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The Use of Flipped Classroom Model in Teaching Profession Knowledge Course: Its Effects on Attitudes and Self-Efficacy Beliefs

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Abstract

The purpose of this study was to investigate the effects of the Flipped Classroom Model on preservice teachers' attitudes and self-efficacy beliefs about Teaching Principles and Methods course. It was also aimed to consider the opinions of preservice teachers about the model. A quasi-experimental research model with pre-test and post-test control groups was used in the study. The study sample consisted of 78 preservice teachers at a state university in the Western Black Sea Region in Turkey. The Teaching Principles and Methods course was carried out in a 14-week implementation process. The Flipped Classroom model was applied in the experimental group while the traditional teaching methods were applied in the control group. According to the results, it was determined that the model positively affected the preservice teachers' attitudes and self-efficacy beliefs about Teaching Principles and Methods course. Besides having positive opinions about the model, the preservice teachers also pointed out the educational advantages of the model. The negative opinions about the model and the problems encountered during the implementation process were mostly related to the technical matters.

Ters-yüz Edilmiş Sınıf Modelinin Öğretmenlik Meslek Bilgisi Dersinde Kullanılması: Tutum ve Öz-yeterlik İnançları Üzerindeki Etkileri

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Öz

Bu çalışmanın amacı, Ters-yüz Edilmiş Sınıf Modeli'nin Öğretim İlke ve Yöntemleri dersine yönelik öğretmen adaylarının tutum ve öz-yeterlikleri üzerindeki etkisini incelemektir. Ayrıca öğretmen adaylarının modele ilişkin görüşlerinin alınması da amaçlanmıştır. Araştırmada, ön test-son test kontrol gruplu yarı deneysel araştırma modeli kullanılmıştır. Çalışma grubu, Batı Karadeniz'de yer alan bir devlet üniversitesinde 78 öğretmen adayından oluşmaktadır. 14 haftalık uygulama aşaması Öğretim İlke ve Yöntemleri dersinde gerçekleştirilmiştir. Deney grubunda Ters-yüz Edilmiş Sınıf Modeli, kontrol grubunda geleneksel öğretim yöntemleri kullanılmıştır. Elde edilen sonuçlara göre, modelin öğretmen adaylarının derse yönelik tutum ve öz-yeterlik inançlarını olumlu yönde etkilediği saptanmıştır. Ayrıca öğretmen adayları modele ilişkin genel anlamda olumlu görüşlere sahipken özellikle eğitsel avantajlarına dikkat çekmişlerdir. Modele yönelik olumsuz görüşler ve uygulama süresince yaşanan sorunlar ise ağırlıklı olarak teknik meselelerle ilgilidir.

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Introduction

With the importance of the curricula designed for educating individuals with a modern human profile who can comply with the requirements of the modern era, teachers having the competency for applying those curricula, and new educational theories and approaches has come to the foreground. Teachers, one of the complementary factors of the education system, play a crucial role which determines the fate of the society in raising individuals with that qualified human profile to serve in every segment of the society.

The qualities of the new generations to be educated are directly proportional to the qualities of the teachers (Can, 2019; Sandholtz & Ringstaff, 2013). The concept of teachers' professional qualities includes the concepts of both the professional knowledge and the professional skills (Buldu, 2014). The concept of "teacher qualities", whose foundation is laid on the pre-service and post-service experiences of teachers, has had to be updated in accordance with the conditions and requirements of our day. Especially the new theories and approaches, that have put students rather than teachers in the centre of learning, have underlain the new understanding of education. In this sense, HEI (Higher Education Institution) (2007), underlines that the principles of a constructive approach being used in primary education programs should be taken into account in the implementation of teacher education programs.

The teacher profile required in our country is defined in the Article 43 of the National Education Basic Law No. 1739 with the statement that "preparation for the teaching profession is enabled through general knowledge, specific field education, and pedagogical formation". In the courses "pedagogical formation (professional knowledge)" mentioned in this statement, preservice teachers are equipped with the information about how to organize the learning environment and how to teach students by taking their characteristics into account based on the field knowledge courses (HEI, 2007). Therefore, the Teaching Principles and Methods (TPM) course, one of the teaching profession knowledge courses that enables students to turn the theoretical knowledge into behaviours through applications (Küçükahmet, 2003; Taşkın & Hacıömeroğlu, 2010), was tackled in this study as it is of great importance in the organization of the learning environment according to the aforesaid new understanding of education.

According to the definition by HEI, the TPM course is comprised of content including "basic concepts of teaching, teaching and learning principles, the importance and uses of planned study in teaching, the planning of teaching, teaching and learning strategies, teaching methods and techniques, their relation to the teaching tools and materials, teacher's duties and responsibilities, and teacher competencies".

At universities throughout Turkey, the course contents in the European Credit Transfer System catalogues and in the related curricula have been created according to this description. The TPM course, including such essential content for the profession of teaching, is of prime importance in preservice teachers' future teaching in the light of up-to-date methods and principles (Kuzu & Demir, 2015). In other words, one of the main factors that has a role in teachers' fulfilment of the professional responsibilities expected from them is that they know and utilize teaching principles and methods (Uşun, 2007). However, previous studies have revealed that teachers are not able to utilize the teaching methods, techniques, and principles which are prescribed in the usually renewed curricula during the teaching service (Akçay, Akçay & Kurt, 2016; Aykaç, 2011; Demir & Özden, 2013). It has also been revealed that teachers and preservice teachers do not prefer the student-centered methods and techniques which are especially compatible with the new understanding of education (Yeşilyurt, 2013; Yıldırım, Köklükaya & Aydoğdu, 2016), and they see themselves as incompetent in using them (Akçay, Akçay & Kurt, 2016; Soylu, 2009).

