dayalı öğrenmedir. Araştırma kapsamında PDÖ yaklaşımı ile ilgili Türkiye'de yapılan lisansüstü tezlerin ayrıntılı olarak incelenmesi amaçlanmıştır. Bunun için içerik analizi yöntemi kullanılmıştır. Araştırmanın örneklemini web üzerinden ulaşılan ve 2002-2013 yılları arasında yapılmış toplam 64 yüksek lisans ve doktora tezi oluşturmuştur. Tezlerin incelenebilmesi amacıyla araştırmacılar tarafından hazırlanan bir "İçerik Analizi Şablonu" kullanılmıştır. Ulaşılan tüm tezler bilgisayar ortamında incelenmiş ve sınıflanmıştır. Yapılan incelemeler sonucunda,

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Türkiye'de PDÖ yaklaşımı ile ilgili yapılan tez çalışmalarının konu başlıkları, çalışma grupları, kullanılan veri toplama araçları ve veri analiz yöntem ve teknikleri bakımından benzerlikler gösterdiği, bunun yanında nicel araştırma yöntemlerinin ve deneysel modellerin fazlasıyla tercih edildiği görülmüştür.
Anahtar Kelimeler: *Probleme Dayalı Öğrenme, Aktif Öğrenme, İçerik Analizi*

INTRODUCTION

Today's educational mentality is based on students' reaching certain meaningful conclusions through their own experiences and acquiring new knowledge by constructing what they learn in their minds. That requires students to be active in learning environments. In this regard, Problem-Based Learning (PBD) is a learning method that makes students active in educational practices, provides them with opportunities, and allows them to use their individual and physical capacities.

Problem-Based Learning adopts the idea that learning must be complete and based on competence as life is full of efforts to recognize the problems encountered, to be aware of the importance of these problems, to understand the causes of such problems, to solve the problems, and to eliminate possible problems in advance (Biber, 2012).

Finkle&Torp (1995) define PBL as a programme development and teaching system that both improves students' problem-solving strategies and enables them to acquire core knowledge and skills about their disciplines simultaneously by attributing a role to them as an active problem-solver in the face of a problem situation not structured well that reflects real life situations confronted by them.

Savery&Duffy (1995) regard PBL as one of the best models of constructivist approach environments. Barrows associates PBL with Bruner's Discovery Learning Theory and argues that constructing knowledge around a real phenomenon may facilitate recalling such knowledge in similar situations (Tootle&McGeorge, 1998).

PBL focuses on real life problems. This method consists of three main components involving curriculum and education strategy that complement one another. These components are as the following (Torp&Sage, 2002);

- Students facing a problem situation,

- The fitness of the problem that enables students to learn and makes relevant ways for learning for the curriculum,
- Establishing teacher's creative learning environment that will enable students to think and search in order to facilitate their comprehension.

The philosophy, "students learn by working/studying like a scientist" underlies PBL. Thus, PBL process starts with problem-solving. In this way, students become individuals who can solve problems and think creatively and critically within the framework of learning (Roh, 2003). PBL environments are constructed to enable students to work in small groups and communicate with one another so that they can solve problems, think creatively and critically, and make decisions.

PBL process, which includes real-life problems, starts with focusing on problems. In this process, students try to formulate and analyze problems. PBL is a process where problems are presented and defined; questions to be searched are determined; suggestions and information collected by students through autonomous learning and thus problem-solving are handled; and evaluations are made through small group discussions. In PBL, students work in groups made up of 5 to 7 people by directing themselves in order to solve real world problems. In groups, students undertake one of the following roles: group leader, organizer, clerk, and group member. Students play different roles in different sessions so that they can learn the responsibilities required by all roles (Bridges, 1992). PBL is conducted on the basis of problem-solving sessions carried out in company with a special tutor. A problem-solving session has four main components (Karaöz, 2008);

- Problem (Scenarios)
- Learner
- Tutor
- Evaluation

PBL requires intense use of information sources by students. In problems, their definitions and the conditions giving birth to them are clearly stated. Problems are generally presented as scenarios that report events on related subjects. Being an educational tool, scenarios are the fictions that contain various problems which may arouse curiosity among students, make them think what such problems result from, and provide them with new clues and keep their learning motivations alive continuously on their way to their

targets. In PBL, scenarios are given to students in sessions. PBL sessions are the processes where each problem is presented to students in the problem-based education system; expectations from students are defined; and knowledge and skills are improved (Açıkgöz, 2007).

