

Preparation Before Class Or Homework After Class? Flipped Teaching Practice in Higher Education

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Abstract

Advanced learning in education needs an effective educational set-up, which allows students to practice what they have learned. In order to realize this, various arrangements are made in educational environments. A blended approach (flipped teaching) is arranged in this study on technology and face-to-face education. This study examines the effectiveness of flipped teaching in higher education and the opinions of students about this practice. The pre-test post-test design for this study was formed with the students enrolled in the Faculty of Education. In the control group, the traditional way of teaching was implemented, where the teacher first lectured in the class and then assigned an homework at the end. In the experimental group, the students were asked to examine the theoretical part of the classroom material before attending the class, while the teacher conducted a more practical training on the subject. In the achievement tests applied afterwards, students from the experimental group performed better than the control group. Students from the experimental group stated that the flipped teaching practice makes them attend to class as prepared and thus ensures an effective learning. Additionally, the students find videos entertaining and catchy; the method encourages active class participation; course notes can be easily accessed; the online interaction with the teacher motivates the students; and different ways of approach to the course draws more interest. However, some students experienced problems in reaching the internet and the online activities (e.g. quizzes and course preparation) created some tension. Other negative aspects stated by the students include short and insufficient course lecture, not feeling comfortable with the online teaching practice and the difficulty of reading a material online.

Keywords: Flipped Teaching, Higher Education, Teacher Training

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INTRODUCTION

Factors like changing living conditions, globalization, economic pressures and rapidly spreading technologies changed expectations from the education process. Traditional methods of education now falls behind the needs as the information penetrates every space and access to it has become much easier (Kardaş and Yeşilyaprak, 2015). In order to keep pace with the changing conditions of the time, there is a need to bring education up to the desired level and to act with a special concern for quality. The quality education means equipping learners with the capacity to think by questioning, discuss and solve problems and reach further knowledge (Özden, 1998; Kalaycı, 2001; Erkin, 2002; Aslan, 2011; Aydın and Yılmaz, 2010; Erdem and Demirel, 2002; Saçlı and Demirhan, 2008, Kurbanoglu and Akkoyunlu, 2001). Innovative teaching practices are needed to acquire these skills whose importance has increased much in our age. Traditional teaching practice, where the teacher is only an information transferer, fails to impart these characteristics and make the education environments boring (Hançer, Yıldırım and Şensoy, 2003). One of the most important steps in achieving the goals of contemporary education is to understand the students. Today's students see the Internet as a part of their lives, and think that using it in educational settings helps them understand and embody the issues and facilitate peer collaboration. However, they think that technology-only educational environments will be inadequate, teacher presence and socialization are necessary. (Oblinger and Oblinger, 2005).

In the current status in teaching practice, a teacher transfers information to students in class and practices in the remaining time. The time left for practice might vary depending upon the content of the course and the readiness level of the students. In most cases, practice part is either moved to the next class or given to the students as a homework. This mode of teaching is not in compliance with the contemporary teaching concept that focuses on developing high-level thinking skills. The “flipped class” teaching model, on the other hand, is a practice to be recognized as an “up to date approach”. The model is considered as capable of responding to the changing learning needs of students and, at the same time, includes the face-to-face teaching (Kardaş and Yeşilyaprak, 2015). The flipped teaching model can be considered as a type of the blended learning model (Demiralay, 2014; Görü Doğan, 2015). In the flipped teaching model, a course subject is presented to students in an online platform before the class, together with some practices such as discussions on the subject, mini-tests, etc. During the face-to-face class time, the teacher performs practice-oriented activities through teacher-student interaction. Hence, it can be defined as a model, which is blending face-to-face learning with distant learning (Demiralay, 2014). The flipped teaching is essentially a practice where the lower domains in the Bloom's taxonomy, such as knowledge and comprehension, are left to students while they are at home. Whereas, higher domains that are more difficult for students to cover alone, such as application, analysis and synthesis, are addressed in class under the guidance of the teacher (Sams and Bergman, 2013; Kara, 2016). It is considered that the flipped teaching practice, may provide a more efficient use of the class time in terms of active learning, ways to respond to individual learning needs of students, support a better digestion of knowledge and its transfer to real conditions (Sever, 2014; Aydın and Demirer, 2017; Turan and Göktaş, 2017; Görü Doğan, 2015; Kocabatmaz, 2016; Gögebakan Yıldız, Kıyıcı and Altıntaş, 2016).

