

# A qualitative examination of parents' views on the applicability of the project-based learning approach in science courses

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## ABSTRACT

This study was conducted to investigate the role of the parents of students in the science and technology lessons of the project-based teaching approach. The research was carried out through a case study, one of the qualitative research methods. The data of the study were obtained from semi-structured interviews with 24 students' parents. As a result of the research, it was understood that the parents of the students saw the project as a study aimed at increasing the students' hand skills, thinking skills, and productivity to prepare something new. As a result, it was seen that after the project assignment was given by the teachers, the parents were involved in the process to help their children complete the projects. At the end of the process of doing the project assignments, it was concluded that the parents received informal training, both in one-on-one interviews with the parents who helped their children and in the observations made during the project exhibitions at the school. This situation was important in terms of the informal education of parents. It was also determined that the parents helped their children during the setup and presentation of the project and that they wanted to complete it when wrong or incomplete explanations were made. It was observed that as the contribution of the parents increased during the completion of the projects, the role of the students in the projects decreased and they did not take responsibility. It was concluded that the students thought of family aids as a tool to achieve higher academic success than the project assignments, and therefore the homework deviated from its purpose.

**Keywords:** Project-based learning (PBL), student-parent views, qualitative analysis, science education, secondary school.

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## INTRODUCTION

Science education is scientific thinking and putting this scientific thinking into practice. As can be understood from the definition, science education is the effort to understand, interpret, apply and benefit from the facts, concepts, principles, laws, and theories of nature in daily life. One of the most important purposes of science teaching is to enable students to use the scientific knowledge they have learned in daily life. As a result, individuals make their lives easier by applying this knowledge to their daily lives (İşman et al., 2002). Science education aims to increase people's understanding of science and the construction of

knowledge, as well as to promote scientific literacy and responsible citizenship to nature (Timonen, 2020). Science education helps us make sense of the world. While systematically making sense of the events, changes, and substances occurring in our environment, also enables us to know ourselves (Yüzüak and Zihni, 2022). Today, science lessons and the approach, teaching method, and technique used in these lessons are of great importance for individuals to find creative solutions to the problems they encounter in their lives (Keser, 2008). Especially, it is seen that the project-based learning approach (PBL) is viable in science

lessons for this purpose (Kiliç and Özel, 2014). PBL is the use of a real-world problem or situation as a context for learning (Byoungho-Jun 2021). This approach, which does not only focus on the product in science education, also ensures that the deficiencies in the classrooms are eliminated (Demirel et al., 2001; Havenga, 2015). PBL structures real-life problems as a question. This question organizes and conducts the research of students. This question in the project is carefully selected to include students in real-life problems. This is also chosen as a meaningful question to relate to students' real life and it leads them to research and take the responsibility for the problem (Havenga and Beer, 2016; Rivet and Krajcik, 2004). According to Krajcik and Czerniak (2018), PBL is a teaching methodology that engages students in the learning process and encourages their curiosity to explore meaningful and relevant real-world questions or problems. PBL is an investigative approach that enables students to develop their deductive and inductive mental skills to obtain the best solution to the problem (Alrajeh, 2020; Hibbard, 2017; Meier and Hendel, 2019). In the preparation phase of the project, the students learn how to access the information, how to use it from the sources, how to combine what they find, and to criticize the achievements that they have to earn. While the students are dealing with the individual learning experiences in the PBL approach; teachers support them in doing the projects. While the students are in the foreground to realize the project, the teachers remain in the background to facilitate their work. This approach, which does not focus only on the product, provides the elimination of deficiencies in classes (Demirel et al., 2015). According to Özkan (2012), parents, teachers, adults and peers in the social environment have an important place in the development of the child and learning can take place at this stage. The help and support to be provided in education, especially through the environment such as parents and peers, is explained with the concept of "Scaffolding". Scaffolding is an effective way to learn how to help and stimulate cognitive development. This support provided through the environment includes help and support from teachers and close circles. These supporters help individuals both develop their abilities and meet their social and emotional characteristics (Sternberg and Williams, 2002; Yurdakul, 2007). By organizing project science fairs with students and inviting parents to these festivals, informal information about science can be provided (Timonen, 2020).