In PBL, tutor has a role different from that of traditional teacher. In this process, tutor acts like a team captain: poses problems, controls the process, assigns students, and provides them with small clues for accessing the information. In addition, s/he determines adequate time for the solution of problem by students and allows them to reach sources that are needed for accessing the information. Among his/her roles, the most important one is to guide students through solving problems and learning how to think and use the information (Şenocak and Taşkesenligil, 2005).

PBL introduces a new role to students in the classroom. In PBL process, students work in small groups and make decisions about their own learning. Moreover, students can exchange views with one another and express their opinions comfortably in groups (Ersoy, 2012).

There are considerable differences between PBL approach and direct instruction approaches employed in today's education system in terms of aim, teacher's role, student's role, and acquisition of knowledge. PBL method has important contributions to both affective and cognitive learning products. The present study aimed to examine thesis studies on PBL approach conducted in Turkey through content analysis and thus to determine the fields and age groups in/for which the method was used frequently or rarely as well as the quality of the results obtained and the trends in the research methods employed. It was considered that the research results would light the way for future studies and experts engaged in this field. In this respect, the study made an attempt to answer the below-mentioned research questions;

1. What is the distribution of the master's theses and the PhD theses on PBL conducted in Turkey between 2002 and 2013 by years?
2. What is the distribution of the master's theses and the PhD theses on PBL conducted in Turkey between 2002 and 2013 by thesis types?

3. What is the distribution of the master's theses and the PhD theses on PBL conducted in Turkey between 2002 and 2013 by research methods?
4. What is the distribution of the master's theses and the PhD theses on PBL conducted in Turkey between 2002 and 2013 by research models?
5. What is the distribution of the master's theses and the PhD theses on PBL conducted in Turkey between 2002 and 2013 by writing languages?
6. What is the distribution of the master's theses and the PhD theses on PBL conducted in Turkey between 2002 and 2013 by study groups?
7. What is the distribution of the master's theses and the PhD theses on PBL conducted in Turkey between 2002 and 2013 by data collection tools?
8. What is the distribution of the master's theses and the PhD theses on PBL conducted in Turkey between 2002 and 2013 by research subjects?
9. What is the distribution of the master's theses and the PhD theses on PBL conducted in Turkey between 2002 and 2013 by data analysis methods?
10. What is the distribution of the master's theses and the PhD theses on PBL conducted in Turkey between 2002 and 2013 by the results obtained?

METHOD

Research Model

Content analysis was used for examining the theses on PBL approach conducted in Turkey in detail. Content analysis refers to bringing together similar data within the framework of specific concepts and themes and interpreting them in an order understandable by readers (Yıldırım and Şimşek, 2006). Being a technique frequently used in social sciences, content analysis can be defined as a systematic and repeatable kind of analysis where some words of a text such as a book, a book chapter, a letter, a historical document, a newspaper heading, and a newspaper article are summarized in smaller content categories through codes based on specific rules (Sert et al., 2012). According to Yıldırım and Şimşek

(2006), main purpose in content analysis is to reach concepts and relationships that may explain the collected data.

The Scope of the Study and Data Collection Process

The present study was limited to the master's theses and the PhD theses on PBL approach conducted in Turkey. The theses included in the study were accessed through the Internet, "Council of Higher Education Thesis Center" being in the first place. Accordingly, 64 master's theses and PhD theses conducted between 2002 and 2013 were included in the study. All such theses were examined and classified in the computer environment.

A "Content Analysis Template" prepared by the researchers was used for examining the theses accessed within the scope of the study. The prepared template consists of thesis' name and type, publication year and writing language, the name of university and the institute where the thesis was conducted, problem statement, sub-problems and hypotheses, model and design, universe-sample or study group, sample selection method, data collection tools, data analysis techniques, and results. The prepared "Content Analysis Template" is given in the Annex 1.

