The Impact of Edmodo-Assisted Project-Based Learning Applications on the Inquiry Skills and the Academic Achievement of Prospective Teachers

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Abstract **– In this paper, the impact of Edmodo-assisted project-based learning applications on the inquiry skills and the academic achievement of prospective teachers has been examined. In addition, an attempt is made to determine the opinions of prospective teachers concerning Edmodo platform. The study was designed with pre-test / post-test model with control group and included 72 prospective teachers, 35 of whom were in an experimental group and 37 of whom were in a control group. At the end of the studies which took 12 weeks, it was found out that project-based learning applications assisted by Edmodo platform created a positive impact on the inquiry skills and the academic achievement of prospective teachers. In addition, it was found out that prospective teachers were satisfied with performing activities in Edmodo platform.**

Keywords **– Edmodo, Project-based learning, Teacher training, Technology.**

1. Introduction

Technological improvements affect education and teaching as they affect all other fields, and new education paradigms are having strong influence on the society [1]. Especially the changing values of students are reshaping teacher education philosophy and indicating that emphasis should be put on creating an environment for sharing knowledge and learning in the teaching profession [1, 2]. Collis et al. [1] state that there is need to educate better teachers and Joshi [2] claims that teachers should be more qualified today in order to be effective. In the recent years, teachers have been defined not only as teaching staff but also as guides, and students have been defined not only as listeners but as knowledge accumulators [2]. Baeten et al. [3] emphasize that students are responsible for their own learning processes and that teacher should abandon the classroom applications that they have mastered and pay attention to sharing more between teacher and student and among students [4]. Project-based learning is one of the approaches which ensure that teachers become guides and students actively participate in learning processes. Project-based learning is a constructivist pedagogy where theoretical and practical knowledge is used in order to find solution to problems. It ensures that students acquire deeper knowledge by actively researching the challenges and problems in the real world [5]. Project-based learning can be applied at every education level by focusing on deep learning process through inquiry method [6]. This approach has an enormous potential for making learning experience more interesting and meaningful; in addition, due to the autonomy it provides to students, it helps them take active role in learning environments as researching and inquiring individuals [7,8]. Technology, on the other hand, adds new dimensions to project-based learning which has been bearing importance for many teachers for a long time and increases its essence in the fields of curriculum, teaching and evaluation. In particular using such tools as webquests, blogs, forums and social networking, it helps sharing knowledge and information and allows for enriching project-based learning environments [9,10]. Another platform which facilitates project-based learning and supports cooperative studies of students is Edmodo platform.

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Edmodo can be used on both mobile devices and web environment in order to create an online application group. It is a free-of-charge social learning platform which ensures that students reach the content uploaded by teachers. The platform allows for the teachers and students to communicate and cooperate in a virtual class environment [11]. Edmodo was elected among the best learning tools on internet by 500 professionals from 48 countries; it is defined as a complementary tool for learning which ensures that students actively participate in online discussions and tasks and allows them to improve their learning [12]. Balasubramanian et al. [13] describe Edmodo as a free and safe learning platform which not only allows for the teachers to create and manage an online class society but for the students to contact their peers and teachers at all times and provide an easy way to study. Edmodo is a social platform tool for educators and is used by more than 6.5 million teachers and students; it is also an interesting professional learning platform which provides a safe area for asking questions to teachers, sharing resources and learning from other members [14]. Due to its similarities with Facebook, it is known as "Facebook for school" and has the potential to replace course management system due to such features as platform sharing or socialisation [15]. The basic difference between Edmodo and other social platforms is that Edmodo is a social learning platform designed to ensure cooperation, communication, knowledge sharing, doing homework and discussion between students, teachers and parents [11,13].

