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Flipped Classroom Approach during Multimedia Project Development

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Abstract: The Flipped Classroom Model is a particular type of Blended Learning Model that enables more active learning in the classroom environment. In other words, by dismissing the traditional teaching method, the Flipped Classroom Model provides an active learning environment with classroom activities. Students learn by making use of information and communication technologies. Students watch videos about their course whenever they want and take notes before coming to class. Instead of providing students with lecture notes before each lesson, videos are assigned to be watched. Therefore, in this research, it aims to identify the teacher candidates' views regarding project development training carried out with the Flipped Classroom approach. The research is composed of qualitative data collected from 21 teacher candidates studying their final year at the university. The research findings indicated that teacher candidates are satisfied with applying the Flipped Classroom approach as it increased curiosity and willingness of the participants towards the multimedia development course. It is also found that the majority of the teacher candidates produced complimentary views regarding the project development training carried out with the Flipped Classroom approach.

Keywords: *Teacher candidates, flipped classroom, blended learning, project development.*

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1. Introduction

Developing a project and group working are two of the most significant targets of the Computer Education and Instructional Technology department. Students expect a lot from the project development course. Emiroglu (2012) stated that the project development courses help students solve problems, do research, study socially and independently, increase their self-confidence, self-discipline, responsibility skills, and use time and technology correctly. In addition to these skills gained in the project development courses, students' self-confidence increases, which later stands as positive references for their future professional lives. Since the project development course requires working cooperatively in groups and skill of responsibility and group management, students sometimes find it challenging to cope with (Karakaya & Bostan, 2013; Karagozlu & Ozdamli, 2017). Therefore, in this case, the project development courses' lecturers are assigned some duties. Increasing students' motivation gradually and completing projects with a sense of responsibility under teachers' guidance is undoubtedly expected in project development courses (Hassan, 2008; Yang & Pete, 2011). Besides, when the relevant literature is reviewed about the learning process, it is found that activities carried out within the classroom are insufficient in plenty of work. It is claimed that to create a significant atmosphere, out-of-class activities should be given a place (Song & Kong, 2017; Yusri, Goodwin, & Mooney, 2015; Ozdamli, 2018).

The higher education institutions should meet the increasing knowledge and skill requirements of the innovative pedagogic models (Chiang & Chen, 2017). However, today, traditional learning approaches are the most commonly used learning-teaching approaches in higher education. Along with this, students who receive their knowledge with this approach generally have passive roles. Nonetheless, rather than teacher-centered education system, the systems where students are more active and could find the possibility of learning according to his/her speed has increased their popularity. Flipped Classroom Model, one of these learning models, enables more active learning (Leo & Puzio, 2016). The Flipped Classroom Model is a particular type of Blended Learning Model (Kong, 2014). The flipped Classroom Model creates an opportunity for students to learn by using information and communication technologies (Barseghian, 2011). With this approach, students watch videos about their course whenever they want and take notes before class. For the points they fail to understand, they prepare questions (Kapoun & Milková, 2014). In the classroom, supportive activities like solving a problem, having discussions, finding answers for the students'

questions before each course, making inferences, and working as a group take place (Formica, Easley & Spraker, 2010). Serçemeli (2016) defined the Flipped Classroom as an approach that could offer solutions to the problems and inadequacies within the education system. Flipped Classroom Model can be explained as a model that enables moving traditional classroom atmosphere out of the classroom and carrying out-of-class activities into the school (Yavuz, 2016). In this regard, Artal-Sevil et al. (2016) claimed that with the Flipped Classroom approach, students' getting information from their teachers has changed. In this way, academic assignments, projects, and out-of-class communication have turned into a more effective form. Bicen and Taspolat (2019) stated that videos are prepared for the subject taught by the instructor based on this teaching model. Students learn the subject by watching the lecture video from anywhere they want before the lesson. In the classroom, they perform high-level cognitive activities such as homework, discussion, and brainstorming individually or in groups. Bergmann and Sams (2012) claimed that the Flipped classroom approach is more than online videos. However, choosing a suitable tool is a very delicate and challenging thing (Ababneh, Aljarrah, and Karagozlu, 2020).