In order to achieve the aim of the TPM course, different educational approaches to convey the course content to students should be discussed and tried. Particularly, the fact that there is student activity at the heart of contemporary education (Varış, 1996), and there are many studies showing that active learning methods yield more positive results for students' academic achievement (Aziz & Hossain, 2010; Chan, Wan, & Ko, 2019; Güven, 2011; Yazlık & Erdoğan, 2016), should be taken into consideration in this sense. In addition, knowing that active learning develops professional competences (Niemi & Nevgi, 2014), higher-order thinking skills (Brown, 2014),

attitudes (Kardaş & Öztürk, 2015; Kardaş & Uca, 2016) and self-efficacy perceptions (Fook et al., 2015) of students makes the revision of the TPM course in this direction inevitable.

The self-efficacy beliefs and attitudes mentioned above are the variables taken as a basis in this study. Specifically, Schunk (1991), who stated that self-efficacy beliefs are the most important predictors of individuals' goal-oriented behaviors, emphasized that the satisfaction of achieving the goal also doubled the self-efficacy belief. Besides this characteristic, it is known that self-efficacy is associated with major variables of the teaching process such as motivation and academic achievement (Sharp, 2002; Zimmerman & Cleary, 2006). Similarly, one of the factors affecting the success in the learning process is student attitudes (Küçükahmet, 2008). Whether the attitudes defined as the tendency of individuals to react to any object, event or subject based on their knowledge, experience, and motivation (İnceoğlu, 2004) are positive or negative directly affects the learning process (Güven, 2008). The individuals' attitudes towards the teacher, the teaching material, and the subject area affect their academic achievement (Kara, 2010; Şen & Özgün-Koca, 2005). It is known that individuals who feel the sense of success are more motivated to study (Bandura, 1982). At this point, it is thought that the self-efficacy beliefs and attitudes which preservice teachers develop within the scope of the TPM course, and which are of the essence for their teaching skills, are quite important for their professional lives.

Creating learning environments that will make preservice teachers more active in the TPM course, minimizing the connection problems between theory and in professional knowledge courses, integrating technology much more into the process, ensuring more effective use of the lesson duration, and achieving the overall objectives of the course have become a necessity. In this context, blended learning environments, where the advantages of the traditional classroom environment and new educational technologies are used together, can be considered as an alternative solution to eliminating these drawbacks and limitations. The opportunities offered to the teaching-learning processes, as well as daily life, by the product range equipped with new technologies have enabled the technology to become a preferred structure in education (Admiraal et al., 2017; Dunn & Kennedy, 2019). These new technologies have become an indispensable part, a complement and a supporter of new models, methods and techniques to be used in student-centered teaching-learning processes. In this framework, the importance of blended learning environments, where the advantages of the traditional classroom environment and new educational technologies are used together, are increasing day by day (Lalima & Dangwal, 2017). The Flipped Classroom (FC) model, which has been widely used in educational research in recent years (Mitroka, Harrington & DellaVecchia, 2020; Zhu, Lian & Engström, 2019), is one of the blended learning models in question.

Flipped Classroom Model

In the FC model, lessons are conducted outside of school time, usually through online videos. Within school time, homework, performance tasks, and projects that are expected to be done at home in the traditional understanding, are carried out at school with active and collaborative learning techniques (Awidi & Paynter, 2019; Bergmann & Sams; 2012; Cheng & Weng, 2017; Elmaadaway, 2018). In the "out-of-class" phase, which is the first stage of the model, teachers share their own videos and other educational resources containing theoretical information about the lesson on a common platform that students can access over the internet. With the guidance of their teachers, students access and study the subject and activities of the related course from digital educational sources independently of time and place before coming to class (Zainuddin & Halili, 2016).

In the "in-class" phase of the model, the groups formed by the teacher discuss the subject in the traditional classroom environment of the model first. Then, the group members enter into the process of solving the problems posed about the subject. This not only supports collaborative learning but also helps students' inquiry and problem-solving skills develop (Kong, 2014; Wilson, Waghel & Dinkins, 2019). In this way, on one hand, the model enables the effective use of classroom time in order to make more use of student-centered active learning strategies; on the other hand, it enhances classroom interaction (LaFee, 2013; Milman, 2012). This student-centered learning environment has positive effects on students' attendance at lessons and satisfaction as well as their knowledge and skills (Awidi & Paynter, 2019; Murillo-Zamorano, López Sánchez, & Godoy-Caballero, 2019).

