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Challenges Faced by Project Competition Participants and Recommended Solutions*

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Abstract

The numbers of project competitions and interest in this kind of competition have been steadily increasing in Turkey. Accordingly, it is important to determine what challenges teachers and students may face while preparing themselves for project competitions, so that recommendations may be made to overcome these challenges. This study investigated challenges faced by secondary school students and their project advisors. The teachers' own solutions for the difficulties that were encountered are presented at the end. Both quantitative and qualitative research approaches were used in the data collection and analysis processes. One hundred twenty-one teachers participated in this study. The identified challenges include the students' lack of requisite information and skills, insufficient financial and technical support, the students' lack of interest, and problems with cooperation from universities. The recommended solutions include improving financial and technical support, revising education programs to be more project-based, and strengthening cooperation with universities.

Key Words

Project-based Learning, Project Competitions, Preparing a Project, Challenges, Recommendations.

Recent changes in the Turkish education system have placed a new emphasis on student interpretation and synthesis of information, rather than on the simple memorization of information directly transferred to them (Cibik, 2009). In order to realize this new goal, approaches are required in which the students are active, the information is structured by the learners themselves, and the stu-

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dents communicate and interact with others. One of these methods is the Project-based Learning method (PBL). In this format, the learning process is based upon projects (Pektas, 2009). These projects help students to find solutions to problems, either individually or as a group. They incorporate various educational activities, result in an outcome, and require considerable time and teacher input. In PBL, students learn by doing. They learn how to learn and how to make that process entertaining. A team spirit is formed while improving the students' confidence, and their thinking, searching, and communication skills (Basbay & Ates, 2009). With these characteristics, PBL, affects students' academic achievements and academic self-concept in a positive way (Korkmaz & Kaptan, 2002). When using PBL, students are also much less prone to ask "why are we learning this?" This is because the method aims to explain how topics of study are directly relevant to the lives of the students. This approach presents students with incentives and encourages motivation (Sacli, 2004, p. 15). However, projects are complex activities which raise interesting problems. They require the participation of students in their designs, involve problem-solving and decision-making, and allow the students to study independently to some degree for a long period of time (Korkmaz & Kaptan, 2002; Thomas, 2000).

While PBL helps students to learn the content of lessons and to put these lessons into practice, students can face several challenges associated with competitions (Edelson, Gordin, & Pea, 1999). For example, the most important challenge is that students may lack relevant information and skills for their project, or for conducting research (Ayvaci & Coruhlu, 2010; Baki & Butuner, 2009; Edelson et al.; Krajcik et al., 1998; Pektas, 2009). Also, their inability to develop a unique research problem (Ayvaci & Coruhlu, 2010; Krajcik et al., 1998), difficulty producing an original product (Pektas), difficulty selecting an appropriate method for research, inability to link data with results, and lack of knowledge about how to report results in an appropriate way are all examples of common challenges faced by students (Krajcik et al., 1998). Furthermore, students often fail to properly manage project activities (Edelson et al.). Apart from their lack of appropriate knowledge and skills, students may also harbor negative perceptions and attitudes about project preparation, which can cause them to be reluctant to undertake a project (Edelson et al.; Krajcik, Blumenfeld, Marx, & Soloway, 1994). To overcome those challenges, Baki and Butuner (2009) suggested the creation of courses to teach project managing processes in primary schools.

While students face many challenges, teachers, who are also a critical factor in the project preparation process, face challenges in project preparation as well, and sometimes cannot effectively perform their duties as guides (Baki & Butuner, 2009; Marx, Blumenfeld, Krajcik, & Soloway, 1997). Teachers take the role of a consultant rather than an authority (Cepni, 2005; Helle, Tynjälä, & Olkinuora, 2006; Icelli, Polat, & Sulun, 2007). In many studies, the teachers have stated that they cannot find a unique project subject (Baki & Butuner; Krajcik et al., 1994) or use the information resources in an effective way (Pektas, 2009). This is due to their own lack of appropriate knowledge and skills relating to the projects that they are asked to manage. Baki and Butuner think that the teachers' inability to guide projects effectively is related to a lack of practical training courses in universities. They suggested that teachers who have problems with project management should undertake long-term in-service training. Park and Ertmer (2008) argued that many schools do not have a common vision relating to the project process and provide inadequate feedback on project work. Providing cooperation among colleagues, developing a common vision, encouraging peer consultation to support the teachers, and providing feedback are suggested strategies to satisfy the teachers' needs.