In the literature, some studies have been identified on the introduction and usage of Edmodo in education [12], student determination [13] and teacher opinions [16] on its usage as a learning platform, its usage in teacher education programmes [11], its impact on the students' attitudes towards the class [17] and its usage in language teaching [18]. Edmodo is a research topic in a variety of fields, but not enough studies have been identified in its usage and effectiveness in teacher education. It is believed that studies supported by student-centred approaches such as the project-based learning of Edmodo platform are essential in filling the gap between theory and practice. Likewise, at present when 21st century learning skills have gained importance, it is believed that giving weight to applications that will improve the metacognitive skills of prospective teachers such as researching, problem-solving and inquiry, is a necessity. In this context, the purpose of this study is to determine the impact of Edmodo-assisted project-based learning on the academic achievement and inquiry skills of prospective teachers. In addition, an attempt is made to determine the feelings and opinions of prospective teachers on the usage of Edmodo platform in measuring and evaluation class. Answers were sought to the following questions in order to reach the determined objectives:

1. Is there a significant difference between post-test scores of inquiry skill levels of the experimental and the control group?
2. Is there a significant difference between the academic achievement levels of the experimental group and the control group?
3. What are the opinions of prospective teachers concerning usage of Edmodo platform in measuring and evaluation course?

2. Method

72 prospective teachers who were students of a private university attended the study. Prospective teachers were assigned to the experimental and the control groups based on the last 2 digits of their student numbers. The prospective teachers whose number ends with an even number were assigned to the experimental group and those whose number ends with an odd number were assigned to the control group. In this context, the experimental group consisted of 35 prospective teachers and the control group consisted of 37 prospective teachers. The mean age of the participants of the study is 23; out of the participants 47.2% are males and 52.8% are females.

Research design

This study was designed with pre-test and post-test research model with the control group, and a mixture of qualitative and quantitative methods was employed. Before the implementation, "inquiry skills scale" and "academic achievement test" were implemented as pre-test in order to determine whether experimental and control groups are equal in terms of inquiry skills and knowledge level concerning measuring and evaluation course. The independent samples of t-test results of the pre-test applied to the prospective teachers are given in Tables 1 and 2.

Table 1. Mean values of pre-test scores concerning inquiry skill levels of experimental and control groups

Group	N	Mean	SD	df	t	p
Experiemental	35	31.80	5.08	70	-.314	.754
Control	37	31.27	8.66			

As seen in Table 1, no significant difference has been detected (t=-,314, p>0.05) between the inquiry skill levels of the experimental group (M=31.80, sd=5.08) and the control group (M=31.27, sd=8.66). Independent t-test results sample developed in order to determine whether there is significant difference

between the knowledge levels of the experimental and the control groups concerning the course is given in Table 2.

Table 2. Academic achievement level of prospective teachers concerning measuring and evaluation course

Group	N	Mean	SD	df	t	p
Experiemental	35	3.00	.468	70	-.557	.579
Control	37	2.94	.442			

No significant difference has been detected between the academic achievement levels of the experimental group (M=3.00, sd=.468) and the control group (M=2.94, sd=.442) concerning measuring and evaluation course (t=-,557, p>0.05). As can be seen in Tables 1 and 2, the prospective teachers in the experimental and the control groups are homogeneous in terms of their inquiry skills and knowledge level concerning the course. From this point of view, the courses are delivered with traditional method in the control group whereas Edmodo-assisted project-based learning approach was implemented in the experimental group. At the end of the implementation, "inquiry skills scale" and "academic achievement test" were applied again as post-test to both groups. In the pre-test and post-test applications of inquiry skills scale and academic achievement scale, nicknames were given to prospective teachers in order to ensure that evaluation was made objectively. In addition, the emotions and opinions of the experimental group concerning supporting project-based learning approach with Edmodo were obtained through "interview form".

Data collection tools

The tools used in order to collect qualitative and quantitative data are given below.

Inquiry skills scale

This study focuses on revealing the impact of activities performed in Edmodo platform on the inquiry skills of prospective teachers. In order to determine the inquiry skill levels of prospective teachers, the "inquiry skills scale" developed by Karademir and Saracaloğlu in 2013 [19] has been used. The scale consists of 14 items. Some of the expressions in the scale are as follows: "When I face a new problem I use my previous knowledge", "when I realise that what I learned was wrong, I correct it immediately", "in order to explore the solution to a problem, I combine materials, events and objects", "I verify the knowledge acquired through individual experiences with the knowledge acquired from multiple sources". The scale was used in order to determine the inquiry skill levels of both experimental and control groups before and after the application. The data obtained from post-test measurements of experimental and control groups were analysed with independent samples t-test technique. The change in the scores obtained by groups before and after the experiment was tested with repeated measures ANOVA analysis technique. The obtained values are interpreted at 0.05 significance level.

