Implementing the Flipped Classroom in Teacher Education: Evidence from Turkey

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ABSTRACT

The flipped classroom, a form of blended learning, is an emerging instructional strategy reversing a traditional lecture-based teaching model to improve the quality and efficiency of the teaching and learning process. The present article reports a study that focused on the implementation of the flipped approach in a higher education institution in Turkey. For this pretest-posttest quasi-experimental study, a classroom management course in a pre-service English teacher education program was flipped and its effectiveness was measured against a traditionally taught class. Quantitative and qualitative data came from 62 pre-service teachers (PTs) in two intact classes randomly assigned as the experimental and the control groups. Findings revealed a higher level of self-efficacy beliefs and better learning outcomes for the experimental group PTs in the flipped classroom compared to the control group PTs in the traditional classroom. PTs' perceptions of the flipped classroom were also positive.

Keywords

Flipped classroom, Teacher education, Classroom management, Pre-service teachers of English

Introduction

Enhancing students' learning experiences and meeting their needs and expectations have been among the primary concerns of higher education institutions over three decades (Demirer & Sahin, 2013; Garrison & Hanuka, 2004). Therefore, extensive research has been conducted in order to investigate the ways of improving the teaching and learning environment (Biggs & Tang, 2011). Blended learning (BL) has emerged with its "potential to transform higher education institutions" to supplement the traditional classroom setting and increase the quality of student learning (Garrison & Hanuka, 2004).

Despite its growing popularity, there is not an agreed upon single definition of BL in the literature. In Singh and Reed's (2001) definition, BL refers to a learning program using more than one delivery model to increase students' academic achievement and reduce costs. In Bañados' words (2006), BL is "a combination of technology and classroom instruction in a flexible approach to learning that recognises the benefits of delivering some training and assessment online but also uses other modes to make up a complete training programme which can improve learning outcomes and/or save costs" (p. 534). According to Garrison and Vaughan (2008), BL is about the thoughtful integration of face-to-face and online learning; the redesigning of a course to increase student engagement; and the restructuring and replacement of traditional class hours. They add that BL blends "the best of traditional and Web-based learning experiences," and this blend or integration is "multiplicative, not additive" (p. 7). Common to these definitions is the recognition of BL as the combination of face-to-face and online-delivery methods to enhance students' learning and reduce costs.

The use of BL has been reported to be on the rise in higher education (Garrison & Vaughan, 2008; Graham, Woodfield, & Harrison, 2013). Its popularity is attributed to research suggesting that BL results in improved learning outcomes (Bonk & Graham, 2006; Vaughan, 2010), improved pedagogy (Graham, 2006), increased learner motivation and satisfaction (Collopy & Arnold, 2009; Fulkerth, 2010), increased interactions (Bonk & Graham, 2006; Delialioglu & Yildirim, 2007), and reduced costs (Bonk & Graham, 2006; Graham, 2006).

In recent years, the flipped or inverted classroom, falling under the broad definition of blended learning, has gained prominence in higher education institutions as an alternative pedagogical model reversing what traditionally occurs in and out of the class.

The flipped classroom

The flipped classroom is an emerging pedagogical model in which traditional lecture is moved outside the classroom via technology and assigned as homework while in-class time is spent on collaborative inquiry-based learning (Bergman & Sams, 2012; Lage, Platt, & Treglia, 2000; Stone, 2012; Tucker, 2012). The flipped classroom is defined by Bishop and Verleger (2013) as follows:

> The flipped classroom is a new pedagogical method, which employs asynchronous video lectures and practice problems as homework, and active, group-based problem solving activities in the classroom. It represents a unique combination of learning theories once thought to be incompatible- active, problem-based learning activities founded upon a constructivist ideology and instructional lectures derived from direct instruction methods founded upon behaviourist principles. (p. 1)