It is possible to come across with some studies on flipped teaching model in the relevant literature. Sever (2014) used flipped class model in violin lessons and concluded that this model saves time in class by making it possible to spend more time to high-level skills and also making the students feel more comfortable in the class. Turan and Göktaş (2015) collected the opinion of students attending pre-school teaching department concerning the flipped teaching practice in a computer course. The results indicate that a large majority of students have positive thoughts about the model and define it as a flexible and effective learning model while ensuring permanence. The students included in that study stated that they dislike watching long pre-class videos, but they enjoy playing games in online learning platforms. Similarly, the study by Görü Doğan (2015) indicates that flipped teaching in the higher education computer course is positively assessed by students. In a different study, Kocabatmaz (2016) stated that students mainly evaluated the flipped teaching practice as positive; however, they had difficulties in accessing the internet and they thought that watching videos

before class was time consuming. A study by Göğebakan Yıldız, Kıyıcı and Altıntaş (2016) indicates that flipped class model used in a general chemistry class in higher education has affected the achievement of students significantly and the students stated positive opinions concerning this model. Similarly, another study by Karaca (2016) concludes that flipped teaching is a method that improves student performance. The study by Göğebakan Yıldız and Kıyıcı (2016) was conducted with science teacher candidates in their class of “Nature and History of Science”. The study indicates that flipped class model positively affected the achievement of students and the levels of metacognition, but had no effect on their epistemological beliefs.

Based on the previous results, the question arises if the flipped class model fits for any course/subject or not. According to Sams and Bergman (2013), flipped teaching may not be appropriate for courses, which do not require intensive theoretical knowledge or allow socratic questioning and exploratory learning. The main objective in flipped teaching is to have students learn the fundamental knowledge, which requires more time when taught in class, at home and use the saved class time more efficiently for higher-level learning. Many courses included in a university-level teacher training programme contain dense theoretical information. However, this theoretical background needs to be supported by practice to enhance the professional competencies of teachers (Özdemir, 2008). A study by Bozpolat et. al. (2016) points out that lecturers often prefer giving direct instruction in classes, without giving enough attention to practice while student participation in class remains limited. The same study suggests shifting the weight to practice oriented activities in class. The study by Kutluca, Birgin and Çathoğlu (2007) indicate that practical activities in a teaching profession course contribute to the development of candidate teachers in various areas. Then, it facilitates their learning while also suggesting the integration of theory and practice in other courses as well. At this point, it can be thought that the practice of flipped teaching can provide students with the opportunity to put what they have learned theoretically into practice and move away from the traditional methods such as direct instruction, question and answer. And it can also be said that this practice will be particularly suitable for teaching vocational courses that require a combination of theory and practice. This study examines comparatively the effectiveness of flipped teaching and post-class assignments. It is believed that the outcomes of this study may be useful in understanding innovative approaches and contribute to the creation of further opportunities for flipped teaching in various courses. Answers to the following questions were examined in this context:

1. What is the performance of students when they come to class as prepared or they study after the class?
2. What are the effects of flipped teaching practice and homework assignment approaches on the student performance?
3. What are the opinions of students on the flipped teaching practice?

METHODOLOGY

This study was conducted with freshmen students in Educational Psychology class of 2016-2017 who are enrolled in the department of primary school mathematics teaching. The process totally took 8 weeks, while allocating the first and last week to pre and post-tests. Below, research model, data collection tools and analysis, and empirical procedure of the study are explained in detail.

Research Model

In the research, an experimental design with pre-test post-test control group was used. In addition, the opinions of students on the flipped teaching practice were collected. The study group of the research consists of the 2nd grade students enrolled in Elementary Mathematics Education Department who took the Educational Psychology course in 2016-2017 academic year. There were two sections for this course and the groups were randomly assigned as experimental and control groups among these two sections. Indications related to the equivalence of the groups are included in

the findings section. In addition, the opinions about the flipped teaching practice were collected from the experimental group students. For this purpose, an interview form (prepared based on expert opinions) was applied to the 30 students from the experimental group.

Data collection tools and analysis

Achievement test was applied to both experimental and control groups as a data collection tool. In addition, the opinions about flipped teaching were collected with the interview forms from the experimental group students. Achievement test was developed as a multiple-choice test with 40 questions. The test was applied to different students (totally 122 students reached) who had already taken the course of educational psychology before. Based on the validity and reliability calculations after the pre-test, a 33-question test was selected. The reliability coefficient KR 20 for the 33-question test was 0.78. The student interview form used in the study consists of open-ended interview questions. Interview questions were prepared based on expert opinions, subjected to a preliminary trial and finalized by making necessary arrangements. Interview questions were formed by considering the features of flipped teaching practice. Independent t test, mean and standard deviation calculations were used for the analysis of data. Qualitative data were analysed descriptively.