Moreover, they stated that the essential point is to provide an active learning environment with classroom activities and learning beyond classrooms. Mehring (2016) made an important point by saying that teachers are continuously acting in interaction with students in the Flipped Classroom approach. He also added that students have the potential of having discussions, giving examples from real life, and improving their classroom experience. Other researchers stated that the Flipped Classroom offers interactive group learning in class and a computer-based unique learning environment out-of-class. Instead of providing students with lecture notes before each course, videos are assigned to be watched (Bishop & Verleger, 2013). This model improves your skill of "organizing your time for tasks" for completing certain activities. Evseeva and Solozhenko (2015) stated that one of the topics most emphasized by educationists and researchers was the flipped classroom model with which classroom activities and homework assignments were reversed. They designed a flipped classroom model in their studies for language teaching. At the end of the course, they stated that students' motivation increased and their academic performance. Nishigawa et. al. (2017) compared the success level of three groups, namely "team-based learning group," "flipped classroom group," and "traditional group." It claimed that the most successful group was a team-based group but that there was no significant difference with the

success of flipped classroom groups and that both groups were successful compared to traditional groups. According to the European Higher Education Area (EHEA), teamwork is one of the critical competencies that current students should possess. It can be thought that using a flipped classroom and team-based learning together can allow for obtaining even more successful results. Moving from this point, when it is believed that students have active roles cooperatively in their project development courses, they cannot surprisingly learn course subjects with the Flipped Classroom Model at home and pursue their cooperative studies in class. The primary purpose of this research is to identify students' views regarding the Flipped Classroom approach, which is designed for the project development course.

2. Related Research

In 2007, Kaw and Hess mentioned the concept of a flipped classroom, but it began to be widely used in 2013. In the literature review study conducted by Uzunboylu and Karagozlu in 2017, examinations on flipped classrooms began in 2013 and skyrocketed in 2015. The same study mentions that most studies were born in the USA by undergraduate students in medical education and nursing. In 2018 a survey conducted by Sergis, Sampson, and Pelliccione determined the cognitive learning outcomes of students and the motivation needed for the learning process and, according to the obtained results, it was found out that learning media blended with flipped classroom model made a positive contribution to the learning outcomes and experiences of low-performing students. Patanwala, Erstad, and Murphy (2017) researched the extent to which flipped classroom medium is used, videos are watched and their impact on success at therapeutics course and found out that the number of students who watched the first video was the highest and that as time passed the number of pupils who watched video decreased, that there was a relation between video watching period and success, meaning that those who watched video obtained more successful results. In their study on the flipped classroom, Chilingaryan and Zvereva (2017) looked into its potential in foreign language teaching. The advantages of a flipped classroom in foreign language teaching were increasing the high-quality time between teacher and student and improving students' independence and responsibility. Also, other benefits mentioned were that students could study according to their learning speed. Teachers could get interested in the students individually, and creativity, critical thinking abilities, and students' concentration could be increased.

Nishigawa, Omoto, Hayama, Okura, Tajima, Suzuki, Hosoki, Shigemoto, Ueda, Rodis, and Matuska (2017) studied the impact of especially team-based learning on fixed prosthodontic education and determined that it was more effective compared to traditional courses, and that student satisfaction was higher; then, they researched the impact of flipped classroom model until final exams. Researchers compared results from the term-end examination between the curriculum covered by flipped classroom and TBL-style classes to evaluate the relationship between learning styles and their effectiveness. Results showed that TBL classes had slightly higher scores than flipped classroom classes. From a different perspective, Yılmaz (2017) stated that students' e-learning readiness state caused the problems experienced in the flipped classroom. In his study, he concluded a significant relationship between Flipped Classroom satisfaction and motivation and e-learning readiness level. As shown in the literature search covering the last two years, the flipped classroom model is rapidly being studied based on several factors. There are some negativities in addition to its advantages.