Some challenges for both teachers and students involve the technical aspects of a project's development process. Insufficient resources, not having the appropriate technology (Edelson et al., 1999; Park & Ertmer, 2008), limitations in accessing existing resources and technology (Edelson et al.), and lack of library resources (Pektas, 2009) are among those challenges. Moreover, the integration of technologies into projects is often difficult for teachers (Krajcik et al., 1994; Marx et al., 1997). Apart from these problems, projects frequently require a long period of time. Teachers and students experience difficulties managing the project schedule. That is why many projects take much more time than was expected (Baki & Butuner, 2009; Krajcik et al., 1998; Marx et al.).

Although participants face many challenges in PBL and in project competitions, these methods of learning are still highly effective because of the hands-on nature of this process (Saracaloglu, Akmaca, & Yesildere, 2006). For this reason, TUBITAK (The Scientific and Technological Research Council of Turkey) and MEB (Republic of Turkey Ministry of National Education) have organized competitions to popularize PBL in Turkey, to encourage students to study science and the social sciences, and to enrich scientific developments. The number of these competitions, and interest in them, have been steadily increasing. However, this also requires specific teacher competencies. One study found that teachers and students who engaged in a

project and reported positively on the process in an evaluation also expressed doubts about the successful completion of that project, due to their anticipation of possible problems during the remainder of the process (Orgev, 2012). To alleviate anxieties concerning these issues, seminars and workshops have been organized on the topic of how to conduct a project. As teachers' confidence increases, they become more willing to work on projects with students and begin to initiate that interaction (Onen, Mertoglu, Saka, & Gurdal, 2010; Erdem, Uzal, & Ersoy, 2010). But achieving successful results from projects still can be difficult, as the process requires long and tiring effort. Acquiring an awareness of challenges that might arise, some knowledge of what a project development process looks like, and feedback concerning solution recommendations when performing practice projects allows trainee teachers to take steps that will make project development processes easier for themselves and their students. This also tends to shorten the time needed to solve problems. Following this training, they can focus on their projects more fully, without so many distracting anxieties.

A different problem is that some teachers and other adults pay too little attention to children's learning outside of classrooms (Uitto, Juuti, Lavonen, & Meisalo, 2006). In addition, some Turkish studies on PBL have found that insufficient attention is sometimes given to work on projects, and that many students at both the high school and teacher training levels lack skills that are required to prepare and help conduct successful learning projects (Akdeniz & Devecioglu, 2001; Akdeniz & Keser, 2000). This study will provide educators with case-based information concerning challenges that might be encountered specifically in project competitions, which are PBL activities performed outside of the classroom. The results are intended to guide teachers, students, parents, the MEB, TUBITAK, and academicians. Accordingly, the study proposes to inform those institutions which organize and contribute the project competitions. It can also serve as a guide for teachers and students, to encourage them to cooperate more fully in project competitions, to reduce their prejudgments concerning competitions, and to acquire requisite knowledge needed to manage projects. The specific goal is to reveal the challenges that secondary school students and their project advisors encountered while preparing for TUBITAK research project competitions, and to discuss solutions that were devised to overcome these challenges. The research questions that guided this study were:

1. What are the challenges that students and teachers face during the project preparation process?
2. What recommendations might help to overcome these challenges?

Method

This is a mixed method study in which both the qualitative and quantitative approaches were used. Quantitative and qualitative instruments were used for methodological triangulation, to enhance validity and reliability. Triangulation is used when the method addresses the shortcomings of another method. Thus, a more comprehensive data set can be provided, and the reliability of findings can be increased (McMillan & Schumacher, 2010). In this study, the mixed method was used in order to identify the challenges that participants faced while preparing themselves for project competitions, and to obtain richer data by analyzing the subjects' attitudes and perceptions.