Academic achievement test

In the study where project-based learning approach is supported by Edmodo platform, an attempt is made to determine the academic achievement of prospective teachers concerning "measuring and evaluation" course. The academic achievement of the prospective teachers concerning "measuring and evaluation" course was identified through "academic achievement test" developed by the researcher. The academic achievement test which was prepared after obtaining expert opinion consisted of 47 items. The KR-20 reliability coefficient of the test was calculated as 0.82. The series width of item difficulty index of the test is between 0.40 and 0.80 and the item discrimination index of the test is accepted as 0.30. In this context, the items below 0.30 value were excluded from the test and the test was given its final form with 40 items. Academic achievement test was applied as both a pre-test and a post-test to both groups. The items in the test aimed at detecting the knowledge acquired by prospective teachers during 12 weeks of the course and the sum of points obtained from the test items was scored out of 100. Prospective teachers were evaluated out of 100 from the achievement test which they solved both before and after the application and the mean of the scores they obtained from the test constituted their principal achievement level.

Interview form

At the end of 12 weeks of application, semi-structured interview form developed by the researcher was used in order to identify the opinions of prospective teachers in the experimental group concerning the activities in Edmodo platform. The interview form consisted of semi-structured questions prepared with a view to determine the advantages and the limitations of Edmodo platform. In addition, the questions were prepared utilizing literature search and the opinions of 6 experts were sought in terms of the convenience of the expressions. The interview form was put into its final form in line with expert opinions. Qualitative data obtained from the semi-structured interview form were analysed with content analysis method. The data were recorded with voice recorder in order to

avoid data loss. Then, qualitative data were transcribed by the researcher into writing and the meaningful data units were determined. The data were coded, the draft themes were determined and controlled. In addition to the researcher, the themes were checked by 2 experts and the themes were finalised upon agreement. Finally, the determined themes were organized under research questions and frequency tables were given. In addition, the created themes and categories were supported with direct citations from the opinions of prospective teachers. The citations of prospective teachers were indicated as participant (P). Face-to-face interviews were only made with voluntary prospective teachers in the experimental group. Interviews took some 20-25 minutes.

Preparation of Edmodo platform

Prior to the application, a group with the title "teaching profession knowledge" was formed by the researcher based on the group name, class grade, area of topic and number of pupils in the classroom in Edmodo platform. The prospective teachers in the experimental group were offered by the researcher a 2-hour training on using Edmodo. In the end of the training, the prospective teachers were subscribed to the group as members using the automatically-generated group code. In the Edmodo platform, badges were utilized using such tools as "note", "warning", "homework", "Edmodo planner" and "notebook".

Implementation

This study has been conducted in order to determine the impact of technology-assisted project-based learning approach on the inquiry skill levels and the academic achievement of prospective teachers. It was conducted at "measurement and evaluation" course for 12 weeks. In order to decide whether the inquiry skills and course knowledge levels of students in both groups are equal, pre-tests were conducted at the beginning of the study. Obtained results showed that experimental and control groups were equal both in terms of inquiry skills and course knowledge levels. In this context, in the experimental group, project-based learning approach which is one of the student-centred approaches was applied with technology support whereas in the control group a traditional method was followed. The courses were delivered by the researcher in both groups. In the control group, lecturing method and question-answer technique were used and the prospective teachers were given individual assignments at the end of each course. In the experimental group, project-based learning approach was applied. The researcher and the prospective teachers worked together in the processes of choosing the project subject, planning the activities needed for the research, and determining the roles and the responsibilities. In project-based learning process, prospective teachers performed cooperative works inside the group and constructed information. In this context, the purpose was to improve the problem-solving and the inquiry skills of the prospective teachers. The existing programme was followed in the control group and the learning was based on progressing from one chapter to another and the discipline. In addition, courses were delivered in classroom environment for 2 hours a week on a face-to-face basis and course book was used as the basic material. In the experimental group, considering the interest of the prospective teachers, chapters consisting of complicated problems and interdisciplinary approach were applied. The researcher and prospective teachers came together 2 hours a week in classroom environment; in the remaining time, the activities continued online in a synchronous and asynchronous manner.