When the literature is examined, there are many quantitative studies on the application of the project-based learning approach in science education. In studies carried out with this approach, it is seen that qualitative studies are less than quantitative studies. In recent years, qualitative research methods in education have been considered more important than quantitative research methods (Kiliç and Özel, 2014; Kiliç and Özel, 2015). While quantitative research tries to reach generalized and

numerically supported conclusions about the various problems it deals with, qualitative research aims to explain the depth, environment, and limits of a phenomenon. Although the quantitative research results provide some general information, it is insufficient to provide practical information and suggestions to teachers and administrators who are in the position of practitioners, since this information remains at a very general level. Especially the limited explanatory features of such studies and their inability to make sense of the results lead education researchers to make discoveries (Yıldırım and Şimşek, 2011). In many studies, the application of the PBL approach in science education is based on quantitative studies examining academic achievement, attitude towards science and technology lessons, scientific process skills, creative thinking levels, and views of teachers and students. In the literature in Türkiye, it is seen that there are qualitative researches that include the opinions of teachers and students. However, it is thought that parents will also play an active role in the application of the PBL approach to students in secondary education. There are not many qualitative studies in the literature on this subject. This study was carried out both to fill the gap in the literature and to understand how the PBL approach used in the Science and Technology course affects the parents. In addition, it is thought that it can contribute to the studies to be carried out on the application of the PBL approach in science lesson teaching. In line with the situations mentioned above, this study was aimed to qualitatively examine the views of parents on the applicability of the PBL approach in science courses in Türkiye. In line with the above aim, it was tried to find answers to the following sub-problem questions.

In many studies, the application of the PBL approach in science education is based on quantitative studies examining academic achievement, attitude towards science and technology lessons, scientific process skills, creative thinking levels, and views of teachers and students. In the literature in Türkiye, it is seen that there are qualitative researches that include the opinions of teachers and students. However, it is thought that parents will also play an active role in the application of the project-based learning approach to students in secondary education. There are not many qualitative studies in the literature on this subject. This study was carried out both to fill the gap in the literature and to understand how the PBL approach used in the Science and Technology course affects the parents. In addition, it is thought that it can contribute to the studies to be carried out on the application of the PBL approach in science lesson teaching. In addition, the PBL method consists of a process that consists of the effects that predict that students are involved in long-term learning activities and that they should create the knowledge themselves, rather than teacher-centered lessons that are concluded by applying it in the classroom for a short

time (Çetin Cengiz and İzci, 2021). This whole process cannot be done at school and families are also included in the process. Families can be scaffolding students in this process. The aim of this study was carried out to find answers to the questions of how many families are in this PBL process, how many students are scaffolding, and whether they are disturbed by being in this process, and are satisfied with this situation. In line with the situations mentioned above, this study was aimed to qualitatively examine the views of parents on the applicability of the PBL approach in science courses. In line with the above aim, it was tried to find answers to the following sub-problem questions.

1. What do the parents understand from the concept of the project?
2. What are the thoughts of the parents about the project assignments?
3. How do the parents explain the project preparation process?
4. Do parents help students with their project assignments?

In order to answer these sub-problems, 9 open-ended questions were asked to the parents of the students through semi-structured interviews.

## MATERIALS AND METHODS

In this study, the qualitative research method was applied by using a semi-structured interview technique. This method has been used because of its features such as the freedom to change the number and order of the questions, helping to reveal complex personal and emotional problems, obtaining the desired information completely, and reaching the desired information exactly. This method is in-depth, provides instant feedback to the answers received, has the flexibility to adapt to different conditions, and has the feature of instant change (Büyüköztürk et al., 2012). The case study method, which is one of the qualitative research designs, was used in the study. In Creswell's (2003) explanation, the qualitative research method allows the research of case studies. The exploration and discovery of data via this method often indicate that not much has been written about the participants or the study subject. Some of the characteristics of qualitative research include being in a natural setting, using interactive and humane multiple methods, and interpreting emerging data rather than predetermined data.

### Participants

The participants of the study consisted of 23 parents of 38 students who were given science project homework

by their teachers from five state schools in Istanbul, Turkey. The parents of 23 students were randomly selected.

### Measurements and tools

Semi-structured interview forms were prepared for the interviews with the parents of the students. These forms were used because they allow rapid coding and analysis of the data and the comparison of similarities and differences between the data provided by the participants. A preliminary study was conducted to improve the validity, reliability, and usefulness of the prepared interview forms. The questions in this interview form were determined by considering the purpose of the research to ensure the content and structural validity of the prepared forms, a research group was formed that reflects the purpose of the research. The forms were applied to the parents of two randomly selected students from the research group. The results of the pre-test were reviewed and the interview forms were finalized. The target questions in this form were used to guide the semi-structured interview. All questions asked to parents are given in the discussion section.