The Population and Sample

The participants in the study were advisory teachers with whom students participated in the 43rd project competition exhibition (which was held in the spring semester of 2011-2012) and earlier TUBITAK research project competitions for secondary school students. One hundred twenty-one teachers were selected by the purposeful sampling method, which is one of the non-probability sampling methods. The participants' demographic information is shown in Table 1.

Table 1.
The Participants' Demographic Information

Gender	***f***	**%**	**Field**	***f***	**%**
Male	68	56.2	Science	74	61.0
Female	53	43.8	Social Sciences	47	38.9
Experience	***f***	**%**	**Education level**	***f***	**%**
0-5years	36	30	Graduate	55	45.5
6-15 years	50	42	Undergraduate	66	54.5
16-24 years	29	24	**Project experience**	***f***	**%**
26 + years	6	5	Had previously joined a project	74	61.2
School type	***f***	**%**	Had not previously joined a project	47	38.8
Public	114	94.2	**Project achievement**	***f***	**%**
Private	7	5.8	Received a prize	33	27.3
Total	121	100	None	88	72.7

As seen in table 1, 56.2% of the participants were male, and 43.8% were female. The majority (94%) worked in a public school. Teachers in nineteen different branches took part in the study. Many of the teachers worked in the field of Science (61%), and

45.5% of the teachers stated that they had a graduate degree. Many of the teachers had experience ranging from 0-5 and 6-15 years (72%).

Data Collection

Two instruments, the "challenges faced in project competitions and recommendations questionnaire" and a semi-structured interview guide, were developed by the researchers to collect data in the study. To develop the questionnaire, firstly, an item pool was formed with reference to studies in the relevant literature (Ayvaci & Coruhlu, 2010; Baki & Butuner, 2009; Korkmaz & Kaptan, 2001; Kufrevioglu, Baydas, & Goktas, 2011; Onen et al., 2010; Park & Ertmer, 2008; Pektas, 2009; Thomas, 2000). The resulting five-point likert scale questionnaire was reviewed by five peers, seven experts, and three language experts, and then revised. The questionnaire was divided into three categories. In the first part, nine items were related to the participants' demographic information. The second part contained seventeen items and one open-ended question on challenges that the teachers and students faced while preparing for the project competitions. In the third part, twelve items and one open-ended question focused on the teachers' recommendations to overcome the challenges. The Cronbach's alpha reliability of the questionnaire was 0.89. The semi-structured interview guide was reviewed by two peers and one field expert, and then revised. Test interviews were conducted with two of the teachers to determine if the interview procedure was acceptable.

Data Analysis

One hundred twenty-one teachers provided data via the questionnaire. Interviews were additionally conducted with twelve teachers who were selected during the 43rd project competition exhibition. The interviewer conveniently selected teachers who were available to interview. The quantitative data collected from the questionnaire were analyzed using the SPSS 18 packet program and the descriptive statistical method (for calculating means, percentages, and standard deviations). The collected data were presented in tables. To analyze the qualitative data, the content analysis method was used. The interviews were transcribed. Then, the qualitative data collected from the interviews and open-ended questions in the questionnaire were coded and presented in bullet format. Direct quotations were also provided.

Results

The challenges that the participants faced and the teachers' recommendations are presented here in separate qualitative and quantitative findings sections. The teachers were coded as "T-X" for their direct quotations.

Challenges Faced during the Project Preparation Process

The challenges from the teachers' point of view that were derived from the quantitative data are shown in Table 2, in order of their significance. According to these findings, the most widely encountered challenges were "lack of financial resources," "preparing a project takes a long time," and "having difficulty reporting the project (referring to students)." The least encountered challenge was "lack of knowledge and skills for project preparation (referring to the teachers)."