The flipped classroom model has developed through the years with contributions from several researchers. In 1996, Mazur argued against using lectures and having passive students in the classroom. He used a technique called "Peer Instruction" to change the traditional instructional model. He asked his students to prepare for class by reading the assigned materials so that they could be actively engaged in the learning process with their peers (Mazur, 2009). Similarly, Baker (2000) shared lecture notes with his students online and used class time for group work and problem solving activities. In the same year, Lage et al. (2000) also inverted their classroom and provided students with a choice of videotaped lectures, reading materials and slides to study outside the class. In-class time was spent on group work activities based on practice. In 2006, Salman Kahn launched his non-profit website offering free videos on almost every topic to support instruction. In 2007, with the study of Bergmann and Sams (2012), the flipped model became more popular. They shared recorded teacher presentations online to support students who were frequently absent. Although this was their initial purpose, in time, their study showed that the flipped classroom resulted in greater teacher-student rapport and increased student-student interaction. More in-class time was allocated to conducting engaging activities.

As a student-centred instructional model, the flipped approach is grounded in the constructivist theory of learning (Strayer, 2012). In constructivism, "knowledge is actively constructed by the learner, not passively received from the outside. Learning is something done by the learner, not something that is imposed on the learner" (Sjøberg, 2007, p. 3). The flipped approach aims to create a student-centred learning environment in which students take care of their own learning and become more active and interactive in class. Among the foundations of constructivist theory of learning are collaboration, interaction and engagement of learners (Jonassen, Davidson, Collins, Campbell, & Haag, 1995). In the flipped classroom, students "work through problems, advance concepts, and engage in collaborative learning" (Tucker, 2012, p. 82). Such collaborative activities are effective in supporting students' higher level of understanding (Sorden, 2011; Yang & Wu, 2012).

Differentiated instruction is also evident in the flipped classroom. Differentiating, or personalising, instruction involves the identification of the needs and preferences of learners and the organisation of instruction that is meaningful and relevant to their learning (Algozzine & Anderson, 2007; Keefe, 2007). In the flipped approach, students have the opportunity to learn according to their needs and preferences. They can, for example, rewind or fast-forward to review the materials shared prior to class and decide on their own pacing. In the classroom, teachers have more time to guide students and give them differentiated feedback (Berrett, 2012).

Research on the flipped classroom

Despite its rapid rise in popularity in higher education, there are relatively few studies on the efficacy of the flipped model. Stone (2012) flipped a class of a genetic diseases course with 30 students and a class of a general biology course with 400 students. In both courses, students were provided with short recordings of lectures, readings, animations and simulations prior to the lesson. In class, activities such as jigsaw exercises and case studies were conducted. Compared to students in previous non-flipped semesters, the flipped class students scored higher on exams, attended the classes more and had mostly positive attitudes towards learning in the flipped classroom. The study conducted by Marcey and Brint (2012) in two introductory biology classes aimed to compare a traditional lecture model with the flipped classroom approach. At the end of the study, students in the flipped classroom had higher scores on tests and quizzes than the students in the lecture class. Davies, Dean and Ball (2013) compared three different teaching approaches, i.e., traditional lecture-based instruction, simulation-based instruction and the flipped classroom in a course on spreadsheets with 301 students. The results indicated the effectiveness of the flipped classroom. Due to its allowance for greater differentiation of instruction, this approach increased students' motivation and facilitated their learning. Similarly, in their study, McLaughlin et al. (2014) flipped a pharmaceutics course with 162 students by creating online videos of their lectures and using class time for active learning exercises. The findings revealed an increase in students' learning and their perceived value of the model.

Compared to research on the implementation and efficacy of the flipped classroom approach in other disciplines, there is very little research on the effectiveness of the model in teacher education specifically; furthermore, the findings are inconclusive. In one such study, Vaughan (2014) investigated the effect of a flipped classroom

approach on PTs' engagement level in a teaching profession course. Data came from discussion board notes, journals and observations. During the study, PTs in the flipped classroom watched the taped lectures and answered discussion questions outside the classroom and participated in activities such as small group debates inside the classroom. The findings revealed an increased level of reflection and inquiry for the PTs in the flipped group. Fraga and Harmon (2014) also aimed to investigate PTs' perceptions of the flipped classroom and the effect of the approach on their achievement by comparing the flipped and the traditional lecture classrooms in a word study course. Fifty-one PTs enrolled in the Department of Education and Human Development participated in the study. The flipped group PTs were provided with lectures in the form of narrated PowerPoint presentations. The findings did not reveal any significant difference between the groups in terms of PTs' academic achievement. The authors noted that different factors such as topic choices, preferences and learning styles of PTs influenced the effectiveness of the way teaching and learning was conducted.