### Data collection tools and analysis

For the qualitative data analysis and to increase the reliability of the research, the answers of the participants to the interview questions were recorded with a voice recorder. Before reviews, permission was obtained from the participants for appointments and audio recordings. The interviews were conducted face to face. The interviews lasted an average of 20 to 25 minutes, depending on the age and attention-deficit of the participants. Interviews were held in school meeting rooms, science and technology laboratories, and conference rooms. Care was taken to ensure that the interview environments were quiet and free of distractions.

In the analysis of the data, the descriptive analysis method, which is one of the data analysis methods used in qualitative research, was applied. The main purpose of content analysis is to reach the concepts and relationships that can explain the collected data. The data summarized and interpreted in the descriptive analysis are subjected to a deeper process in content analysis, and concepts and themes that cannot be noticed with a descriptive approach can be discovered as a result of this analysis. The basic process in content analysis is to gather similar data within the framework of certain concepts and themes and to organize and interpret them in a way that the reader can understand (Yıldırım and Şimşek, 2011).

Due to the protection of personal data, the names and

special situations of the participants were not included in the interview forms, but codes such as P1, P2 and P3 were given. In the research, Miles and Huberman's (1984) summarization and transformation principles were used to reach the main problem data. By examining the relationships between the codes, similarities and differences were determined. The coding consistency of the individually created categories was examined. Then, the evaluations of the researcher and two experts were examined separately. In the light of these evaluations, they were grouped as "Agreement" and "Disagreement" according to the answers given to the questions of teachers and students. The reliability of the research was calculated by using the Percent Buyers calculation formula. Percent agreement is the ratio of the total number of evaluations or observations to the number of items that observers or evaluators agree with (Türnüklü, 2000). The calculations show that the percentage of agreement between the researcher and the two experts for the participants is 87.5%. It is seen that there is no significant difference between the encoders According to Şencan (2005), it was emphasized that the percentage of consent should be above 70% to be credible. Therefore, considering the results obtained, it is possible to say that this research is reliable.

## RESULTS

In this section, instead of giving the data for each of the sub-problems of the study, inferences are given from the open-ended interview questions asked to the parents. However, in the discussion section given from the study, the results according to each sub-problem are discussed.

The answers given to the questions asked as a result of the interviews with the parents are given in the tables according to f (Frequency) and % (Percentage) values. Some of the questions addressed to the participants in the working group are given below:

Question 1: Does your child like school and study?

When Table 1 is examined, it is seen that parents like school and study for their children. Some of the opinions of the parents about the students' love of their lessons are given below:

P7: "He likes school and his lessons."

P10: "She loves school very much, and her sense of responsibility is very good. He does his homework as soon as he comes back from school."

PV23: "It is good. He likes school. How can I say, he likes everything about school."

P2: "She does not study at home much, but when I talk to her teachers, she says she's an intermediate student. She does not study at home"

**Table 1.** Frequency (F) and percentage (%) values of the answers given by parents according to question 1.

Coding	F	%
He/She likes	17	74
He/She does not like it	5	21
He/She does not like it very much	1	5

V9: "Obviously, she does not like studying very much, but she needs to be supported. With a little support, she can do it. She's a kid who can succeed."

Question 2: Does your child ask for help with their homework? If he gets help, from whom does he get help?

As can be seen in Table 2, it was stated by the parents that the students asked for help from their teachers and friends, as well as from family members such as parents, older sisters, and older brothers while they were doing their projects. Most parents stated that their children (95.6%) wanted help, while a few of them stated that they did not want help while doing their homework. According to the information of the parents, it was seen that the majority of the students received help from the people who were the easiest to reach around the students. It was revealed that they especially asked for help from their mothers and then from their siblings. Some of the parents' answers are given below:

P13: "My son asks for help once in a while, although not very often. Especially "Mom, can you help me?" he asks. doing his homework and helping him."

P23: "Yes, he wants help. If there are lessons that he has difficulty with, he asks for help with them. I'm trying to do my best, too."

P5: "He doesn't get any help from me, he always does it on his own."

P6: "He doesn't usually ask me for help. Since he goes to the private course, he gets help from his teachers there. He does it with them."

P10: "Yes. He asks for help when he has difficulties. Sometimes her brother helps, sometimes her sister."

Question 3: What do your children benefit from while doing their research homework?