The data obtained from the interviews and open-ended questions in the questionnaire support the quantitative findings. The participants commented on the "lack of research skills (of the students)":

> What is a project? What is a project competition? How can a person prepare a project? Students have no idea what these questions mean. From their point of view, projects are the work of engineers. (T-3)

"Lack of knowledge and skills for project preparation (referring to the teachers)" was a challenge, but not a commonly noted one. One of the participants said about this issue:

> On the one hand, a project is a wish; but the capacity of the teacher needs to be taken into consideration. Has she space and time for this project? In universities, professors specialize in one field and become a specialist on that subject. But the secondary school teachers are not the same as them. They have information in every subject; but regarding detail, there are many challenges and a lack of information. (T-6)

Opinions were also stated concerning "reluctance towards projects (referring to the students)" and "lack of appropriate administrative support":

> It is a problem to find curious students with whom to work in a project. We are planning to do a project next year. But is there any chance to find students to get involved in that? We are anxious about it. (T-4)

> All of the administrators in school have different approaches to the project issues. Even if the principal has the sensibility, vice principals have not.

They ask why we are using that room, or etc.… I can say that there is not a common approach towards projects. (T-2)

Table 2.
Challenges Faced during the Project Preparation Process

	%						
	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
Lack of financial resources	8.3	13.2	9.1	31.4	38.0	3.8	1.3
Preparing a project takes a long time	9.1	9.1	8.3	52.1	21.5	3.7	1.2
Having difficulty reporting the project (students)	5.0	14.9	8.3	52.9	19.0	3.7	1.1
Lack of research skills (students)	4.1	18.2	12.4	43.8	21.5	3.6	1.1
Lack of cooperation with universities	4.1	24.0	9.9	34.7	27.3	3.6	1.2
Having difficulty finding a unique project subject (students)	6.6	19.0	5.8	48.8	19.8	3.6	1.2
Problems in the implementation process	2.5	24.0	7.4	48.8	17.4	3.5	1.1
Lack of technical hardware in schools	9.9	24.0	10.7	27.3	28.1	3.4	1.4
Reluctance towards projects (students)	10.7	22.3	5.8	39.7	21.5	3.4	1.3
Having problems with group work (students)	7.4	28.1	9.9	44.6	9.9	3.2	1.2
Lack of appropriate administrative support	11.6	27.3	12.4	29.8	19.0	3.2	1.3
Lack of support from the data collecting centers	5.8	37.2	16.5	27.3	13.2	3.1	1.2
Late announcements of project competitions	9.9	40.5	6.6	21.5	21.5	3.0	1.4
Lack of access to information resources	10.7	37.2	8.3	28.9	14.9	3.0	1.3
Lack of experience to lead a project (teachers)	21.5	32.2	9.1	27.3	9.9	2.7	1.3
Prejudgments toward preparing a project (teachers)	17.4	43.8	16.5	14.0	8.3	2.5	1.2
Lack of knowledge and skills on project preparation (teachers)	21.5	43.0	10.7	16.5	8.3	2.5	1.2

The participants' opinions on the challenges "lack of financial resources," "having difficulty providing supplies and materials," and "lack of technical hardware in schools" were the following:

Financial supplies are really important in projects. Now, a teacher starts the project and coordinates it with enthusiasm in one year or two. (T-6)

We have difficulties supplying technical materials for preparing a prototype of the product. (T-12)

The hardest challenge that I have ever faced is that there were no proper laboratories to carry out the scientific research projects. Even though I am a teacher who works at a Science High School, our laboratory failed to get scientific results. (T-9)

Regarding the items "lack of cooperation with universities" and "late announcements of project competitions," some of the participants' opinions were:

We couldn't succeed in cooperating with a university. At first, we had a huge project load, and couldn't lead our students fruitfully. Also, we failed to direct the right student to the right lecturer. So we couldn't get much help from the university. (T-10)

The competitions were announced two to three months before they were conducted. I and my students had a really hard time coping with this, and it made us both physically and mentally tired. (T-11)

The responses obtained from the interviews and open-ended questions in the questionnaire were similar in substance to the questionnaire items. However, some new challenges were derived from that data. Those challenges were:

- The attitude that this kind of project disrupts ongoing lessons
- Negative attitudes of parents towards project work
- Reluctance about engaging in projects because of the university entrance exams
- Students' lack of self-confidence
- Limitations in accessing information resources, caused by MEB web censorship
- Lack of information related to the procedure (ethical rules, etc. …)
- Not having a standard project development guideline
- Very detailed information is required to fill in the project application web page