The master's theses and the PhD theses included in the study were accessed by the researchers separately. The researchers worked together in the classification process. In this way, disagreements encountered in the classification process were settled instantly thereby finalizing the classification without any delay.

FINDINGS AND INTERPRETATION

This section presents the findings obtained from the master's theses and the PhD theses examined within the scope of the study and the interpretations concerning such findings.

The distribution of the theses on PBL approach conducted in Turkey between 2002 and 2013 by years was examined. The obtained findings are given in Figure 1:

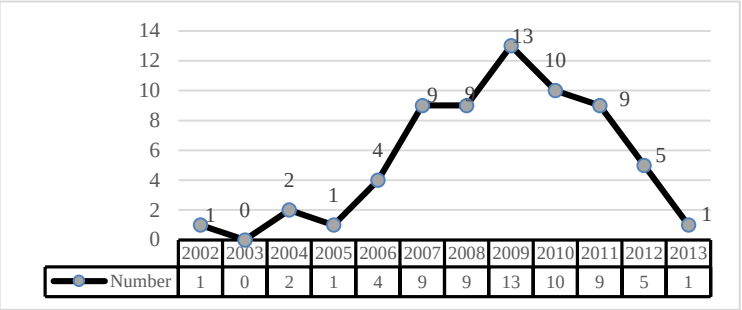


Figure 1: The Distribution of the Master's Theses and the PhD Theses on PBL Approach Conducted in Turkey between 2002 and 2013 by Years

According to the Figure 1, PBL started to attract attention in Turkey in 2004. It is evident from the continuous increase in the number of studies on this subject until 2009. It is seen that many thesis studies were carried out on this subject between 2006 and 2012 in particular. Figure 2 shows the distribution of the theses on PBL conducted in Turkey by thesis types;

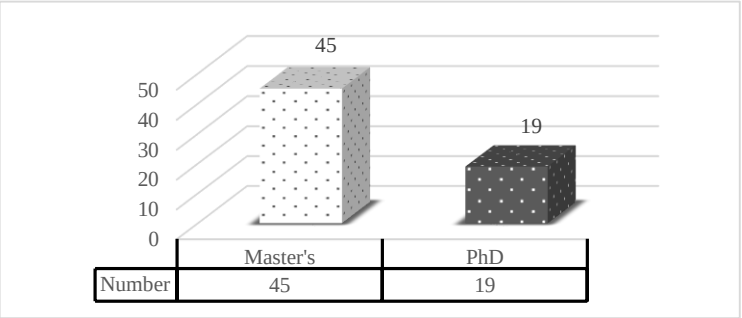


Figure 2: The Distribution of the Theses Constituting the Research Sample by Thesis Types

According to the Figure 2, 45 master's theses and 19 PhD theses were found in relation to PBL between 2002 and 2013. It is clear that more researchers adopted this subject in their master's theses.

The distribution of the theses constituting the research sample by research methods was examined. The obtained findings are given in Figure 3:

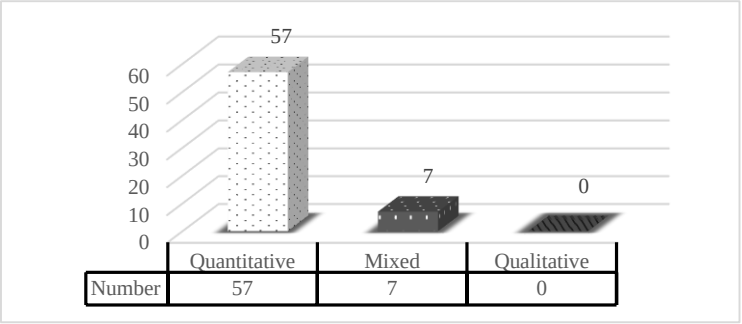


Figure 3: The Distribution of the Theses Constituting the Research Sample by Research Methods