As seen in Table 3, it was stated by the parents that the students used the internet, textbooks, libraries, and encyclopedias to do research, and some of them benefited from the information of their elder sister or brother. However, it was observed that students occasionally used the internet while conducting the research. In this situation, it can be said that students use the internet, which is indispensable for our age, as the

**Table 2.** Frequency (F) and percentage (%) values of the answers given by parents according to question 2.

Coding		F	%
Ask for help	S/He only gets help from his mother	8	34.7
	S/He gets help from teachers in the classroom	4	17.4
	S/He gets help from his brother	3	13.0
	S/He only gets help from his father	2	8.7
	S/He gets help from her parents	2	8.7
	S/He gets help from her mother and sister	2	8.7
	S/He gets help from relatives	1	4.4
Does not ask for help	S/He does it himself	1	4.4

**Table 3.** Frequency (F) and percentage (%) values of the answers given by parents according to question 3.

Coding	F	%
Benefits from the Internet and textbooks	8	34
Benefit from the internet and gets support from his elder brother or sister if necessary	5	21
Only the Internet benefits	4	19
Benefits from the Internet and encyclopedias	3	13
Benefits from the Internet and libraries	3	13

first source to access information. The fact that they choose the textbook as the second most preferred resource can show that these books are well prepared and meet their needs.

Question 4. What do you think the project is?

As seen in Table 4, it has been understood from the parent's point of view that the project is mostly seen as an effort to increase students' dexterity, thinking skills, and productivity to prepare something new. The explanations given by the parents when asked "What do you think the project is" are as follows:

*P22: "It is the homework given to improve the child's skills and knowledge to learn new things."*

*P10: "It is dexterity development it is a beautiful thing. The child is working. Whatever it is, it produces something out of it. In other words, it produces something new from what you say will not happen. Teachers and students do the project, that is, when the child is talented, he does it."*

*P19: "I think a project is something that a person develops himself. It's something he has to do. Adults and mothers usually do the project."*

*P14: "It is the homework to learn new things and to increase the child's knowledge and skills. In other words, the most important feature of the project is to do research and to find new ideas for the student."*

Question 5. Various project assignments are given to

students in schools. Who does your child get/can get help from while doing these projects?

Question 6. How would you help your child?

When both Tables 5 and 6 were examined, generally, the aids given to the students give various ideas during the creation of the projects. In the construction phase, it is stated that it is supported in situations that require manual dexterity such as cutting with scissors and sticking. Some parents stated that they tried to help their children, but they could not help them much because they thought that their education was insufficient. Some parents, for example, said that "Actually, my child is more enthusiastic in project assignments and his hand skills are good, but I also help him to be more organized and ostentatious." They also stated that they help their children because they want them to get higher academic achievement grades. Some of the answers given by the parents to the 5th and 6th questions are presented below:

*P1: "She gets help from her older sister, I don't understand her lessons. She asks for help from time to time. Usually in math questions. She gets help from her older sister for her research assignments online, but does the paperwork or manual dexterity homework herself"*

*P4: "His father drew a picture in his social studies project. He drew the picture of his father because it was more beautiful. I also did the coloring. Sometimes we give him ideas, he does his best. We don't like project assignments. We have to do their homework ourselves. Teachers*

**Table 4.** Frequency (F) and percentage (%) values of the answers given by parents according to question 4.

Coding	F	%
It can be a study to increase skill or ability	8	34.7
It could be homework	6	26.2
It can be imagination and creativity	5	21.7
It could be a preliminary study	2	8.7
It can be a study to increase the skill	8	34.7

**Table 5.** Frequency (F) and percentage (%) values of the answers given by parents according to question 5.

Coding	F	%
From his mother	5	21.7
From her parents	5	21.7
From mother and teacher	3	13.0
from friends	3	13.0
from his father	2	8.6
From your older sister/brother	2	8.6
No help	2	8.6
Father and teacher	1	4.3

**Table 6.** Frequency (F) and percentage (%) values of the answers given by parents according to question 6.

Coding	F	%
Both By giving ideas and dexterity	10	44
Just giving an idea	8	34
I do not help	3	13
Just dexterity	2	9

give us grades. I think that teachers measure the knowledge/interest of families.”

P13: “First of all, he gets help from his teacher, then he searches on the internet. He then tries to do it himself. My daughter is a responsible child. I help give her more ideas, like do this or do it that way.”