"The attitude that this kind of projects disrupts ongoing lessons," "negative attitudes of parents towards project work," and "reluctance about engaging in projects because of the university entrance exams" were the most significant challenges identified by the participants. About these, the teachers said:

One of the most important challenges is that project work and lessons are performed together. This leads to a huge problem, as students can miss lessons. (T-7)

There were very few parents who are positive about participation of their children to the projects. Others' comments were, for example, "no, it is not necessary; they need to prepare themselves for exams." (T-9)

We cannot share time for project competitions, because the typical attitude of private teaching institutions started to predominate in the schools. The students' interest is focused only on the examinations. They only evaluate themselves by taking their scores into consideration. (T-10)

Regarding the items "students' lack of self-confidence" and "limitations in accessing information resources caused by MEB web censorship" the participants said:

We, as a school, were overshadowed by the other schools. We have the attitude that "this is a public high school; no matter how much they struggle, they cannot be successful in competitions." In general; administrators have a common despair on that issue. A confidence problem occurs at the first stage, regarding whether to do it or not. (T-4)

As we did all the researching online, using MEB filtered searches in school was a disadvantage for us. Many of the websites related to our project subject were blocked by the MEB. From time to time, we could watch a video on the subject together with the students. But in the MEB filtered Internet, access to videos was totally blocked. That was a huge challenge for us. (T-3)

Apart from these issues, there were also some challenges regarding the application process and procedural paperwork. On these issues, the participants said:

While putting the project draft on paper, we had no idea what was expected from us, how to prepare documents, or how to model the project. We made our minds up with our own rules. There were no guidelines at all. (T-8)

We faced huge problems in the application process. In the application page, TUBITAK asked for a lot of information. From my point of view, one would need to be an assistant professor or professor to fully understand the application process. (T-9)

Recommendations to Overcome Challenges Faced during the Project Preparation Process

Recommendations to overcome the challenges faced during the project preparation process, obtained from the quantitative data, are presented in Table 3, in order of their significance. The three most important recommendations are "more support from the MEB for teachers and students," "MEB financial support for teachers and students," and "strengthening the technical background of schools." The least important item was "the academics should take part in the projects."

Table 3.
Recommendations for Overcoming the Challenges

	%						
	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
More support from the MEB for teachers and students	2.5	0.8	1.7	23.1	71.9	4.6	0.8
MEB financial support for teachers and students	2.5	1.7	2.5	24.8	68.6	4.6	0.8
Strengthening the technical background of schools	0.8	3.3	4.1	25.6	66.1	4.5	0.8
Organizing encouraging activities for students	1.7	1.7	5.0	27.3	64.5	4.5	0.8
Benefiting from universities more	5.0	2.5	2.5	28.1	62	4.4	1.0
Revising education programs to be more project-based	2.5	2.5	6.6	32.2	56.2	4.4	0.9
Announcing all competitions in http://www.meb.gov.tr	3.3	1.7	3.3	42.1	49.6	4.3	0.9
Using more than one communication channel for announcements	0.0	5.8	5.8	40.5	47.9	4.3	0.8
Creating departments such as project coordinating	5.0	3.3	4.1	34.7	52.9	4.3	1.0
Training teachers in pre-service training courses	5.0	4.1	7.4	36.4	47.1	4.2	1.1
Training teachers in in-service training courses	4.1	3.3	9.1	40.5	43	4.1	1.0
The academics should take part in the projects	5.0	5.0	9.9	34.7	45.5	4.1	1.1

Again, the responses obtained from the interviews and open-ended questions in the questionnaire were similar in substance to the questionnaire items. The participants said the following about "MEB financial support for teachers and students" and "strengthening the technical background of schools":

A fund must be shared for the projects. We always have to ask for money to buy any materials needed for the project. We shouldn't need to deal with money issues. (T-1)

Technical and financial support must be given to the schools to prepare projects. (T-11)

Concerning the recommendations "revising education programs to be more project-based," "bene-

fiting from universities more," and "organizing encouraging activities for students," the participants voiced these opinions:

> Project preparation lessons should be given in schools actively. Practice on that topic must be conducted in these lessons. (T-5)

> In order to support the participating students who will engage in TUBITAK project competitions, a coordination center which works under the leadership of TUBITAK could employ university lecturers! And whenever we visit them in that center, they can make us feel comfortable… (T-9)

> They can employ certain lecturers from certain departments of universities. In other words, we need a regional coordinator from whom to obtain information. When we visit this person, he can direct us to the right assistants or professors. We are getting support via a common friend who is acting like a bridge between us and the professors these days. (T-6)

> They can arrange advertisements, [like] tag-line program brochures, to encourage the students to get into projects. (T-7)

The responses obtained from the interviews and open-ended questions in the questionnaire were mainly in accord with the questionnaire items. But some new recommendations were also found. Those recommendations are as follows:

- Extra-credit should be given to those students who participated in competitions, in the university entrance exams.
- Top-rated projects should be collected in a database.
- Teachers' daily schedules in schools should be made flexible.
- Other teachers should support students who are working on a project.
- Teachers should be encouraged to obtain graduate education.
- Universities should provide better education on projects.
- Extra course payments should be paid to the teachers who are coordinating a project.
- Students should be informed about projects.
- Getting support from school administration is important.

Among those recommendations, "extra-credit should be given to those students who participated in competitions, in the university entrance exams," "top-rated projects should be collected in a database," "teachers' daily schedules in schools should be made flexible," and "teachers should be encouraged to obtain graduate education" were the most significant items. The participants said the following about these recommendations:

> If TUBITAK supported the students chosen for the regional competitions by giving them at least one or two [extra-credit] points in university exams, participation in these kinds of competitions would reach into the thousands. People wish to benefit from those kinds of competitions. (T-9)

> A database should be formed. For example, projects of the last five years should be published, [so that] students can access those documents, because in the first place, students and teachers who do not have any information or experience with projects need to have examples. (T-8)

> Teachers and students who are dealing with projects should have their lesson schedules adjusted to accommodate the project. (T-12)

> Challenges in regard to obtaining a graduate degree or doctorate should be cleared away. (T-4)

Discussion

This study was designed to identify the challenges faced by secondary school students and project advisors who participated in TUBITAK research project competitions, in order to provide recommendations to overcome those challenges.

The results indicate that students experience difficulty with project work that is related to their lack of relevant information and skills. Students also experienced difficulties finding a unique project subject, and were challenged by both the project process and reporting the findings of their projects. In the literature, similar studies can usefully be compared with the results of this study (Ayvaci & Coruhlu, 2010; Baki & Butuner, 2009; Blumenfeld et al., 1991; Edelson et al., 1999; Krajcik et al., 1998; Pektas, 2009). According to Ayvaci and Coruhlu (2010), students who chose their own subjects were more successful in projects. However, the present study revealed that many of the students had difficulty initially finding a subject on their own. Blumenfeld et al. stated that problems would be more complicated when students did not possess the required information and skills, and that this could cause disappointment among them.

Many of the teachers reported that they (the teachers) did possess the necessary information and skills to prepare a project and to coordinate it. However, Baki and Butuner (2009), Park and Ertmer (2008), and Pektas (2009) all concluded that teachers lack the necessary information and skills to guide the project process. The results in this study are thus

contradictory to the literature in some respects. This is likely because the projects examined in this study were all chosen from among the top projects evaluated and chosen for the exhibition. Also, this could be due to the fact that many of the teachers (61%) participating in this study had experience with project competitions, and a large number of them (45.5%) possessed a graduate degree. Only a small portion (25%) of the teachers said that they did not have the necessary information and skills for project preparation. On this issue, Blumenfeld et al. (1991) and Park and Ertmer stated that teachers need support in order to fulfill their mission regarding project guidance successfully.