The digital materials used within the scope of the model attract the attention of today's generation Z students, especially at higher education levels, and enable them to establish a connection with the course (Priporas, Stylos,

& Fotiadis, 2017). This situation positively affects students' autonomy and motivation (Abeysekera & Dawson, 2015; Zainuddin, 2018). The studies in the literature show that the model improves students' group work and problem solving skills (Bishop & Verleger, 2013; Zhu, Lian & Engström, 2019), it is more effective than traditional methods regarding knowledge and areas of learning (Rawas, Bano & Alaidarous, 2019), it improves learning outcomes (Cheng, Ritzhaupt & Antonenko, 2018; Van Alten et al., 2019), it strengthens self-efficacy beliefs (Chuang et al, 2018; Thai, De Wever & Valcke; 2017), it enables efficient use of classroom time (Fulton, 2012), allows students and teachers to enjoy using the model and feel good (Ha, O'Reilly., Ng, & Zhang, 2019), gives students positive opinions about the model (Butt, 2014) and develops positive attitudes (Tütüncü & Aksu, 2018). On the other hand, as for the limitations of the model, it has been reported that it requires institutional support, there may be problems with internet access (Greene, 2016), students may resist to a new model (Herreid & Schiller, 2013), teachers find it difficult to develop video materials (Effield, 2012), it is uncertain whether students watch videos, and the interaction outside the classroom is less (Rivera, 2015; Sams & Bergmann, 2013).

The FC model with these characteristics is a powerful alternative which is based on active learning and has many student-centered advantages such as problem solving, individual-group work, use of technology, and class participation. Taking into account both the contemporary education approach and the curricula improved in this direction, it has become inevitable to use new models, methods, and techniques in the pre-service teaching-learning process (Kaya & Büyükkasap, 2005). Another factor causing this necessity is the problems and troubles experienced in training teachers from past to present, especially in professional knowledge (pedagogy) courses. In recent studies, it has been observed that there are various negative evaluations regarding the troubles in the teaching of the related courses and the practical effectiveness of the courses (Kavas & Bugay, 2009; Kumral & Saracaloğlu, 2011; Şallı-Çopur, 2008). Yüksel (2011) emphasized about these evaluations in a summative and supportive manner that the criticism made over the teaching profession knowledge courses since the 1930s has been concentrated on teaching the courses abstractively, independently from each other, and away from intense and repetitive content as well. Therefore, in terms of elimination or minimization of the problems, it is thought that the holistic evaluation of variables such as self-efficacy and attitudes that have an important place are key in the teaching process within the scope of the TPM course, which aims to teach the interrelated basic teaching skills, and will be guiding for making educational inferences about the FC model at the micro level and solve the mentioned problems at the macro level. It is seen that there are a limited number of studies on the use and effectiveness of the FC model in teacher education in literature. It is very important to try new models and approaches that can make teacher education more effective.

In this regard, the main focus of this study is to investigate the “active learning environment”, one of the main cornerstones of the Constructivist Learning Theory, which shapes the current curricula in the Turkish education system, and the "FC model" supporting this environment within the scope of the TPM course. From this point of view, results and evaluations regarding the effectiveness of critical variables for the teaching process, such as attitudes and self-efficacy beliefs towards the course of the preservice teachers who took the TPM course designed within the frame of the principles of FC model during one semester, will be included in the current study.

The purpose of the study

The purpose of this study was to examine the effect of the Flipped Classroom model on preservice teachers’ attitudes and self-efficacy beliefs towards the TPM course that they were attending as one of the teaching profession knowledge courses given at higher education level. It was also aimed to determine the opinions of preservice teachers participating in the study about the practices related to the model. Within the scope of this overall purpose, answers to the following questions were sought:

1- What is the effect of the Flipped Classroom model on preservice teachers' attitudes towards the TPM course?
2- What is the effect of the Flipped Classroom model on preservice teachers' self-efficacy beliefs towards the TPM course?
3- What are the opinions of preservice teachers about the use of the Flipped Classroom model in the TPM course?

Method

In this study, quantitative and qualitative research methods were used together. In the quantitative part, a quasi-experimental design with pretest-posttest control groups was used. The effect of the technique used on the experimental group can be investigated according to the results obtained from the pretests and posttests in experimental studies (Büyüköztürk, 2013). While the TPM course was conducted with the FC model in the experimental group of this study, traditional teaching methods were used in the control group.

Table 1. Research Design

	Pretest	Process	Posttest	
Experimental Group (FC)	SES AS	FC Applications (14 Week)	SES A	Qualitative Data Collection
Control Group (Traditional Methods)	SES AS	---	SES AS	

SES: Self-efficacy scale, AS: Attitude scale

In the qualitative part of the study, the descriptive survey model was utilized and the data were obtained from the experimental group. Observing, recording, diagnosing the relationships between the events, and making generalization over the controlled and unchanging principles are the qualities of science used in descriptive survey model.(Yıldırım & Şimşek, 2013) .

Study Group

The study was carried out with 78 (2nd grade) preservice teachers studying at the education faculty of a state university in the Western Black Sea region. There were 37 preservice teachers (20 females, 17 males) in the experimental group of the study and 41 (18 females, 23 males) in the control group. In determining the experimental and control groups, students' university placement exam scores, score types, and overall academic grade point averages were taken into consideration. In order to determine the equivalence of the groups before the experimental process, the attitude and self-efficacy scale was applied as a pretest in teacher undergraduate programs at the faculty of education. Two groups (Elemantary Mathematics Education and Science Education) between which there was no statistically significant difference were selected among them as the experimental and control groups. It was also taken into consideration that the same instructor was responsible for the TPM course in the selected classes.

Content and the Procedure

The general structure of the in-class and out-of-class learning environments for the experimental and control groups during the implementation process is shown in Figure 1.