3. Methodology

This research that seeks answers for specific questions is composed of qualitative data. It aims to determine students' views regarding the use of Flipped Classroom approach in Project Development. In order to achieve this aim, the following research questions have been tried to be answered.

- What are the advantages of the flipped classroom model in the project development course?
- What are the limitations of the flipped classroom model in the project development course?
- What are the thoughts of the students participating in the research about the flipped classroom model?
- What are the views of the students regarding applying the flipped classroom model in different lessons in the future?

3.1. Participants

This research was conducted with 21 teacher candidates studying their final year at the Near East University. Additionally, the research was carried out within the scope of the Project Development II course. The teacher candidates who participated in the study were average 21 years of age and will work at secondary school level institutions as Computer Education and Instructional Technology teachers after they graduate. Nineteen of the participants were male, while 2 of them were female. When

the department's general distribution is examined, it can be seen that male students are in the majority. Before the research, the head of the department of Computer Education and Instructional Technology was informed about the details of the research. After that, an *"Informed Consent Form"* that was developed by the researcher was provided to the participants. The participants were told that they had the right to decline to participate in the research. All the students gave their permission to be part of the research. Finally, the participants were told that interview transcriptions as well as any other identifying participant information would be preserved confidentially.

3.2. Data Collection

An *"Interview Form"* was employed to collect the data from the participants. The interview form was developed by the researcher and used as a data collection instrument in a Flipped project which had a lot in common in terms of their purposes with this current research. Therefore, the same interview form was used to identify the teacher candidates' views regarding the use of Flipped Classroom approach in Project Development. The interview form was semi-structured in nature and composed of 4 questions. The questions are: "What do you think are the advantages of taking part in these activities?", "What do you think are the limitations of these activities?", "What do you think about the Flipped Classroom approach?" "Would you like these activities to be implemented into your other courses? Why?". The interview form aimed to determine the teacher candidates' feelings and opinions regarding the activities carried out in the classroom and videos used. The interviews held at the end of the 14-week applications on face to face basis lasted between 15 and 20 minutes.

3.3. Data Analysis

The interview that was recorded via a recorder by the researcher herself was also computerized. After that, one of the researcher's colleagues was asked to double-checked the data obtained. Following that process, the data was analyzed through in-depth content analysis. Also, the qualitative data obtained was supported by the direct quotations involving participant teacher candidates' views. While quoting, the names of the participants were kept confidential. Each of the participant teacher candidates was coded as a learner (L).

3.4. Application

Moodle system, which is free of charge and open-source, is preferred as an online platform. The videos that were prepared for the course firstly

uploaded into Youtube and then integrated into the Moodle LMS. The videos that were added to the Moodle platform can be seen in figure 1 below. For all the subjects, videos of 8 to 10 minutes were prepared and integrated into the system. These videos were all activated to enable students to watch four days before each course. The course teacher integrated questions at different intervals to students watched the videos thoroughly. Discussion topics were regularly opened over the Moodle platform to enable students to have discussions. The researcher added the feature of providing students with badges over the Moodle system. Besides, quizzes were prepared for each classroom activity through the Kahoot application. Students were asked to download Kahoot onto their smartphones at the beginning of the term. In the first week of the application that was lasted for 14 weeks, having introduced the Flipped Classroom Model, students were explained what duties they were expected to carry out. Students formed teams of 3 or 4 with their classmates. These teams' primary responsibility was to complete their projects of developing instructional games, which is one of the project development course requirements until the end of the term, and conduct pre-tests to the target group.

The students used software like Java, Scratch, Flash, Captivate, Camtasia, and Vizia throughout their 4-year education while developing instructional games. The students watched specific videos before their course, answered the questions accordingly, and searched for and learned about the necessary documents. For the points that they failed to understand, they connected their teachers and friends online, asked questions, and found answers. When there was no answer, they learned by having discussions in the classroom atmosphere. Furthermore, the teams were enabled to develop their projects actively within the classroom activities. It was aimed to keep students' interests and motivations at the highest level by arranging different activities every week. In some weeks, solutions were sought with the brainstorming technique for the students' problems and difficulties during the coding and designing process. In some other weeks, people who specialized in their areas were invited and asked to share their views regarding the instructional game software they developed before. In the final weeks of the application, however, primary school pupils were invited to play with the students' instructional games. Doing this enabled them to make specific changes as well as corrections on the software. Besides, quizzes were held at the end of the course through the Kahoot application. This application created a competition between the classroom teams.