The teachers encountered the students' reluctance while they were trying to find volunteer students to participate in project competitions. This could be a result of the students' lack of relevant information and skills, university entrance exams, or the negative attitudes of parents. Edelson et al. (1999) said that "getting students' attention and motivating them in inquiry-based learning activities" is one of the most difficult challenges to overcome in the process. Similarly, Soloway, Guzdial, and Hay (1994) argued that "providing motivation" is the most important challenge in student-focused learning (cited in Edelson et al.). Apart from the students' reluctance toward project work, administrators' and parents' reluctance was also observed. According to Baki and Butuner (2009), parents from the rural areas sometimes neglect their children. In addition, administrators only focus on the results of the project work, and do not provide necessary support to teachers and students in the process. Accordingly, Lam, Cheng, and Choy (2010) reported that *"perceived school support predicted teachers' attitudes about future persistence, both directly and indirectly, through its influence on teacher motivation"* (p. 487). Edelson et al. stated that students without motivation cannot get good results in these kinds of competitions. Some students' resistance to projects is due to their need to prepare themselves for the university entrance exams and/or their concern that they will miss important lessons. Regarding these issues, Pektas (2009) said that PBL affects students' preparations for university entrance exams negatively. From the teachers' point of view, projects take a long time, and the teachers find it difficult to prepare plans for them. This is similar to the finding of Marx et al. (1997) that projects take a great deal of the teachers' time, and to that of Krajcik et al. (1998) that students have difficulty managing time. According to Blumenfeld et al., projects place burdensome responsibilities on students for a long period of time, which may result in their experiencing time-management problems. Another challenge regarding time is schools receiving the competition announcements late.

Another particular issue that has been raised is that schools having financial difficulties are inadequate in technical capacities. For that reason, students developing projects in those schools may be unable to obtain the necessary materials, and so will have to try to obtain them on their own. That leads to not fulfilling the aims of the projects. Edelson et al. (1999), when speaking of inquiry-based learning activities, ordered their list of limitations as (a) unstable and insufficient resources, and (b) inconvenient technologies. Similarly, Baki and Butuner (2009) stated that the project they were coordinating in a rural school had to be cancelled due to lack of financial and technical support. Similarly, Pektas (2009) stated that the students' library resources were insufficient. Blumenfeld et al. (1991) stated more than twenty years ago that technology could be used to overcome challenges faced during the project preparation process.

The students and teachers in this study attempted to obtain support from universities and tried to cooperate with them. But they experienced difficulties accessing lecturers and could not get enough support from the academicians. For that reason, they tried to find support through common friends who could act as a bridge between the university lecturers and themselves. This was a significant challenge that limited the efficiency of their work on the projects. Blumenfeld et al. (1991) and Park and Ertmer (2008) stated that teachers needed feedback from the expert teachers who were implementing PBL in schools; this cooperation attempt provided a useful basis for obtaining that feedback.

Conclusions and Recommendations

Students planning to work on a project need knowledge, determination, self-regulation skills, and the requisite information and skills to conduct the research process. Gaining these skills is not easy. Teachers shoulder a great responsibility while guiding their students during the process. But both the teachers and the students face challenges. The teachers in this study recommended ways to overcome the challenges that they identified. This study provides useful suggestions for teachers, students, institutions, and schools to follow and implement. In addition, this study employed both qualitative and quantitative approaches, which enhanced the results. Our concluding recommendations are listed below, along with supporting references from the literature.

- The technical background of schools should be developed, and teachers and students should be supported financially (Baki & Butuner, 2009).
- Lessons on project preparation should be added into current school curricula (Baki & Butuner, 2009).
- Encouraging activities should be organized for students.
- Support units for projects should be formed in the universities (Ayvaci & Coruhlu, 2010; Ladewski, Krajcik, & Harvey, 1994; Park & Ertmer, 2008).
- Extra-credit should be given to those students who participated in competitions, in the university entrance exams.
- Top-rated projects should be collected in a database and published.
- Teachers should be encouraged to obtain graduate education.
- Daily schedules of teachers coordinating a project should be flexible.
- More than one communication channel should be used for announcements.
- Studies should be conducted on teachers and students who prepared unsuccessful projects, and the challenges that they faced in the process should be revealed comprehensively.
- Descriptive and correlated studies on the basic underlying reasons for challenges faced during the project process should be conducted, to identify the main reasons for the challenges.

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