According to the Figure 3, most of the researchers employed quantitative methods. In addition, mixed methods where quantitative research methods were supported by qualitative methods were used in recent years, too. However, it is interesting that there is no thesis study on this subject that adopted qualitative methods alone.
The distribution of the thesis studies on PBL by research models is given in Figure 4:

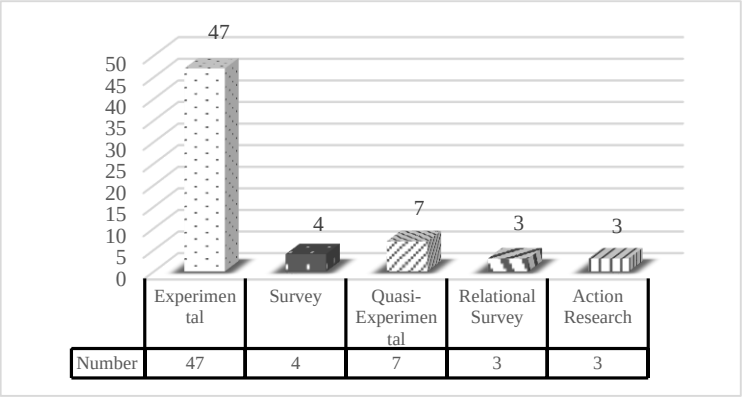


Figure 4: The Distribution of the Master's Theses and the PhD Theses Constituting the Research Sample by Research Models

According to the Figure 4, majority of the thesis studies employed the experimental model. There were also some quantitative studies

that employed quasi-experimental, survey, and relational survey research models. In general, the qualitative aspects of the studies involved the action research model. When the experimental designs of the studies using the experimental model or the quasi-experimental model were examined, it was seen that most of these studies employed the pretest-posttest control group design, and a small number of studies employed the nonequivalent control group design, the single-group pretest-posttest design, or the three-group pretest-posttest mixed experimental design.

The distribution of the theses examined within the scope of the study by writing languages was examined. The obtained findings are given in Figure 5;

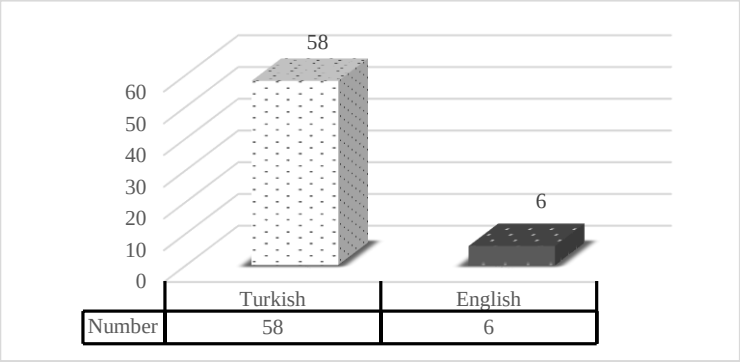


Figure 5: The Distribution of the Master's Theses and the PhD Theses Constituting the Research Sample by Writing Languages

According to the Figure 5, majority of the theses on PBL conducted in Turkey between 2002 and 2013 were written in Turkish, and only 6 theses were written in English.

The distribution of the theses on PBL under examination by study groups is presented in Figure 6:

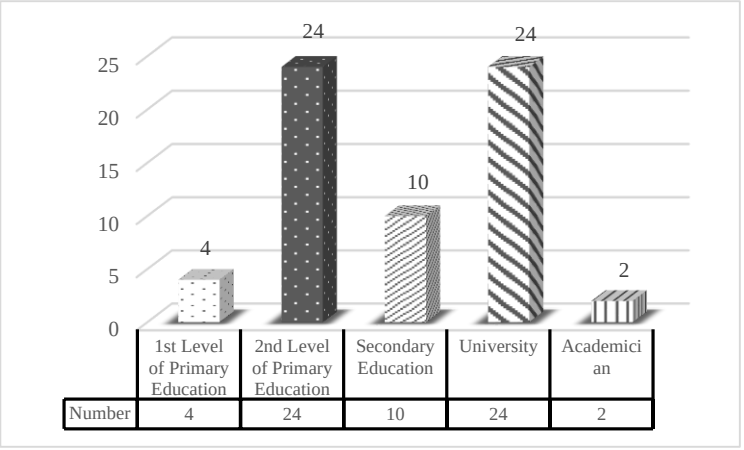


Figure 6: The Distribution of the Master's Theses and the PhD Theses Constituting the Research Sample by Study Groups

According to the Figure 6, most of the thesis studies on PBL focused on primary education 2nd level students and university students, and some (less frequently) covered secondary education students. Just a small number of studies included primary education 1st level students and academicians.