In the experimental group which focused on the problems in measuring and evaluation area, project-based learning approach was supported by Edmodo platform. Prospective teachers who participated in Edmodo platform with computers or mobile devices were split into small groups and had the opportunity of working in cooperation in a project-based manner. The researcher and the prospective teachers shared files and connections with group members through the "note" section in Edmodo platform. This tool allows the researcher to perform any sharing with any member whereas prospective teachers had the opportunity of sharing with the researcher and all group members. With "Edmodo planner" tool, the course period, the assignments and the tasks were planned and announced to the prospective teachers. Therefore, prospective teachers shared all their assignment in Edmodo platform. Likewise, assignments were scored in Edmodo platform and feedback was given to prospective teachers. In addition, the researcher awarded the prospective teachers with badges in Edmodo platform when they performed the required behaviours (see Fig. 2). The purpose here was to ensure that prospective teachers who worked independently in the majority of the process generate unique products. In this context, questions were asked to direct prospective teachers to research in Edmodo platform and guidance was provided in choosing the project topic. Prospective teachers focused on problem-solving in the first stage and conducted research by reaching certain databases. Resources were researched in order to scan and organize information about the problem which was shared in Edmodo platform. Articles,

photographs and caricatures about the problem were among the major resources. Prospective teachers also performed online discussions on the resources shared in Edmodo platform. Seven different groups were formed in the experimental group each of which consisted of 5 members. All 7 groups collected information about the problem they chose, which was followed by such stages as determining the purpose of the project, creating the research methodology of the project, collecting and analysing data, reaching findings and reporting conclusions. In this process, prospective teachers shared their draft reports on the projects in certain intervals in Edmodo platform, and groups evaluated the studies of each other and made recommendations. In addition, discussion method, problem-solving method and brainstorming technique were used within the classroom. In the end of the application, the prospective teachers presented the projects they completed in classroom environment and performed both peer evaluation and self-evaluation. The projects were focused on identifying and solving problems that prospective teachers could encounter in measurement and evaluation area during their professional lives. Particular attention was paid to ensure that the projects consisted of the problems that prospective teachers could encounter during their professional lives. In the end of the application, "inquiry skills scale" and "academic achievement test" concerning the course were applied once again to the experimental group and the control group. In addition, face-to-face interviews were held in order to determine the opinions of the prospective teachers in the experimental group concerning application.

Figure 1. Online discussions in Edmodo platform

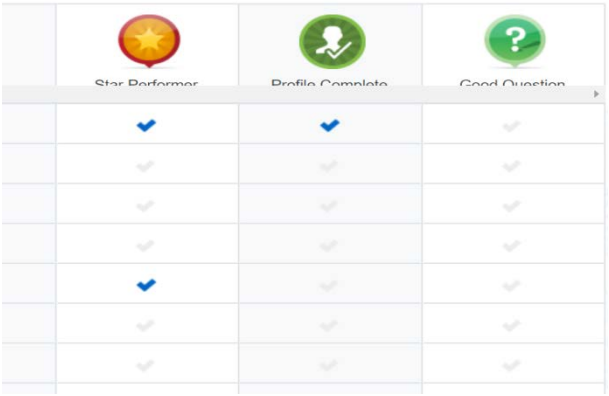

Figure 2. Weekly badge distribution of prospective teachers in Edmodo platform

3. Results

The findings obtained from the qualitative and the quantitative data of the research are given below.

The impact of Edmodo-assisted project-based learning approach on the inquiry skills of prospective teachers

Independent samples t-test technique was used to analyse whether there was significant difference between the post-test scores of the experimental group where project-based learning approach was supported by Edmodo platform and post-test scores of the control group. Table 3 gives the distribution of post-test scores of the experimental and the control groups.

Table 3. Descriptive statistics of the inquiry skills of experimental and control groups

Group	N	Mean	SD	df	t	p
Experiemental	35	4.14	.200	70	-6,371	.000
Control	37	3.70	.359			

Significant difference has been identified (t=-6,371, $p<0.05$) between the post-test mean score of the experimental group (M=4.14, sd=.200) and post-test mean score of the control group where a traditional method was used (M=3.70, sd=.359) in favour of the experimental group. The repeated measures ANOVA analysis results calculated to see whether the difference between post-test scores of the experimental and the control groups is significant, is given in Table 4.