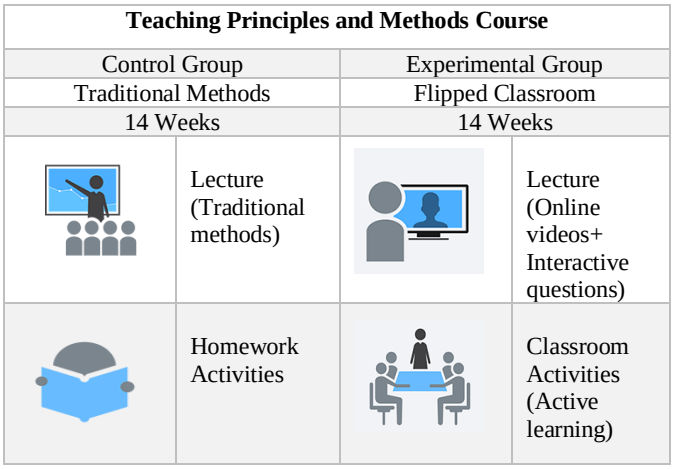

Figure 1. *Design Of Learning Environments For Experimental And Control Groups*

At the beginning of the implementation process, orientation training about the FC model was provided to the students in the experimental group and the problems that may be encountered during the implementation phase were minimized by testing before proceeding to the actual applications. In addition, the instructor was also provided with the training on the FC model before implementation.

In-class and out-of-class activities which were previously planned for the TPM course by the researcher to continue throughout the course period (14 weeks, 42 hours) were carried out with the experimental group students. The videos that the experimental group students watched outside the classroom were produced in a studio environment with the cooperation of the researcher and the responsible instructor. While preparing the videos and the presentations in them, the multimedia design principles proposed by Mayer (2001) within the scope of Multimedia Cognitive Learning Theory were taken into consideration. In addition, in each video lesson, there are sections titled as "What will we learn?", "Why is it important?", "Course video", "Let's think a little" and "Let's not forget". The duration of the videos created according to the weekly-planned lesson subject was arranged to be 12:56 min for the shortest one and 16:11 min for the longest one in accordance with the recommendations in the FC literature. Interactive questions prepared in cooperation with the instructor were included in each video.

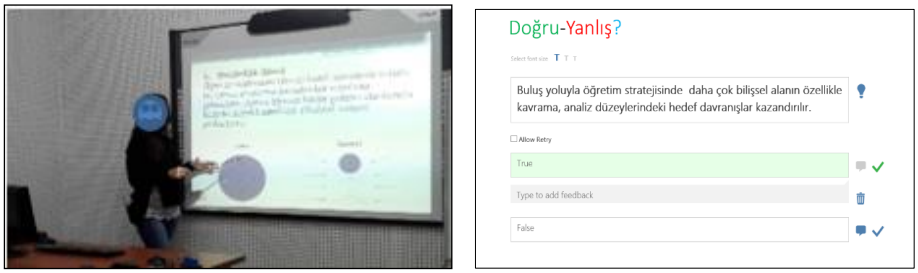

Figure 2. *The Images Of Sample Lesson Video And Interactive Questions*

The videos were opened to access on the OfficeMix platform weekly. This platform presents the statistics of students' logins to the system, video watching durations, and answers to the questions. These statistics were checked by the researcher and the instructor weekly.

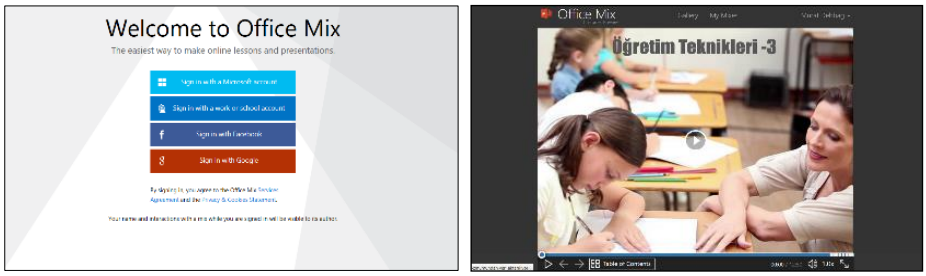

Figure 3. *Screenshots Of The Officemix Platform*

Video links, announcements, and other sources related to the course were also shared regularly on the education platform of Beyazpano.com.

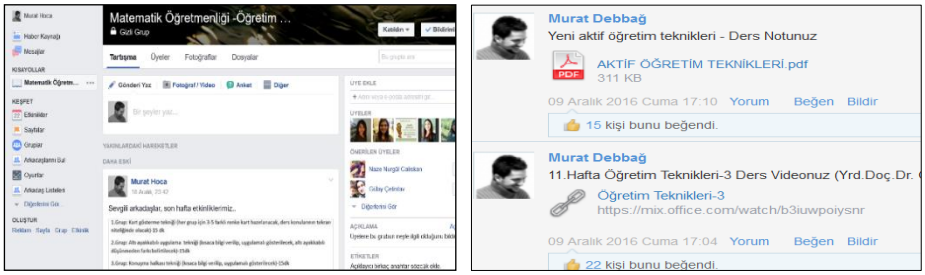

Figure 4. *Screenshots Of The Beyazpano Platform*

The procedures applied in the experimental group each week during the process are shown in Figure 5.