The distribution of the master's theses and the PhD theses on PBL by data collection tools was examined. The obtained findings are given in Figure 7:

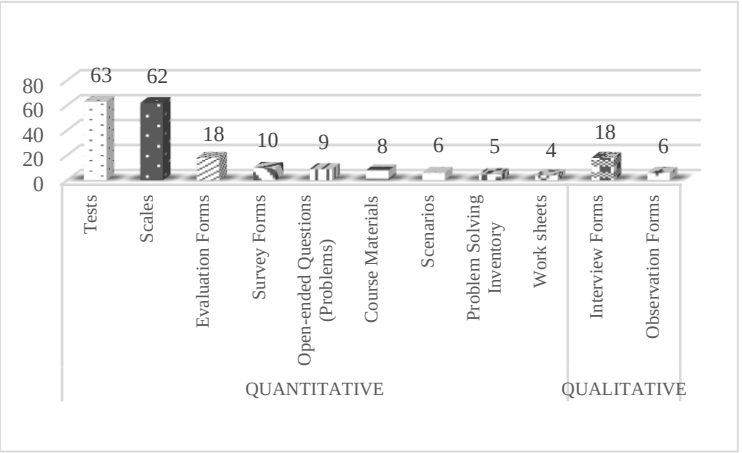


Figure 7: The Distribution of the Master's Theses and the PhD Theses Constituting the Research Sample by Data Collection Tools

According to the Figure 7, mostly tests and scales were used as data collection tools in the quantitative parts of the thesis studies on PBL. A considerable number of the tests used were academic achievement tests. Apart from that, the Scientific Process Skill Test was used in many studies, too. Some studies employed the Motivation Styles Test, the Concept Test, or the Permanence Test. Most of the scales used were attitude scales. Among such attitude scales were scales about attitude towards PBL (The Attitude Towards Problem-Based Learning Scale, etc.), scales about attitudes towards various courses and topics in which PBL was employed (The Attitude Towards Mathematics Scale, The Attitude Towards the Chemistry Course, The Attitude Towards the Biology Course, The Attitude Towards Renewable Energy, etc.), or scales about attitudes towards different teaching methods whose relationships with PBL were investigated (The Attitude Towards Web-Based Instruction Scale). Other scales used in the studies under examination were creativity scales, self-efficacy scales, scales for determining students' views, acquisition scales, problem-solving skill scales, and PBL environment scales. The theses under examination gave considerable coverage to evaluation forms and questionnaire forms, too. Among the evaluation forms used were PBL Practices Evaluation Form, Group-

mate Evaluation Form, and Scenario Evaluation Form that aimed to evaluate various components of PBL process. Among the questionnaire forms used in the examined theses were the Constructivist Learning Model Questionnaire, the Motivation Styles Questionnaire, and The Personal Information Questionnaire Applied in Normalizing. What is more, some studies employed open-ended questions, course materials, scenarios that were the educational tools of PBL, problem-solving inventories, and worksheets in order to obtain quantitative data. In general, interview forms were used for obtaining qualitative data. However, some thesis studies employed observation forms, too.