Table 4. ANOVA results of pre-test and post-test scores of experimental and control groups

Source of variance	Sum of squares	df	Mean square	F	p
Group (Experimental / Control)	2.251	1	2.251	16.114	.000
Error	9.779	70	.140		
Factor1(Pretest-Posttest)	33.059	1	33.059	214.988	.000
Factor1*Group	**1.303**	**1**	**1.303**	**8.473**	**.005**
Error	10.764	70	.154		

*Significant at the .05 level of confidence

When the repeated measures ANOVA results are examined, it has been found out that there is significant difference ($F_{(1-70)}$=8.473, p<0.05) between inquiry skill levels of the experimental and the control groups in favour of the experimental group (M=4.14, sd=.200). The findings obtained from the research displayed that the project-based learning approach supported by Edmodo platform was effective in the inquiry skills of the prospective teachers concerning measuring and evaluation course. In this context, it can be claimed that project-based learning approach supported by Edmodo platform improves the inquiry skill levels of prospective teachers positively.

The impact of Edmodo-assisted project-based learning approach on academic achievement levels of prospective teachers

In a pattern with pre-test / post-test control group, this study focused on seeing whether experimental procedure was effective. The impact of project-based learning approach was analysed with One Factor ANCOVA analysis technique. First, descriptive statistical scores of the experimental and the control groups concerning the academic achievement level at measuring and evaluation course are given in Table 5.

Table 5. Descriptive statistical scores of experimental and control groups concerning the academic achievement level at the course

Group	N	Mean	SD
Experiemental	35	46.74	5.31
Control	37	38.51	7.97

When the academic achievement level of the prospective teachers at measuring and evaluation course is examined, it can be seen that the mean score of academic achievement of the experimental group at the course was (M=46.74, sd=5.31) and that the mean score of the control group was calculated as (M=38.51, sd=7.97). The results of One Factor ANCOVA analysis which was calculated in order to determine whether there was a significant difference between academic achievement post-test scores of experimental and control groups are given in Table 6.

Table 6. ANCOVA results according to the corrected academic achievement post-test scores of groups

Source of variance	Sum of squares	df	Mean square	F	p
Pre-test (Reg.)	401.953	1	401.953	9.745	.003
Group	**1164.459**	**1**	**1164.459**	**28.232**	**.000**
Error	2845.976	69	41.246		
Total	134601	72			

According to ANCOVA results, significant difference has been found between the post-test academic achievement scores at the course of the experimental group and the control group ($F_{(1-69)}$=28.232, p<0.01). According to the Bonferroni test results conducted between corrected post-test scores of the groups, academic achievement levels of the experimental group (M=46.74) at the course is higher compared to the academic achievement level of the the control group (M=38.51). In this context, it can be claimed that technology-assisted project-based learning approach is effective in terms of increasing academic achievement in teacher education.

Opinions of prospective teachers concerning Edmodo platform

The purpose of the study is to determine the emotions and the opinions of the prospective teachers concerning Edmodo platform. At the end of the applications which continued for 12 weeks, face-to-face interviews were held with 28 volunteering prospective teachers. In the research, 4 questions were asked to prospective teachers using a semi-structured interview form: “Are you satisfied with performing activities in Edmodo platform?”, “What are the advantages provided by Edmodo platform to you?”, “Which is your favourite application in Edmodo platform?”, “What can be the limitations of Edmodo platform?”. The themes and categories concerning these 4 questions, including frequency distribution, are given below.

Table 7. Satisfaction of prospective teachers from Edmodo platform

Theme	Code	f
Satisfaction	Yes	26
	Partially	1
	No	1

In the end of the application, the prospective teachers were asked about their satisfaction from Edmodo platform and it was found out that a majority (n=26) was satisfied with participating in the applications. Only one prospective teacher stated

that he was bored of participating in applications in Edmodo platform. When the prospective teacher was asked about the reason of negative opinions on Edmodo platform, he stated that he did not like technology and spending time with technology even if it was for education purposes:

P15: "*I get very much bored of spending time on computer. I am not someone who uses internet very much, either*."

One prospective teacher stated that he was partially satisfied with participating in applications in Edmodo platform and confessed that it was due to his inadequacy in using technology:
P3: "*I am weak in technological devices and platforms. I had problems in participating in Edmodo platform and following the applications there*."
However, as can be seen in Table 7, majority of the prospective teachers was satisfied with performing the project-based learning activities in Edmodo platform. In this context, it can be claimed that the prospective teachers had positive opinions about the Edmodo platform. The advantages provided by the Edmodo platform in prospective teaching are given in Table 8.