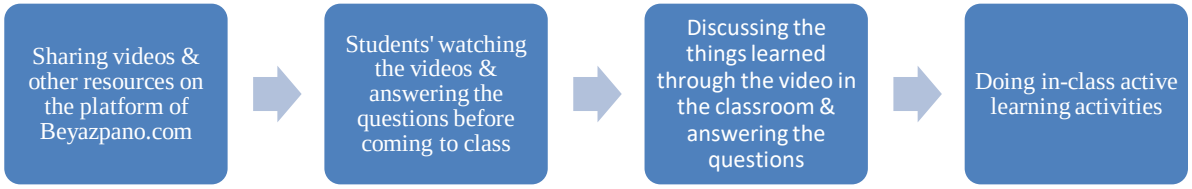

Figure 5. *Phases Of The Weekly Flow Of The Lesson*

In-class learning activities specific to each week were planned by the researcher in accordance with the topic. It was aimed to get the students to be involved in the process individually or in groups. In this regard, methods and techniques such as concept maps, problem solving, cooperative learning, case study, small or large group discussions, brainstorming, role playing, drama, and educational games were used. The lessons of the experimental group were held in the studio classroom (consisting of displaceable tables and chairs) in order to carry out these activities in a favorable learning environment. Classroom design was changed according to weekly activities. In Figure 6 there are images from the examples of the activities in the experimental group.

Figure 6. *Images Of In-Class Active Learning Activities*

No intervention was made to the control group. The control group continued with the traditional methods in which the FC model was not applied to the TPM course during the relevant course period. Also, the lessons in this group were mainly teacher-centered; methods and techniques such as lectures, presentations (powerpoint slides), demonstration, and question-answer were used in the classroom. The scales within the scope of the research were applied to the experimental and control groups both at the beginning and at the end of the process. In addition, the opinions of the students in the experimental group about the implementation process and the FC model were taken at the end of the research process. The lessons were carried out by the same instructor in the Experimental and Control groups.

Data Collection Tools

Two scales were used to collect the quantitative data of the research. "Teaching Principles and Methods Course Self-Efficacy Scale" developed by Kuzu and Demir (2015) was used to determine the self-efficacy levels of preservice teachers about the TPM course. The scale, in total, consisted of 33 items under six factors titled "Knowledge of Curriculum Development Process", " Knowledge of Teaching-Learning Approaches", " Knowledge of Applying Teaching Principles and Methods", "Knowledge of Basic Concepts", "Capability to Explain the Knowledge of Teaching Principles and Methods" and " Knowledge of Planning". Factors explain 67% of the total variance. The Cronbach Alpha coefficient (α) of the scale is 0.95, and the reliability coefficient for the factors of the scale varies between 0.85 and 0.91 (Kuzu & Demir, 2015). The scale was of 5-point Likert type. In line with the aims and research questions of this study, the scale was evaluated as one-dimensional; that is, it was analyzed and interpreted over the total score. CFA was conducted to determine whether the construct validity of the TPM-SE scale was ensured within the scope of the present study. The results showed that the suitability statistics of the model with six factors for the 33 items of the scale were within the acceptable range in terms of the fit indices (χ^2 = 158.76, CFI = 0.89, GFI = 0.91, RMSEA = 0.079, SRMR = 0.068).

The "Attitude Scale towards Teaching Principles and Methods Course" developed by Gür-Erdoğan (2011) was used to determine the attitudes of preservice teachers towards the TPM course. The scale consisted of a total of 40 items under three factors titled "internalization", "adoption" and "abnegation". The Cronbach Alpha coefficient (α) of the scale was 0.90, and it was calculated as 0.96 for the "internalization" factor, 0.92 for the "adoption" factor and 0.84 for the "abnegation" factor (Gür-Erdoğan, 2011). The scale was of 5-point Likert type. As in similar studies in the literature (Woolkul, 2014) and in accordance with the aims and research questions of this study, the scale was evaluated as one-dimensional; that is, it was analyzed and interpreted over the total score. In this sense, the high scores obtained from the scale were evaluated as the indicator of high attitude towards the TPM course and low scores as the indicator of low attitude. The data were coded as positive (5) and negative (1) and included in the analysis process accordingly. CFA was conducted to determine whether the construct validity of the TPM-A scale was ensured within the scope of the present study. The results showed that the suitability statistics of the model created with three factors for the 40 items of the scale were within the acceptable range in terms of the fit indices (χ^2 = 137.11, CFI = 0.93, GFI = 0.94, RMSEA = 0.074, SRMR = 0.073).

In the collection of qualitative data, a survey form consisting of open-ended questions prepared by the researcher was used. The survey consisted of four questions, but only one out of the four was taken into consideration in accordance with the purpose of this study. While creating the survey form, the draft questions were examined and corrected by three specialist instructors in terms of content validity. Questions ensuring content validity were rearranged after presenting them to language and assessment specialists. Finally, in order to test the comprehensibility of the questions, they were applied to the students who were at the same level with the study group and the survey form took its final form according to their feedback.