Empirical procedure

This section explains the procedures applied to the experimental and control groups. In the control group, the students experienced with a traditional and frequently preferred teaching approach. In each lecture, the names of the subjects to be addressed in the following week were given to the students and they were asked to get prepared for the subject before the class. When the lecture started, course delivery proceeded mainly under the control of the lecturer. While the experimental group watched videos before the class, the control group did it during the class. With the control group, there was no activity in the classroom related to application, but all assignments were arranged to include case examinations. In other words, students listen to class lecture and then based on what they have learned, they conducted a case study as a part of their home assignment. Assignments were given at the end of the class every week and students were asked to submit their assignments at the following week. These homework assignments were done individually.

Coming to class as prepared by students in the experimental group was ensured through a web portal called Edmodo. The lecturer uploaded videos, course notes and reading materials to the portal for students to come to class as prepared. After their preparation, students were asked to respond to quizzes that were shared one day before the class. When the students came in the class, instead of giving elaborate explanations about the subject, a summary is given and students were asked if there were parts that they could not understand. Then, case studies were conducted through groups that were formed earlier. Responses given to case questions were shared and discussed by all groups. In the selection of the case studies, a book (Özcan & Sarıcı Bulut, 2013) containing case examples in the field of Educational Psychology was used. Students were given no assignment at the end of class; instead, they were told it would be helpful if they recap. Both experimental and control groups examined the same cases.

In the class where the traditional teaching took place, students' class preparedness was not checked. They were only informed about the subjects to be addressed in the following class to make them come prepared and told that coming to class as prepared would be useful. In the class where flipped teaching is applied, students' state of preparedness was checked by applying quizzes on the portal. Further, assignments of students from the control group were collected at the end of classes whereas students from the experimental group were only told that recapping what was addressed in class would be useful.

FINDINGS

1. Class preparedness and homework performance

Students were asked whether they came to class each week as prepared before and to give their responses in writing without putting their names on. The state of being prepared for class is given below in percentages and by weeks. Additionally, it is examined whether students were engaged in recap after class. Since the methods applied to these two groups are different, class preparation and homework processes are also expected to be affected. Relevant data can be found in the table below.

1. a. Class preparedness and homework performance of students in the control group

PREPAREDNESS FOR CLASS IN THE CONTROL GROUP												
Control Group	1. Week		2. Week		3. Week		4. Week		5. Week		6. Week	
	n*	%	n	%	n	%	n	%	n	%	n	%
Prepared before class	3	8%	4	13%	2	6%	2	6%	4	11%	3	9%
No preparation before class	34	92%	28	87%	33	94%	29	94%	32	89%	30	91%
Total	37	100%	32	100%	35	100%	31	100%	36	100%	33	100%

*n: number of students

HOMEWORK SUBMISSION IN THE CONTROL GROUP												
Control Group	1. Week		2. Week		3. Week		4. Week		5. Week		6. Week	
	n	%	n	%	n	%	n	%	n	%	n	%
Submitted homework	26	79%	31	89%	29	94%	33	92%	32	97%	30	100%
Not submitted homework	6	19%	4	11%	2	6%	3	8%	1	3%	0	0%
Total	32	100%	35	100%	31	100%	36	100%	33	100%	30	100%

As can be seen in the table, a very large percentage of the control group students (87% and over for almost all weeks) came to class without any preparation. Very few students said they came as prepared. On the other hand, there is a high level of participation to homework (79% and over). Coming to class as unprepared while doing their homework can be associated with the fact that preparedness for class is questioned, whereas the homework is collected and checked.

1. b. Class preparation and after class recap among students in experimental group

PREPARATION FOR CLASS												
Experimental Group	1. Week		2. Week		3. Week		4. Week		5. Week		6. Week	
	n	%	n	%	n	%	n	%	n	%	n	%
Prepared before class	36	92%	36	97%	31	94%	34	97%	35	97%	30	91%
No preparation before class	3	8%	1	3%	2	6%	1	3%	1	3%	3	9%
Total	39	100%	37	100%	33	100%	35	100%	36	100%	33	100%

AFTER CLASS RECAP AT HOME												
Experimental Group	2. Week		3. Week		4. Week		5. Week		6. Week		7. Week	
	n	%	n	%	n	%	n	%	n	%	n	%
After class recap	7	19%	5	15%	4	11%	6	17%	6	18%	3	9%
No after class recap	30	81%	28	75%	31	89%	30	83%	27	82%	29	91%
Total	37	100%	33	100%	35	100%	36	100%	33	100%	32	100%

As can be seen in table above, a large percentage (90% and over for every week) of students in the experimental group responds to the questionnaire that they came to the class as prepared. A very small percentage stated the opposite. The experimental group did not take any homework after the class. They were told recapping after class would help them better keep in their mind what had been learned and no material was disseminated. Looking at the practice of recap after class we see a table different from the pre-class preparedness. The majority of the students (75% and over) stated that they did not recap after the class every week. It is considered that the reason why students do not pay enough attention to recapping after class, while making their pre-class assignments, may be related to the compulsory attendance to the applications and the quizzes.