Table 8. Advantages of Edmodo platform

Theme	Code	f
A beneficial platform	Permanence	20
	Active participation	13
	Acquiring professional skills	4
	Flexibility in time and space	1
Improving thinking abilities	Acquiring different viewpoints	14
	Problem solving	
	Inquiry	7
	Analysis and synthesis	4
	Being democratic	4
		1
Effective learning	Motivation	26
	Cooperation	20
	Communication	17

The opinions of the prospective teachers concerning the advantages of the Edmodo platform are grouped under 3 different themes. The results obtained from qualitative data, display that Edmodo platform is a beneficial application in teacher education. Majority of the prospective teachers stated that Edmodo platform was beneficial as it ensured permanence in learning (n=20) whereas some indicated that Edmodo was beneficial as it allowed for active participation in classes (n=13). Four prospective teachers explained that platforms like Edmodo could be effective in adding skills to teaching profession and one prospective teacher stated that Edmodo eliminated the limitations imposed by time and space on education:

P7: "*Participating in the class actively made me learn much information within logical framework*."
P19: "*In Edmodo platform all friends assumed tasks and learned together*."
P22: "*There were no limitations on time and space. Whenever I wanted I entered Edmodo platform via my computer or phone and had the chance of following the shared materials*."

Some prospective teachers expressed that with applications in Edmodo platform they acquired the ability of seeing events from different perspectives (n=14). The prospective teachers stated that they had the chance of seeing an event from different perspectives due to online discussions and explained that they could produce solution proposals to problems (n=7), improve inquiry skills directed at problems (n=4), and acquire behaviours at analysis and synthesis levels. One prospective teacher explained that Edmodo platform equipped students with the skill of being democratic:

P4: "*Online discussions ensured that I could see events from different perspectives*."
P26: "*I had the chance of thinking again why and for which reason I do what I do*."
P5: "*I had the opportunity of making public what I think in Edmodo platform without hesitation*."
P5: "*Edmodo is an application which I feel myself comfortable and a platform which I can ask questions without hesitation*."

The prospective teachers explained that effective learning was realised in Edmodo platform; they also expressed that they were motivated towards the course (n=26) and found the opportunity of working in cooperation (n=20). Some prospective teachers explained that Edmodo platform strengthened the communication between the teacher and the students and among the students (n=17):

P6: "*The badges I received in Edmodo platform increased my interest in the course. Badges made me participate in the classes willingly*."
P17: "*Taking active part in the class increased my motivation*."
P8: "*Measurement and evaluation class was fun. I enjoyed it*."
P1: "*Through Edmodo, I had the chance of reaching my peers whenever I wanted*."
P9: "*Performing cooperative studies with my group mates and sharing these studies in Edmodo platform gave me great pleasure*."

Table 9. The favourite features of the prospective teachers in Edmodo platform

Theme	Code	f
Features	Badges	22
	Instant feedback and correction	19
	Library	9
	Objectivity	7
	Peer evaluation	4
	Being free of charge	1

As can be seen in Table 9, the prospective teachers mentioned badge application as their favourite application in Edmodo platform (n=22). Likewise, instant feedback and correction opportunity for sharing in the Edmodo platform was another feature liked by the prospective teachers (n=19). Nine prospective teachers stated that they liked the library feature in the Edmodo platform while some explained that Edmodo platform provided the opportunity for making an objective evaluation (n=7). 4 prospective teachers stated that they participated in peer evaluations in Edmodo platform willingly. One prospective teacher indicated that Edmodo platform was a free-of-charge application:
P25: "*Badges was an effective application so that I could evaluate my own performance*."
P12: "*My favourite application in Edmodo platform is the feedback feature*."
P8: "*Peer evaluations on our assignments allowed us to correct our mistakes*."

As can be seen above, most prospective teachers have positive opinions on the Edmodo platform. Teacher opinions on the limitations of Edmodo platform are presented in Table 10.