At the end of the academic term, the Computer Education and Instructional Technology department lecturers pretended as a jury. They evaluated instructional game software and reports that were presented by the students. Again, at the end of the academic term, the researcher organized meetings with all the students to identify their application views.

Fig. 1. The video advertising of instructional game developed by the students and poster advertising

Source: The poster advertising is developed by the students who were involved in the course and this figure is photographed by the researcher herself after getting the permission and explaining the reason of taking the photograph.

In each meeting, the participants were asked the questions that were placed in the interview form.

4. Results

The findings obtained from the teacher candidates' views regarding the project development training with the Flipped Classroom approach are given below.

4.1. Advantages of Project Development Training with the Flipped Classroom Approach

The participant teacher candidates are asked the question of "What do you think are the advantages of taking part in these activities?", to identify their views regarding the advantages of the project development training carried out with the Flipped Classroom approach. The opinions of

the teacher candidates regarding the benefits of the activities are given below in Table 1.

Table 1. Advantages of training
Source: Author's own conception

Advantages	F
Permanent learning	20
Easy communication	17
Cooperation	14
Motivation	10
Curiosity and willingness	7
Developing behavior at an advanced level	5

As seen in Table 1, the teacher candidates' views regarding the advantages of the activities carried out are composed of 6 subcategories. Most of the teacher participants agreed that the activities provide them with permanent learning:

L1: *"In project development training, we had the opportunity of moving out of the traditional classroom features by carrying out video supported activities. I had the chance to observe many abstract subjects as concrete through the videos."*

L8: *"I actively attended the courses every week. I had the chance to think about the topics that I would learn by following the videos about them before each course. I did not learn by memorizing; I learned by doing and experiencing."*

L12: *"With this course, I learned how to be more useful for my students when I start my professional life in the future. I found the opportunity of doing profound research for each topic and having deep discussions throughout 14 weeks. I believed that my knowledge would be permanent."*

The teacher candidates also stated that the activities they attended supported classroom communication and allowed cooperative studies to be carried out:

L5: *"I had the chance of reaching my course teacher and classmates whenever I wanted during the course."*

L3: *"Every week, some effective discussions took place within the classroom. With these discussions, we learned how to respect each other's opinions. We created a democratic atmosphere in the classroom."*

L10: *"We all had active roles continuously in the courses. I believe that we carried out effective group work. I became aware of the significance of cooperative learning using our group work."*

As can be understood from L10's views, in the training of Flipped Classroom project development, the activities were supported by cooperative studies. In a similar vein, emphasizing the fact that the activities as mentioned above were crucial to increase their motivation, the teacher candidates expressed that they were curious about the course:

L7: *"I had never had the chance of attending the Flipped Classroom activities before. The activities that I attended for the first time arose my interest in the course."*

L11: *"The activities that I attended were considerably enjoyable. They influenced my motivation for the course positively."*

L8: *"I gained new experiences using project development training. I really would like to implement the Flipped Classroom approach into my future studies."*

L4: *"I attended each course willingly and curiously throughout the term. It was a practical term for me."*

Only a few of the participants who took part in the project development training expressed that the activities they carried out allowed them to gain behavior at the highest level:

L2: *"We did problem-solving activities in the project development training. This process helped me improve my problem-solving skills."*

L16: *"The discussions we had in the activities provided me with the skills of looking at things from different angles and thinking critically."*

4.2. Limitations of the Project Development Training Carried out with the Flipped Classroom Approach

The teacher candidates' views regarding the limitations of the project development training carried out with the Flipped Classroom approach at the end of the application are aimed to be identified with the question of "What do you think are the limitations of the activities you participated in?" The views of the teacher candidates regarding the limitations of the activities are given in Table 2:

Table 2. Limitations of the training
Source: Author's own conception

Limitations	F
Lack of equipment	9
Time taking	4
Workload	2

The majority of the participant teacher candidates have similar views regarding the advantages of the activities. They indicated that they are optimistic about the activities: however, only very few of them produced their opinions over their limitations. Nine of the participants stated that the only disadvantage is the lack of equipment. Poor internet connection meant lack of equipment for 8 of these nine teacher candidates, and the remaining one stated that not having smartphones, iPads, and computers is the most significant disadvantage. The teacher candidates also indicated that a lack of equipment for watching videos influences the education process negatively.

As can be seen in Table 2, only 4 of the teacher candidates who participated in the research claimed that the Flipped Classroom approach activities are time taking:

L3: *"I think that the activities we carried out in this course took a lot of time. Especially getting prepared before each course took a lot for me."*

L13: *"I think that the flipped classroom approach is effective; it is an approach that I consider putting into practice in my future professional life. However, I think that home activities, videos, and class notes can be monitored in a shorter period as I think that using this approach in our class is a loss of time. If all classes are covered this way, we will not have time for ourselves."*

Two of the participants indicated a lot of workload in the activities they took part in. The participants also added that all the teacher candidates avoided having equal workload, and not surprisingly, this influenced the learning process negatively.

4.3. Opinions Regarding the Flipped Classroom Approach

It is also aimed to identify the views of the teacher candidates regarding the Flipped Classroom approach as the training of project development that lasted for 14 weeks was carried out with the same process.

In this respect, the teacher candidates were asked first to produce their views on the classroom activities they carried out and secondly on the Flipped Classroom approach. The findings obtained from the research are given in Table 3.

Table 3. Opinions regarding the Flipped Classroom approach
Source: Author's own conception

Flipped Classroom	F
The richness of the learning environment	19
Effective content	15
Material support	15
Taking responsibility	8

As shown in Table 3 above, the candidate teachers' views regarding both the classroom activities they carried out and the Flipped Classroom approach are gathered in 4 subcategories. The participant teachers stated that both the classroom activities and the Flipped Classroom approach enriched the learning environment. Moving away from the traditional method, the participant teacher candidates indicated that videos that are remarkably coherent with the content provided them with concrete learning. Again, 15 participants said that the content is better and more effectively organized with the Flipped Classroom approach. In contrast, the other 15 said that the Flipped Classroom approach provides material support throughout the learning process, and thus learning becomes easier:

L21: "*Videos supported the content, and this made me understand better. This also increased interaction within the classroom.*"

L19: "*The videos I watched before the course made me get prepared for it. Covering the topics by summarizing ensured that we save time.*"

L2: "*The videos I watched and the other materials shared helped us learn effectively. Learning by not only reading but also by listening to what our teacher tells added diversity.*"

L5: "*The Kahoot platform used in the direction of the Flipped Classroom approach helped applications be more effective. We carried out individually as well as social activities with the Kahoot application. Especially, the scores and badges that we got enabled us to carry out not only cooperative activities but also to be more motivated for the course.*"

Some of the teacher candidates expressed that the activities that they carried out with the Flipped Classroom approach improved their sense of responsibility:

L3: *"Watching videos and seeking answers for questions before every course were among the activities that I loved to do. Doing efficient research to find answers to certain questions before the courses were one of the most significant responsibilities that I took this term."*

L10: *"The group activities that we carried out necessitated me to take responsibilities for myself as well as my group friends. Through these activities, I improved myself in terms of taking responsibilities."*

4.4. Satisfaction regarding the activities of Flipped Classroom

To determine the satisfaction of the teacher candidates regarding the Flipped Classroom activities, an answer sought the question of "Would you like the activities that you carried out to be implemented into your other courses? Why?" The data obtained from the teacher candidates' views indicated that they were satisfied with the activities that were carried out with the Flipped Classroom approach and would like to have them in their different courses. The categories that were obtained from the teacher candidates' views are given in Table 4.