The idea in the first sub-problem of the study was to expose the state of student preparedness and whether they did their assignments or not. Results listed in Table 1 indicate that both assignments and preparedness are frequently ignored when there was no examination on whether it is fulfilled or not. Indeed, as mentioned earlier, preparedness for class is taken seriously in the experimental group while after-class assignments were collected in the control group. As such, it is observed that assignments that were supervised were taken more seriously.

2. Impact of flipped teaching practice on student performance

2.a. Pre and Post-test Scores of Experimental and Control Groups

	Group	n	X	S	t	p
Pre-test	Control	39	3.97	2.05	0.390	0.972
	Experimental	36	3.78	2.03		
Post-test	Control	37	14.34	4.56	-4.243	0.000
	Experimental	35	18.86	4.21		

Table 2.a compares the pre and post-test score averages of experimental and control groups. Independent t-test was used to compare the scores of these groups. The pre-test averages indicate that there is no significant difference ($p < 0.05$) between the levels of performance of these two groups. Thus, those groups stand equal with respect to the pre-experiment level of performance. The post-test average score of the control group is 14.34 while that of the experimental group is 18.86. The t value calculated over the scores of these two groups is 0.000. According to this result, there is significant difference between the levels of achievements of these two groups ($p > 0.05$). Even if there is an increase in the level of achievement of students, going ahead and collecting students' opinions about flipped teaching was considered as important in obtaining deeper information about its application. The following section analyzes the student opinions on the flipped teaching practice.

3. Student opinions on the practice of flipped teaching

In relation to the flipped teaching practice, students were first asked to give a short response to the question

Question 1: "Which one would you prefer: Class in school and assignment at home after class or preparation before class and assignment in school?"

Responses given by students to the question above are as follows:

2.a. Responses to Question 1

	n	% of students
Preparation for class at home, homework in school (Flipped Teaching)	14	46.66
Class in school, homework at home	11	36.66
Undecided	5	16.66

In Table 2.a, whereas positive student opinions on flipped teaching are remarkable, the number of students with negative opinions or remain undecided is not negligible. Following this single question questionnaire, there were interviews with students on voluntary basis. Information obtained from opinions of students was made subject to a content analysis. When the written opinions were examined, it is noted that almost all students spoke about both positive and negative sides of the model. Hence, opinions were grouped under two main categories which were then examined in the context of sub-categories given in tables 2.b and 2.c.

2.b. Positive Opinions of the Students

Positive opinions	n
Makes you come to class as prepared	19
Spending more time to class activity is an effective way to follow	11
Videos are entertaining and catchy	7
Ensures active participation in class	5
Makes it possible to recap since we can reach class notes again	2
Contributes to studying in a regular manner	1
It motivates us when our comments on the video is appreciated	1
We are more interested since it is different	1

In Table 2.b, the most frequently repeated positive features of flipped teaching is coming to class as prepared, and then spending more time to class activity. Additionally, students find the videos entertaining and catchy; they think that they were encouraged to more active participation to the class. Other aspects that were found positive include the availability of course notes, the motivation generated by the teacher comments to videos.

2.c. Negative Opinions of the Students

Negative opinions	n
Traditional model is better, it is difficult to adapt to the new practice	8
Reading materials shared are boring and hard to understand	8
You cannot reach internet all the time and its speed may be a problem	5
Quizzes and preparation create tension	5
Course narration in the class is short and insufficient	4
Online learning practice is hard to understand and there can be disruptions	4
It is difficult to read something on internet	3
Things turn to be bad when you come to class unprepared	1
One can be detracted to other site on internet	1

According to Table 2.c, negative opinions are: Not having accustomed to the new method and thinking that the traditional method is more helpful in learning; written materials were seen as boring; problems related to internet access and speed; and the tension created by the necessity of preparation for the class and by the quizzes. Additionally, students stated that they find the class lecture short and inadequate; they do not feel comfortable with the online learning; had trouble when trying to read online, and they want more entertaining materials like videos. Furthermore, some students stated that this method remains ineffective if the students come to class unprepared. There might also be some distractions to other web sites while surfing on the internet. Some of the actual opinions of the students are listed below.