The distribution of the theses examined within the scope of the study by research subjects is given in Figure 8:

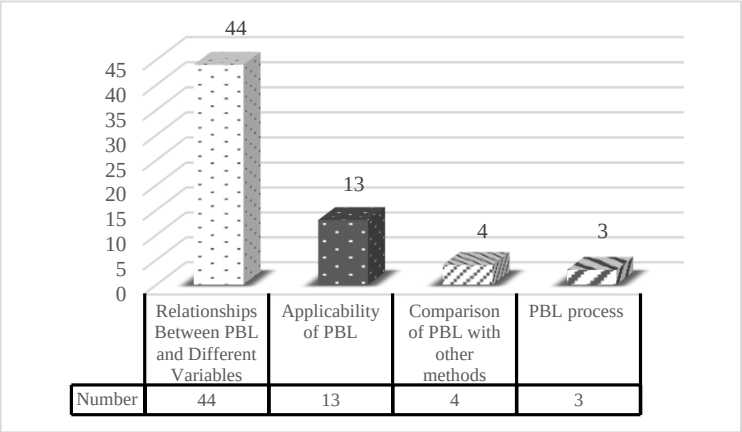


Figure 8: The Distribution of the Master's Theses and the PhD Theses Constituting the Research Sample by Research Subjects

According to the Figure 8, majority of the master's theses and the PhD theses on PBL conducted in Turkey dealt with the relationships between PBL and different variables. Many studies investigated the influence of PBL process on students' academic achievement levels and attitudes towards courses. There were also studies investigating the applicability of PBL. These studies made an attempt to obtain results in regard to the applicability of PBL in such courses as mathematics, geography, science, and music. A small number of

studies focused on PBL process or the relationships between PBL and other methods. Some studies compared PBL method with traditional teaching methods. The studies dealing with PBL process attempted to examine the contributions of the process to students' mathematical acquisitions, clinical reasoning levels, etc.

The distribution of the theses examined within the scope of the study by data analysis methods was examined. The obtained findings are given in Figure 9:

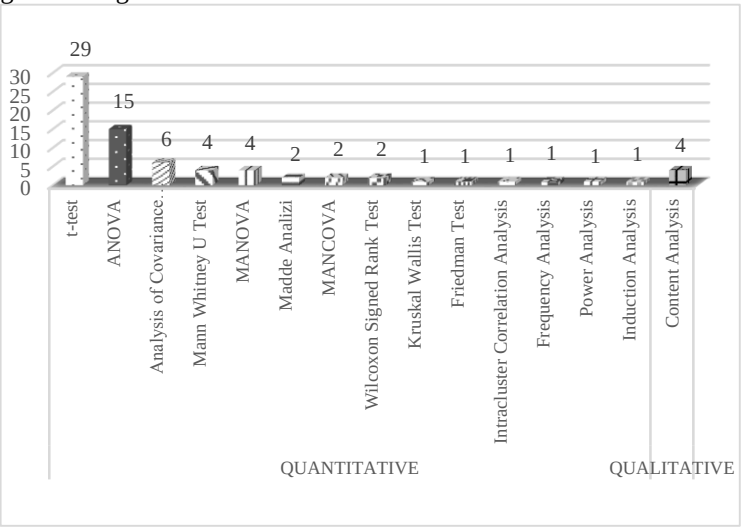


Figure 9: The Distribution of the Theses Constituting the Research Sample by Data Analysis Methods

According to the Figure 9, t-test was the data analysis technique used in the quantitative parts of the theses most frequently. On the other hand, many thesis studies employed the variance analysis. The qualitative parts of the thesis studies under examination, however, mostly analyzed data through content analysis to obtain research findings.

The distribution of the theses examined within the scope of the study by results was examined, too. The obtained findings are given in Figure 10;