P15: “I try to teach him the logic of the business more. Of course, my daughter wants her project to be beautiful, and she asks me for help. I do my best to help him, but I seldom help him in terms of ideas and construction. However, when I think of the parents in Türkiye; As a teacher, I think that children do their projects completely, I also observe them.”

P19: “We inevitably help our children's projects. sometimes we do it all. Mostly we help their creativity, we also give ideas. There are projects that our children can do, but mostly they are given projects that children cannot do. We do most of the difficult projects together.”

P22: “His teachers already help enough at school; he also gets help from his teachers in the study centers. I usually give him information about the path to be followed, I try to guide him.”

P20: “V20: “Actually, I think the given project is given to see our child's creativity about a subject. It is doing it yourself by adding something. But it doesn't work. Sometimes children can't think of anything, then they ask us for help. We want to take care of it just because it is a project, we help it.”

P9: “He gets support in the construction of the project but no support in the design. One way or another, we are helping. I'm helping where he really can't. He does the gluing or joining works himself, we don't help him.”

Question 7: In the Science and Technology course, students are given project assignments on a wide variety of subjects. What topic would you like your child to do a project on?

As seen in Table 7, it was seen that 56.5% of the parents wanted their children to make projects on the subjects they wanted. They may also think that parents trust their children for project selection and that they should leave them free in their choice of subject. In addition, it is deduced from the interviews that it may be beneficial for their child to take a project topic that their child can achieve since their knowledge of the project subjects is insufficient. Some of the answers given by the parents to the 7th question are shown below:

*P1: "I want him to make his dreams come true. He usually does what he imagines, and he's doing it."*

*P23: "I put a lot of emphasis on mathematics no matter what course it takes. I think mathematics is very important because everything happens with it."*

*P15: "I would like him to take it with science lessons. I want people to do original things that are useful to them."*

Question 8. What do your children do in their daily lives regarding the projects they do at school? How do you evaluate your child?

When Table 8 is evaluated, it is understood that most of

the students in the interviews tried to apply the knowledge they gained during the project at school in their daily life and wanted to inform the people around them. A few examples of the answers given by the parents to the seventh question are given below:

*P5: "Sometimes he tries to do what he learned at school as long as we have the means at home."*

*P9: "He tells us what he learned at school. It gives information about the project. The aspect of making projects is much better."*

*P10: "He makes inferences that I can get it from them, so it will be useful. He comes and applies the knowledge he learned at school and home."*

*P12: "Trying to apply what he learned at school to home"*

*P19: "He comes and shares the information he learned at school at home. My son is a regular kid who does his homework on time."*

*P20: "She can't apply it right away, but after a while, the mother says what she learned at school, that's why it happens like this. He tries to make projects with what he learned in school."*

*P23: "He tries to come home and apply what he learned at school. Sometimes he tells us, too."*

**Table 7.** Frequency (F) and percentage (%) values of the answers given by parents according to question 7.

Coding	F	%
I want my child's will	13	56.5
I didn't think, I don't know	5	22.2
I would like to take a project in math or science	4	17.3
I do not know	2	8.7
I would like it to be the teacher's request	1	4.0

**Table 8.** Frequency (F) and percentage (%) values of the answers given by parents according to question 8.

Coding	F	%
Trying to apply what he learned at school at home	9	39.2
He says at home what he learned at school	6	26.0
He says what he learned at school and tries to apply it at home	4	17.4
*Other	4	17.4

\* Expressions coded with frequency less than two are not shown.

Question 9. Do you think the projects are beneficial for students? Explain the reasons?

As can be seen in Table 9, the majority of the parents (82%) stated that the project work contributed to the

students. They stated that these project studies contributed to the mental and psychomotor development of the students, as well as both of them at the same time. The number of parents who say that they have no contribution is also low (22%). Some of the answers

**Table 9.** Frequency (F) and percentage (%) values of the answers given by parents according to question 9.

Coding		F	%
Yes (78%)	Mental development	12	52.0
	Psychomotor and mental development	4	17.3
	Psychomotor development	2	8.7
No (22%)	It does not contribute to the student. Because we do the projects	3	1.3
	*Others	2	8.7

\* Expressions coded with frequency less than two are not shown.

given by the parents to question 9 are given below. They stated that these project studies contributed to the mental and psychomotor development of the students, as well as both of them at the same time. The number of parents who say that they have no contribution is also low (22%). The parents, who think that the projects are not beneficial for the students, stated that the students do not do the project assignments themselves. Families said that they did almost all of their children's project homework in this process. We do the homework. They explained that the reason is that the project work is above the student's capacity, which creates this negative situation. Some of the answers given by the parents to question 9 are given below:

*P13: "I think it has great benefits. Children understand whether their projects will work or not, and they try to apply this knowledge to life."*

*P12: "It helps. It is a very clever work. They work much more carefully, much better, and they can apply what they have learned."*

*P18: "It is beneficial. He works harder on such assignments. I think it contributes to my personal development."*

*P22: "...It will be beneficial. But if it is given in a planned schedule. children's intelligence develops."*

*P4: "I don't think it's useful, teachers don't give homework or homework. They give a project, they say come and do it. It is difficult for students. They make a family at home, the child lives, we do it."*

*P7: "I don't think it's helpful. Children cannot do difficult projects alone. We are doing."*

*P15: "Students do not fully perceive the project. They are struggling. That's why we have to do the homework ourselves."*

## DISCUSSION

Discussions and inferences were made according to each research sub-question created under the main question of the study. Discussions according to the sub-question are as follows:

### ***What do parents understand from the concept of project-based learning?***

In the research, the concept of a project is seen as an effort by most parents to increase students' hand skills, thinking skills, and productivity to prepare something new. According to the parents, the PBL approach is one of the approaches that should be applied. It can be said that the research of Kılıç and Özmen Ulu (2021) shows parallelism with the data of parents' views on PBL. According to Çetin Cengiz and İzci (2021), parents stated that they became aware of every issue by participating in student projects, they stated that their children's self-confidence increased, they enjoyed the activities and thus their learning levels increased.

### ***What are the thoughts of the parents about the project assignments?***

In the interviews with the parents, it is understood that most of their children try to apply the knowledge they gained during the project at school in their daily lives and they want to inform the people around them with the information they learned from the projects in this process. In addition, parents also stated that their children like to study and research and that they can do this study and research in various ways. The study conducted by Ceylan and Gündoğdu (2018), found that the project assignments provided increased the level of awareness in students. According to Avcı (2021), project-based applications increase the level of students' use of technology-based educational materials and the student can increase the level of technology use due to this new habit.

### ***How do the parents explain the project preparation process?***

As a result of the inferences made from Tables 7 and 9, we can state that the majority of the parents participating in the research can apply the PBL approach in schools. They stated that the project-based learning approach contributes to both the mental and psychomotor



development of their children at the same time. The number of parents who stated that they did not contribute is also low (22%). They also emphasized that 56.5% of their children should make projects on the subjects they think of. In their study, Ayaz and Söylemez (2016) concluded that this approach is an indispensable element of education, that it should be applied, and that students take responsibility for their learning and cause them to be active in the learning process. These findings are consistent with the findings of this study.

### ***Do parents help students with their project assignments?***

It was observed that the students received support while doing their projects. It was understood that they received most of the support from their parents, then from family members such as their sisters and brothers, as well as from their teachers and friends (Tables 5 and 6). It has been determined that generally the aid given to the students is done by giving ideas during the development phase of the projects. As seen in Table 2 in this study, the children asked their parents and others for help while doing their homework. The majority of these aids came from their parents (approximately between 60 and 70%). It was determined that he received help from his parents at the same rate while doing his project assignments.

### **CONCLUSION AND RECOMMENDATIONS**

As a result, it has been seen that student-parent roles are important in the project preparation process and qualified products can be produced when sufficient information is given about their roles in the process. However, it is possible to say that when these roles are applied unconsciously, it becomes a situation where parents compete as a means of raising their child's academic success grade. According to the opinions of the parents, it can be thought that the process is not beneficial for the students since the teachers do not follow the student's development during the project process. It was noteworthy that the students brought their families with them during the project delivery. The efforts of the families to show that their child was successful during the project presentation and their efforts to inform the teacher about the project were another noteworthy point. According to the observations made, the following inferences were made from these two noteworthy points. It has been observed that while the students receive a formal education, the parents of the students also receive informal education. In the PBL process, it has been an important gain in terms of the education of parents. This situation has been noteworthy.

Considering the recommendations, when applying the project-based learning approach in education and training, it should be determined whether the parents will

be involved in the process. It should be clearly stated to the students from whom they should seek help while applying this approach. If parents are asked to be involved in the process, they should be told how far and how they should help. If a success grade is to be given from the project work, evaluation should be made by taking into account the contribution of the student, peer, or parent. Comparisons can be made by conducting similar studies to this study in different provinces.

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