Student 1: Although the system is actually practical I had troubles in my first try and it turned to be ineffective. So, I think the traditional way is better. The other could have been better if we could managed to use it. Personally I get tired of virtual environments. I mean the traditional method turned out to be more efficient due to our familiarity with it; I am not psychologically ready for the other.

Student 2: It seemed somewhat awkward since we have accustomed to the class lecture at school and homework at home. I think our failure derives from this. But meanwhile we observe discussions and different opinions in the class. I think this way is more efficient and potentially successful.

Student 3: I could not adapt to this practice much. I don't think it is effective in my own learning. It is important to study in advance and then come to class, but I think class lecturing is more effective. Some reading materials are too long and it may be boring. I believe a summarized narrative will be more effective. Maybe it appeared awkward to us since we have accustomed to the traditional way.

Student 4: This practice made us to be prepared in advance for the topic. We get less bored in class. The practice also helped us in consolidating what we have learned through class assignments. We can keep it in mind for longer period of time. But it may be difficult time to time to spend time to this practice. It is also problematic to be in the internet environment for long periods of time.

Student 5: I felt more at ease in the class as coming in prepared. Information I gathered about the topic allowed me to develop ideas and make comments. On the other hand, continuous presence of homework created some stress. It was the fear of giving wrong answers to homework questions. So I did homework partly for it being necessary.

Student 6: To tell the truth, I would not be regularly studying this course every week if this practice was not applied. I came to the class as prepared thanks to this practice. Also, videos posted by the teacher and the course notes were quite good. I am certain that it is useful for the students. The only negative aspect that I can talk about is the stress I experienced for timing I have to keep in homework and not being as good as I want in quizzes.

CONCLUSION, DISCUSSION AND SUGGESTIONS

During this research, it was observed that the students in the experimental group came to the class as prepared and others from the control group did not. However, it was also identified that while most students from the experimental group did not do the recap after class, other students in the control group did their after-class assignments. The results can be interpreted in terms of the teacher control. There are studies finding that students assign more importance to their homework when their teachers control these assignments (Aladağ and Doğu, 2009).

Achievement tests applied to both groups after practice resulted in higher scores on the experimental group than the control group. This outcome is consistent with the outcomes of many other studies in the literature (Sever, 2014; Turan and Göktaş, 2015; Göğebakan Yıldız et. al., 2016; Karaca, 2016). When students were asked for which method they prefer, the proportion of undecided and those preferring the traditional method was almost the same as the others preferring the flipped teaching. The most frequently repeated positive feature of flipped teaching is coming to class as prepared and then the effective and lasting learning by spending time to the class activity. Apart from these, students find videos entertaining and catchy and think they encourage more active participation to class. Other aspects that were stated as positive include the availability of course notes, motivation generated by teacher comments to videos, and different ways of addressing the subject.

Considering the negative opinions, frequently repeated ones include not having accustomed to the new method and thinking that the traditional method is more helpful in learning, and getting bored in reading the shared materials. Other negative opinions are related to the internet access, the speed, and the tension created by the necessity of preparation for the class and by the quizzes. Besides, students also stated that they find the class lecture short and inadequate; not comfortable with the online learning; had troubles while trying to read online, and they want more entertaining materials like videos. Furthermore, some students stated that this method will remain ineffective if the students come to class as unprepared. There might also be some distractions to other web sites while surfing on

the internet. The study by Turan and Göktaş (2015) indicates that students dislike long videos and prefer more entertaining materials such as games. Similarly the study by Kocabatmaz (2016) Kocabatmaz (2016) stated that students mainly evaluated the flipped teaching practice as positive; however, they had difficulties in accessing the internet and they thought that watching videos before class was time consuming. Similarly, in this study, the negative opinions of students include “Shared reading materials are boring and difficult to understand” while students stated that they need more entertaining, easy to focus on, and less time-consuming materials for preparation.

Based on the outcomes of this study, the flipped teaching method affects the student performance in a positive manner. Students were more engaged in class preparation with self-learning materials and the class environment offered opportunities for a deeper learning. This class preparation process can be defined as a pre-class assignment. Students stick to their assignments when there is a teacher control. In this sense, assignments given before class for preparing students left both the teacher and students more time for practices geared to a deeper learning. In order to accomplish better outcomes, new measures may be utilized to ensure that students use their pre-class preparation materials more effectively. It is expected that the concerns and the problems in this regard will decrease as students take part in online learning environments. Finally, there is still a need for long-breathed studies to confirm this expectation.

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