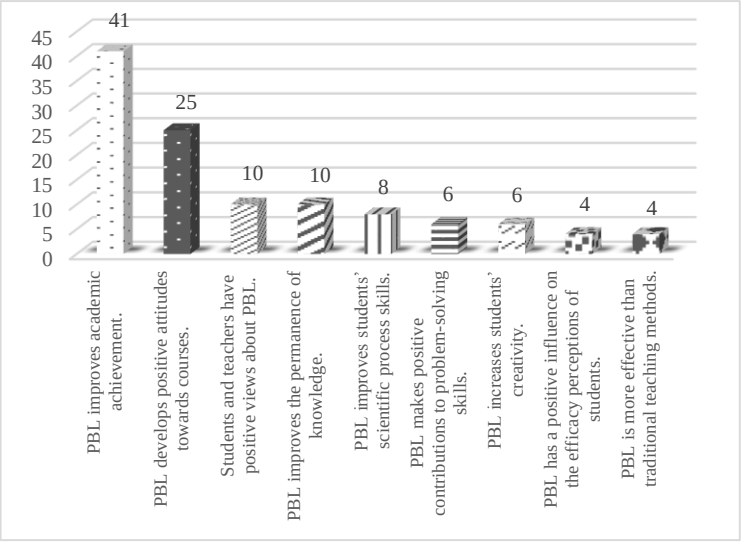


Figure 10: The Distribution of the Theses Constituting the Research Sample by Results

According to the Figure 10, a considerable number of master's theses and PhD theses on PBL under examination in the present study focused on the influence of the method on students' academic achievement and concluded that PBL improved students' academic achievement. A large part of the theses examined found out that PBL improves students' attitudes towards courses. The results obtained in the qualitative parts of the theses under examination revealed that students and teachers liked PBL method and participated in the learning process eagerly and with interest. A considerable number of the thesis studies demonstrated that PBL improved students' scientific process skills and the permanence of knowledge. Some studies indicated that PBL made positive contributions to students' problem-solving skills and competence perceptions and increased their creativity. Some studies compared PBL with traditional

teaching methods and concluded that PBL was more effective in making students gain acquisitions.

CONCLUSION AND DISCUSSION

This study examined the master's theses and the PhD theses conducted on PBL in Turkey between 2002 and 2013 through content analysis.

The examination of the distribution of the theses examined by years indicated that the first thesis study on PBL approach in Turkey was conducted in 2002, and this subject attracted wide attention as of 2006. The results of Alper et al. (2014) support that, too. The research findings demonstrated that interest in PBL approach in Turkey decreased gradually after 2009. However, such decrease may not reflect the truth. This is because; the theses on this subject may not have been entered in the system of the Council of Higher Education Thesis Center yet.

The number of master's theses on PBL approach was much more than that of PhD theses on PBL. In Turkey, the number of master's students is much more than that of PhD students. That may have led to a bigger number of master's theses than that of PhD theses. In addition, the theses examined in the present study were accessed through the Council of Higher Education Thesis Center, and the contents of PhD theses in particular could not be reached due to the limitations imposed by the authors of such theses. That may have been influential on this finding.

It was seen that the theses conducted on PBL in Turkey mostly employed quantitative research methods, but rarely used mixed methods. The results of Ulutaş and Ubuz (2008), Sert et al. (2012), Çiltaş et al. (2012), and Alper et al. (2014) support the above-mentioned result of the present study. Hart et al. (2009) examined 710 studies selected from educational journals published abroad and determined that 50% of the said studies employed quantitative methods, 21% employed qualitative methods, and 29% employed mixed methods. That implies that different research method trends prevailed abroad. It is remarkable that no thesis examined within the scope of the present study employed qualitative research methods alone. That may be explained by the fact that qualitative research tradition has started to develop in Turkey only in recent years, and researchers mostly used qualitative methods for supporting the

obtained quantitative results rather than using qualitative methods alone until recently.

It was observed that the research models used in the theses under examination most frequently were experimental and quasi-experimental models. However, survey and action research were used quite rarely. PBL approach does not have a long history in Turkey. Thus, researchers are curious about the results to be obtained when the method is applied in different age groups and different disciplines. That may be the reason why the conducted studies employed the experimental model. The results of Alper et al. (2014) support this result of the present study, too.

It was found out that most of the theses on PBL approach were written in Turkish, and there were only a small number of theses written in English. Ulutaş and Ubuz (2008) examined 129 studies on mathematics education published in Turkey and revealed that a great majority of such studies were written in Turkish. That may be a reflection of the problems about foreign language experienced in Turkey.