Table 10. Limitations of Edmodo platform

Theme	Code	f
Limitation	Internet	5
	Insufficient devices	3

Some prospective teachers stated that weak internet connection (n=5) and insufficient devices (n=3) could be the basic limitations of the Edmodo platform:

P3: "*Not every student can have a computer or a smart phone*."
P26: "*Weak connection can lead to problems in application.*"

The results obtained from the study displayed that majority of the prospective teachers participated in Edmodo platform willingly. In this context, it is believed that Edmodo platform is an advantageous application in teacher education.

4. Discussion and Conclusion

In the literature, it is debated that modern approaches such as project-based learning should be supported with technology [20, 21], and it is deemed essential that prospective teachers have knowledge and skills required to implement modern approaches and support them with technology. Kaya and Yılayaz [22] emphasised that technology should especially be integrated in teacher education programmes; Uğur and Kocadere [23] indicated the importance of teacher education in technology integration. Researchers expressed that teachers could refrain from using technology even when they received technology integration education and that they could need more practice [23]. From a different perspective, Barnes et al. [24] discussed the need for using student-centred learning-teaching approaches in teacher education. Basilotta Gomez-Pablos et al. [25] mentioned that despite the challenges in the learning process, project-based learning approach could be an effective alternative and that technology could make essential contribution in providing the tools needed for optimizing project studies. The researchers stated that technology could provide considerable assistance in the application of project-based learning model and explained that technology-assisted project-based learning was an essential methodology in improving the criticizing and the researching skills of the students [25]. In this direction, one objective of this study is to explore the impact of Edmodo-supported project-based learning applications on the inquiry skills of prospective teachers. In the end of 12 weeks of application, significant difference has been detected in the inquiry skill levels of the control group and the experimental group in favour of the experimental group. Likewise, Tonbuloğlu et al. [26] showed that project-based learning created significant difference on the metacognitive skills of students. McGrath [27] stated that project-based learning was a strong approach for deep learning and explained that this approach supported by technology was effective in developing such skills as researching, inquiry, data collection, cooperation and communication. Bell [28] defined project-based learning as an innovative approach which taught critical strategies for achievement in 21st century and expressed that with this approach students continued their learning through inquiry. The results in the literature are supportive of the conclusions of this study. In this context, it can be claimed that Edmodo-assisted project-based learning applications are effective in the development of the metacognitive skills of prospective teachers such as inquiry.

Another conclusion reached by this study is that it displayed significant difference in favour of the experimental group in the academic achievement of experimental and control groups at measuring and evaluation course. In this context, it is believed that project-based learning approach supported by Edmodo platform is effective in the academic achievement of prospective teachers concerning measuring and evaluation class. Durak et al. [29] conducted a study with prospective teachers in 2017 and found out that the prospective teachers who used Edmodo platform were more successful than the others. Iwamoto, Hargis and Vuong [30] expressed that project-based approach was effective in the academic achievement of the students. In his study, Konrad [31] defined project-based learning as a good learning and a tool which helped motivate students.

As a result of the face-to-face interviews conducted in order to determine the opinions of prospective teachers on Edmodo platform, it has been found out that majority of prospective teachers had positive opinions on Edmodo platform. In his study Ekici [11] concluded that prospective teachers were satisfied with using the teacher education curricula of Edmodo. In this context, it is believed that in teacher education curricula, using Edmodo is essential for prospective teachers. Another finding obtained from the qualitative data is the satisfaction of prospective teachers concerning using badges in Edmodo platform. Prospective teachers explained that with badges they were more motivated for the classes and had the chance of making self-evaluation. In addition, feedbacks and correction as well as library features appeared among the most liked features of Edmodo platform. Balasubramanian et al. [13] asserted that while using Edmodo features students were encouraged for both learning and responsibility-taking. In this context, Edmodo is defined as a wonderful and user-friendly social learning platform which ensures that students enjoy studying in an online class [13]. In addition, studies display that, due to its various features which support learning process, Edmodo created a positive impact on the learning processes of the students [17, 18]. However, some pre-teachers stated in the interviews that weak internet connection and lack of technological devices could act as constraints of Edmodo platform. Ekici [11] also identified similar limitations on Edmodo platform. In this context, it is recommended that teachers who will use Edmodo take these limitations into consideration and prepare their plans so as to eliminate these deficiencies before they initialize application. In addition, it is recommended that technology integration should be performed in teacher education programmes and student-centred approaches should be included which could fill the gap between theory and practice.

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