Data Analysis

In the analysis of quantitative data related to the first and second questions of the research; Mann Whitney-U test was used because the data did not meet the normality assumptions. SPSS 15.00 software was used in the analysis of the data and the significance level of .05 was taken as a basis. The effect sizes which had lower sensitivity to the sample size (Richardson, 2011) and were recommended to be reported (Beins & McCarthy, 2012) were also taken into consideration. "r" value was taken into account as the effect size and calculated by the researcher. In interpreting this value, the cutting points of Cohen (1988) were used. The effect size gives standardized information about the magnitude of the difference between the two groups (Beins & McCarthy, 2012).

Content analysis was used in the analysis of the qualitative data related to the third question of the study. Content analysis is the process of summarizing the basic contents of the written information and the messages they contain (Cohen, Manion & Morrison, 2007). Content analysis includes the stages of "data processing", "data coding", "determining the categories", "organizing the codes and categories", "defining and interpreting the findings" (Yıldırım & Şimşek, 2013). These stages were followed respectively in the analysis of qualitative data.

In determining the codes and categories, the concepts emerging in the findings and the related literature were taken into consideration.

Research Ethics

This study was evaluated by Abant Izzet Baysal University Social Sciences Human Research Ethics Committee on 21.09.2016 at the 2016/05 no. meeting and it was ethically approved.

Findings

Within the scope of the first research question; the results of the independent groups Mann-Whitney U test conducted for the examination of the difference between the 'attitude towards TPM' posttest scores of the students in the experimental and control groups are shown in Table 2.

Table 2. The Results Of The Independent Groups Mann-Whitney U Test On The 'Attitude Towards TPM' Posttest Scores Of The Experimental And Control Group Students

	Group	N	Mean Rank	Sum of Ranks	U	Z	P	r
TPM Course Attitude (Posttest)	Experimental Group	37	49,35	1826,00	394,00	-3,65	0,00*	0.41
	Control Group	41	30,61	1255,00				
	Total	78						

*p<0,05

When Table 2 is examined, it is seen that there is a significant difference in favor of the experimental group between the post-implementation 'attitude towards TPM' posttest scores of the experimental and control group students (U = 394.00, p <0.05, r = 0.41). This significant difference is represented by a high effect size. Accordingly, it can be said that the FC model is effective in the development of positive attitudes towards the TPM course by the students. In other words, it can be said that the characteristics of the model regarding its in-class and out-of-class dimensions increase the attitude levels of preservice teachers in terms of teaching skills, teaching methods, and planning the learning environment.

Within the scope of the second research question; the results of the independent groups Mann-Whitney U test conducted for the examination of the difference between the self-efficacy beliefs' posttest scores of the students in the experimental and control groups are shown in Table 3.

Table 3. The Results Of The Independent Groups Mann-Whitney U Test On The 'Self-Efficacy Beliefs' Posttest Scores Of The Experimental And Control Group Students

	Group	N	Mean rank	Sum of ranks	U	Z	p	r
TPM Course Self-efficacy (Posttest)	Experimental Group	37	44,97	1664,00	556,00	-2,02	0,04*	0.22
	Control Group	41	34,56	1417,00				
	Total	78						

*p<0,05

When Table 3 is examined, it is seen that there is a significant difference between the posttest scores of the experimental and control group students who participated in the study in favor of the experimental group (U = 556.00, p> 0.05, r = 0.22). This significant difference is represented by a medium effect size. This finding shows that the FC model positively affects students' self-efficacy beliefs for the course. In other words, it can be said that

the characteristics of the model regarding its in-class and out-of-class dimensions enhance the beliefs of preservice teachers in terms of teaching skills, teaching methods, and planning the learning environment.

Within the scope of the third research question, the content analysis including the opinions of the preservice teachers in the experimental group about the FC model is given in Table 4.

Table 4. The Codes And Categories Including The Preservice Teachers' Opinions About The FC Model

Category	Sub-category	Codes	f
Positive	Educational	Providing opportunity for	16
		Providing active participation in the class	14
		Increasing motivation	11
		Enabling coming to class prepared	9
		Being time-saving	9
		Being student-centered	6
	Technical	The chance for wathing the videos over and over again	9
		The practicality of interactive questions	4
		Ensuring attendance to lesson due to the monitoring of the video watching rates	3
	Affective	Increasing self-esteem	11
		Being intriguing	4
		Being liked	3
		Including fun activities	2
Negative	Technical	Being worrisome for those having limited access to the internet	8
		The use-up of the internet quota by the videos	5
		The inaccessibility of videos on some mobile phones bazı telefonlarda açılmaması	4
		Including boring videos	3
	Educational	No lecturing in the classroom	3
		The difficulty of teaching the lesson through videos	3
		The difficulty of questions in the videos	2
	Other	The worry of being assumed not to have watched the videos	6
		The anxiety caused by the monitoring of the video watching statistics	4
		Abstaining from being active in the classroom activities	4

Examples of student responses that form the basis of the findings in Table 4 are given below:

A-1. *"I think Flipped Classroom helps students come to class prepared and be active in the lesson. I think students' self-confidence and ability of self-expression improves because FC helps them become active learners. However, the problems of those whose mobile phones do not support the app or who do not have internet access should be solved.*

A-12. *"After being introduced to this model at the beginning of the semester, I observed in the adaptation process that the model was student-centered. The fact that we come to class with some prior learning motivates and leads us to attend classes much more. I am curious about activities on other topics during the semester.*

Active participation is much better than being lectured, but I get overexcited in lessons. I think the other important feature of the model is that it is time-saving and there will be plenty of time for other activities since lessons are not taught in the classroom."