It was determined that the master's thesis studies and the PhD thesis studies were mainly conducted on primary education 2nd level students and university students. Such thesis studies were conducted on high school students, too. It is interesting that these studies were not conducted on primary education 1st level students and postgraduates. The reason for non-use of this method in primary education 1st level may be the fact that this method requires high-level thinking skills which are not held by primary education 1st level students. However, this method was not adopted much at secondary education level, either. In fact, PBL approach is suitable for the secondary education level. The reason for inadequate use of this approach at this level may be the fact that secondary education institutions provide university entrance exam-oriented education in parallel with the education system adopted in Turkey.

It was detected that among quantitative data collection tools various tests and scales were widely used in the theses examined; and among qualitative data collection tools interview form was widely used in the theses under examination. Since tests and scales allow reaching large masses and collecting data from such masses, they are frequently used by researchers. Among the tests used in the theses,

achievement tests were in the foreground. Among the scales employed in the theses, attitude scales came to the forefront.

It was understood that the master's theses and the PhD theses on PBL conducted in Turkey mostly investigated the relationships between PBL method and different variables and thus the applicability of the method in learning environments. Many studies attempted to examine the effects of PBL approach on students' academic achievement and their affective characteristics in relation to courses. That may have resulted from the fact that PBL approach came to the forefront in Turkey in recent years. Prerequisite for a learning method to be used in educational environments is its making positive contributions to student achievement and improving students' interest in and eagerness for courses. Therefore, researchers applying PBL approach in various courses investigated the influence of the method on students' achievement and attitudes frequently. Ronis (2001) stated that PBL approach was influential on student learning as it strengthened the features of learning in conformity with the brain (Günhan and Başer, 2009). The main structure of education provided through PBL method involves students' learning the information that is considered necessary and has a professional priority with curiosity and suspicion through a search based on learning targets and using such information for solving a problem (Ersoy and Başer, 2010). Therefore, PBL tries to provide prerequisites that are necessary for motivational situations concerning learning to come about in many respects.

It was seen that among the quantitative data analysis techniques, t-test and ANOVA were frequently used in the theses examined in the present study; and among the qualitative data analysis techniques, content analysis was frequently employed in the theses under examination. Göktaş et al. (2012) reported that t-test and ANOVA were widely used in the educational studies carried out in Turkey. The reason for inadequate use of different data analysis methods, multivariate methods being in the first place, in Turkey may result from lack of sufficient knowledge about such methods among researchers.

A great majority of the theses constituting the research sample concluded that PBL method improved the academic achievement of students. The fact that students learn concepts by associating them with their daily lives in PBL approach may be an important factor

influential on increased achievement levels. Apart from that, high social interaction in PBL process may contribute to students' achievements. Açıkgöz (2003) also mentioned that patterns of interaction among students had a positive effect on the effectiveness of process and the development of students. Another important result obtained in the theses was that PBL approach developed positive attitudes towards courses among students. That may be because; PBL allows students, who are accustomed to rote learning because of the traditional methods employed in lessons, to learn by themselves by means of a scenario that may arouse curiosity in them. In parallel with that, Norman and Schmidt (1992) stated that what underlay PBL approach were students' conducting learning tasks and activities with pleasure and excitement without any external influence and exerting an internal effort to learn, and that PBL had positive effects on the learning motivation of students.

The present study carried out a comprehensive examination of the master's theses and the PhD theses conducted on PBL approach in Turkey, revealed current trends concerning this approach in Turkey, and tried to determine what research methods and what data analysis techniques were employed and what study groups were included in the theses under examination. Although PBL approach was a subject attracting big attention in Turkey in recent years, it was seen that researchers mostly focused on similar subjects, did not administer the method to different study groups adequately, and did not give coverage to different analysis methods and techniques. From this perspective, the present study may light the way for future studies. Furthermore, it is believed that reviewing the studies on PBL approach published in scientific journals in Turkey and revealing foreign trend on this subject may allow reaching more meaningful results.

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ANNEX 1

CONTENT ANALYSIS TEMPLATE

Research Name
Publication
Date of Publication
Language
Scope of the Research
Problem Statement
Sub-Problems
Method
Research Model
Research Design
Population and Sampling
Study Group
Sample Selection Method
Data Collection Tools
Data Analysis
Conclusion