Table 4. Satisfaction regarding the Flipped Classroom approach
Source: Author's own conception

Satisfaction	F
Satisfied	18
Indecisive	1
Unsatisfied	1

As seen in Table 4, most of the teacher candidates were satisfied with the Flipped Classroom approach's activities. Also, it is found that the teachers, as mentioned above, are willing to carry out similar activities in their different courses:

L18: *"Flipped Classroom activities were a good experience for me. I had a quite fun and useful term."*

L14: *"Having our courses carried out with activities supported by technology made me so happy. The activities that we carried out were extraordinary, and we all assumed duties actively. I can feel that I improved myself in terms of developing a project."*

L6: *"I really would like to have my other courses to be supported by the Flipped Classroom approach. This method will be effective, especially in our practical classes, as we had to do the practices at home due to the length of lecturing; however, we had to wait until the next class in points that we were not sure about. With this method, as our teacher and friends are with us in time of practice, we can solve the problems instantly."*

L3: *"Our courses were more fun and amusing with the Flipped Classroom approach. This is why I am willing to have this approach to be implemented into our other courses."*

L17: *"The activities that we carried out enabled us to have more effective communication with our group friends and course teacher. Producing solutions to the problems, we assumed roles who searched and questioned. Having this approach in our other courses will contribute to the improvement of our skills."*

While one of the teacher candidates remained indecisive about implementing the Flipped Classroom approach into other courses, one teacher candidate stated that she was happy to have this approach implemented into her class. She followed as:

L9: *"The activities were very tiring for me. Doing preparations before each course and assuming responsibilities made me feel anxious about the course. Taking responsibilities caused fear in me"*.

The Flipped Classroom activities require students to be active in the courses, and it is thought that this is why L9 produced negative views on the approach. Arranging seminars to inform students why attending to the Flipped Classroom courses is crucial may help remove the opposing arguments.

5. Discussion and limitations of the research

This research aimed to identify the views of the teacher candidates regarding the project development training carried out with the Flipped Classroom approach. The qualitative data obtained from the study is composed of 4 themes. The themes are: "Advantages of project development training carried out with the Flipped Classroom approach,"

"Limitations," "Views regarding the Flipped Classroom approach," "Satisfaction regarding the Flipped Classroom activities." However, each theme contains subcategories within itself. The research questions showed that most teacher candidates are optimistic about the project development training carried out with the Flipped Classroom approach. The teacher candidates stated that the most significant advantage of the project development training carried out with the Flipped Classroom approach is that it allows permanent learning and effective communication. Şengel (2016), in her research conducted in higher education with the Flipped Classroom approach, found that students are free to ask questions to their teachers and friends and thus have no problems during the group work. Similarly, she found that teacher candidates' activities enabled accessible communication, cooperatively, and higher motivation. Likewise, Ozdamli and Asiksoy (2016), in their research, claimed that significant interaction is the essential advantage of the Flipped Classroom applications.

Another finding obtained from the research is about the limitations of the project development training carried out with the Flipped Classroom approach. Some of the participant teacher candidates stated that the lack of equipment in training carried out is the most significant limitation of the research. The participants recommended having a strong Internet connection for future activities as they experienced Internet-based problems while watching the training videos. Apart from the limitations mentioned above, the teacher candidates stated that the Flipped Classroom approach enriches the learning environment, helps present the content effectively, and supports the learning process with the materials. Edessa (2017), in his instructional research, found that material enriched environments have always attracted students' attention.

6. Conclusions

Finally, it can be concluded from the findings of the research that the majority of the teacher candidates are satisfied with the project development training that is carried out with the Flipped Classroom approach. In this regard, it is recommended that project development training and different courses be designed with the Flipped Classroom approach. Additionally, in the future, particular attention should be given to ensure that all the participants have at least one of the devices like smartphones, tablets, and computers and have a strong Internet connection in training carried out with the Flipped Classroom approach.

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