A-23. *"As far as I understand, our teachers can even see how many videos we have watched and how long we have stayed in the video. This situation was both surprising and worrying for me. I could not feel comfortable. Also, some interactive questions in the videos were difficult."*

Within the scope of the third question of the study, the content analysis including the preservice teachers' opinions about the problems they faced in relation to the implementation of the FC model (inside and outside of the classroom) and the suggested solutions is given in Table 5.

Table 5. The Codes And Categories Including The Preservice Teachers' Opinions About The Problems They Faced In The Implementation Process Of The FC Model And The Suggested Solutions For Them

Category	Codes (Problems)	Codes (Solutions)	f
Technical	Internet-based problems	Connecting to a different internet source (library, home, canteen, dormitory etc.)	4
		Connecting through desktop computer	2
		Reconnecting to the internet	2
		Watching the videos when the internet connection is fast	2
	Distraction while watching the videos	Watching in a calm/more proper environment	3
		Watching on another day	2
		Rewatching after pausing the video	2
	Impossibility of asking questions while watching the videos	Asking the question in the classroom	3
		Finding answers to questions during activities	2
		Learning from another source/internet	2
	Mobile device-based problems	Getting a tablet computer from counsellor instructor	3
	Incapability to see the questions in the videos	Trying on a different computer, tablet pc or browser	3
	The concern about whether the statistics of video watching are kept accurately	Announcing the watching statistics accurately each week	3
Educational	Insufficient efforts of some group members in group works	The taking over of the duties of those who do not perform efficiently in the activities by other group members.	2
	Forgettability of prior learning or watching	Starting the lesson by asking short questions about the videos watched beforehand	2
	Need for additional sources apart from the videos	Uploading additional written worksheets	2
	The physical conditions of the classroom	Moving to an appropriate classroom after the first week	1

Examples of student responses that form the basis of the findings in Table 5 are given below:

A-11. *"I usually had difficulty in watching videos before the lesson due to the problems on the internet but I don't think this was a problem related to the model itself as I solved it by watching them through different internet ports. In addition, there were some problems in group work activities. Responsibility awareness should be established to overcome these problems. Everyone should be involved in activities with equal consciousness."*

A-5. *"I could not watch the videos uploaded to the platform on the phone, our counsellor instructor provided tablet computers to solve this problem. Sometimes I could not see the questions between the videos, but I solved this problem by accessing through a different browser supported with flash player. Although statistics are kept, not everyone can watch the videos sincerely to learn; mini-tests can be made at the beginning of the lesson to see if the videos have been watched or not"*

Discussion and Conclusion

A significant difference was found in favour of the experimental group between the post-implementation 'TPM course attitude' post-test scores of the experimental and control group students participating in the study. Accordingly, it can be said that the FC model is effective in the development of positive attitudes towards the TPM course by the students. This situation can be explained by the fact that the model offers an individual learning environment for students who learn at different speeds by means of out-of-class applications (Bergmann & Sams, 2012), enables unlimited repetition of lessons (Bishop & Verleger, 2013; Goedhart et al., 2019; Pierce & Fox, 2012), and gives students the opportunity to be responsible for their own learning (Kara, 2016; Tomas et al., 2019). Similarly, the fact that the model turns the dull learning environment in the classroom into an interactive and collaborative atmosphere (Friedman & Friedman, 2013; Van Alten et al., 2019) based on experiential learning (Gillois, Bosson, Genty, Vuillez & Romanet, 2015; Tan, Brainard & Larkin, 2015; Zheng et al., 2019) can also be said to be effective in this situation. In this context, the students in the experimental group put the theoretical knowledge they acquired outside the classroom into practice in a constructivist learning environment in the classroom in which they became part of a project, participated in activities based on active learning, and had the opportunity to test their basic teaching skills and to enjoy their own learning. Therefore, considering the aforementioned in-class and out-of-class dimensions that can be described as student-and learning-friendly, it can be thought that students identify this situation with the TPM course and their attitudes towards the course are positively affected in this context. As a matter of fact, the positive opinions about participation in classroom activities, motivation for the lesson, coming to class prepared, and using time efficiently which are included in the qualitative findings of the study support this situation.

It is seen that there is a significant difference in favour of the experimental group between the 'TPM course self-efficacy' post-test scores of the experimental and control group students participating in the study. Researches in the literature also support these findings (Chou, 2017; Lai & Hwang, 2016). Accordingly, it can be said that the FC model positively affects students' self-efficacy beliefs towards the course. At this point, it can be seen that preservice teachers in the group studying with the FC model can display their own performances in the interactive and democratic classroom environment, take part in active learning-based activities, and have the opportunity to share what they have learned outside the classroom as part of a team. On the other hand, the improvement in students' attitudes towards the course can be evaluated on the same basis with self-efficacy. In this context, in the literature, there are interactive relationships both between self-efficacy beliefs and attitudes (Koballa & Crawley, 1985; Nikolopoulou & Gialamas, 2009) and between self-efficacy beliefs and motivation (Schunk, 1991). In this regard, Bandura (1997) states that self-efficacy belief affects even individuals' thoughts, motivations and the way they explain their environment. As a matter of fact, the participants emphasized that the model had positive effects on their self-confidence and motivation in most of the opinions obtained in the qualitative dimension of the study. In the light of this information, it is seen that the findings obtained in relation to these variables in this study support each other and show parallelism with the literature in general. Moreover, considering that the self-efficacy beliefs and attitudes developed by teachers affect their future behaviors and teaching performances (Li, 1999; Osborne, Simon & Collins, 2003), it can be foreseen that the FC model could make positive contributions to the professional achievements of preservice teachers in the future. As the self-efficacy perceptions of teachers

increase, they are able to practise their professions more confidently, foresee what they can do, communicate effectively and strive to be successful (Benzer, 2011).

The four main sources of the self-efficacy belief are 'the knowledge that individuals obtain through their own learning experiences', 'the observations they make about the successful or unsuccessful practices of others', 'the community's impact on whether they may be successful or not', and 'the psychological situation they have in relation to the expectation of success or failure'. Each of these sources affects individuals' self-efficacy beliefs. Self-efficacy belief also determines the task selection of the learner, the strategy he/she chooses, and his/her perseverance in performing the task and which thus affects the performance (Bandura, 1994). It can be said that the model used in this study has a positive effect on the self-efficacy beliefs about the TPM course as a result of supporting and consolidating the resources that enhance the self-efficacy belief. In other qualitative findings of the study, the fact that the model gives opportunity to put into practice what they have learned encourages participation in classroom activities and saves time required for the activities; the positive opinions about being prepared for the lesson support all these results and evaluations.

It is seen that the participants' opinions towards the FC model are predominantly "positive". It is noteworthy that most of the positive opinions are about the "educational" aspect. On the other hand, negative opinions mainly include concerns about technical issues. Student opinions in similar studies, in which the FC model was handled, also parallel with these findings (Akgün & Atıcı, 2017; Alsancak-Sırakaya, 2017; Andujar, Salaberri-Ramiro, & Martínez, 2020; Başaran, 2019; Chao, Chen & Chuang 2015; Findlay-Thompson & Mambourquette, 2014; Frydenberg, 2012; Yıldız, Kıyıcı & Altıntaş, 2016). For example, in the research conducted by Yıldız, Kıyıcı and Altıntaş (2016), preservice teachers studying with the FC model emphasized the fact that the model enabled them to practice, reinforce what they learned, be prepared for the lesson, and watch videos over and over again. In the studies of Başaran (2019) and Alsancak-Sırakaya (2015), students also stated, in line with the findings above, that the model increased their motivation while in the findings of studies by Alsancak-Sırakaya (2017) and Görü-Doğan (2015), students emphasized that the model helped them to be prepared for the lesson. In the study by Akgün and Atıcı (2017), students stated that being prepared for the lesson positively affected the active participation in the classroom. This is in line with student opinions in this study and in similar studies in the literature, which have revealed that the model increases active participation (Frydenberg, 2012; Sever, 2014; Stone, 2012). Considering the findings above, in a general sense, each opinion emphasized by preservice teachers can be thought to be explanatory of their attitudes and self-efficacy beliefs towards the course. In this regard, this situation coincides with the quantitative findings of the research. It is noteworthy that the criticisms about the FC model are predominantly related to the "technical" aspect. Similarly, there are studies with various conclusions about the problems experienced by students regarding internet and technological deficiencies (Kocabatmaz, 2016; Milman, 2012; Turan, 2015). Although LaFee (2013) states that the problems related to internet connection can be compensated by distributing to students electronic recordings of the lessons (DVD etc.), it is very difficult in this case to benefit from the advantages, such as the monitoring of students' participation and interactive questions.

Limitations

This study is limited to the preservice teachers who were selected as the sample of this study and were studying in the education faculty where the study was conducted, to the data obtained from them during the 14-week implementation period, to the data collection tools used in the study, and to the factors in these tools.

Recommendations

Based on the findings of the study, it can be suggested to apply the model in lessons that are suitable for the FC model in teacher education programs. This can contribute to students' taking their own learning responsibilities, individual and group works, active learning activities, being part of a project, learning with fun, and their attitudes and self-efficacy beliefs towards the course. However, good planning of both dimensions of the model and creating

a classroom environment based on student interaction and guided by the teacher is important for both the course and other educational variables.

The OfficeMix add-on and website used in the implementation phase have started to work in integration with the Powerpoint application since 2019. In this way, the need for participants to download add-ons has been eliminated. Videos can be recorded via Screencast within the PowerPoint application and can be published on the Microsoft Stream platform. New studies can be planned about these programs and platforms.

The videos to be used in research within the scope of FC model should be long enough not to decrease the students' watching habits. In addition, the fact that the videos are created remarkably and in high resolution in accordance with educational goals and visual rules is very important for achieving the goal of the model. The platform where the videos will be uploaded should be chosen properly to be useful for both teachers and students. Filing a report of the electronic movements of students through the platform will facilitate the control of the process.

In future studies, the effects of the model on different variables that are not included in this study can be investigated. Its effect on teaching skills or different variables or its relationships with them can be explored in depth. In this context, long-term or longitudinal studies may provide more detailed findings.

This study was carried out at higher education level and within the scope of education faculty. Similar studies can be conducted at different educational levels or at different faculties. Correlations and inferences can be made in terms of students' demographic characteristics such as age, gender, and socio-economic status.

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Statement of Publication Ethics

The authors declare that the research has no unethical problem and observe research and publication ethics.

Conflict of Interest

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