The present study aimed to contribute to the literature on the implementation and effectiveness of the flipped approach in pre-service English teacher education by comparing a flipped classroom to a traditional lecture-based classroom. More specifically, a course titled "Classroom Management" was flipped and this study was conducted to investigate whether there would be significant differences between the PTs of English enrolled in the flipped classroom management course and those enrolled in the traditional face-to-face classroom management course in terms of their self-efficacy beliefs and learning outcomes. PTs' perceptions of the flipped classroom approach were also analysed.

Methodology

Design, participants and setting

This study adopted a pretest-posttest quasi-experimental mixed methods design. The experiment was conducted over a 14-week semester with 62 PTs of English enrolled in the four-year English Language Teaching program of a state university in Turkey. They were all second-year students and took a 4-credit Classroom Management course as a curriculum requirement. At the time of the study, the course was offered in four sections. Among these four intact classes, two of them were randomly selected for the study and assigned to control (N = 30) and experimental (N = 32) conditions, receiving traditional and flipped instruction respectively. All sections of the course were taught by the same instructor, the researcher of this study.

Demographic characteristics of the participants were as follows: the majority of the PTs in both groups were female (80% in the control group, 81 % in the experimental group). Their ages ranged from 19 to 21. Every PT except one in the control group owned a personal computer and had Internet access. Eighty percent of the PTs in the control group spent up to five hours a day online while the rest reported to be spending five to 10 hours. Similarly, 81% of the experimental group PTs spent about five hours a day on the Web while 19% were spending up to 10 hours. All PTs reported that they used the Internet mainly for social media, communication, entertainment, and education. Their educational uses of the Internet included using an online dictionary, searching the Web for a school project, using Wikipedia, using Edmodo, and practicing language. None of the PTs had heard about blended learning or the flipped approach prior to the study.

The classroom management course and its redesign

Classroom management is considered to be one of the most important skills that teachers and PTs gain for effective learning and teaching (Stoughton, 2007). It is also commonly reported to be a cause of concern for PTs during their practicum and for their future teaching career (Bromfield, 2006). Most teacher preparation programs offer courses on classroom management (Baker, 2005). These courses generally focus on the development of theoretical knowledge through lecturing and opportunities for putting theory into practice are rare. Research focusing on the views of PTs for the adequacy of classroom management preparation during teacher education has revealed that they do not feel adequately prepared, they feel a need for additional training in classroom management, and find the courses too theoretical, not connected to the real world (Atay & Kurt, 2010; Atici, 2007; Maskan, 2008).

The Classroom Management course that is highlighted in this study is conducted in English and aims to prepare PTs to be effective managers of their future classes to maximise learning in the classroom environment. Key topics of study for this course include the development of a favourable and cooperative climate in the classroom, the causes of discipline problems in the classroom and the strategies for dealing with them, and the development

of effective relationships among students, teachers and parents. The course content is traditionally covered by lectures. Students are required to read the assigned chapters before coming to class and follow the lectures during the lesson. Classroom interaction is mainly based on teacher-led question-and-answer sequences. Due to limited class time and crowded classes containing around 30-35 PTs, only few PTs get the opportunity to talk and not much time is left for practical activities.

Prior to the present study, informal discussions with PTs who had already taken the course revealed their concern for classroom management. They felt unprepared to deal with classroom management problems in a real classroom setting, even after taking the course. They considered the lack of opportunity to practice to be the most significant factor contributing to their low self-confidence regarding classroom management. They also mentioned that as the course was mostly theoretical, following lectures could sometimes be difficult and boring.

For the above mentioned reasons, one section of the classroom management course was redesigned, or flipped, in order to (1) create time for activities that would help PTs put their theoretical knowledge into practice, (2) make lessons more interactive and engaging, and (3) improve PTs' learning. The other section assigned as the control group continued with the traditional format.

Description of the flipped instruction

Utilizing the Constructivist theory of learning and differentiated instruction in its design, the flipped Classroom Management course was conducted as follows: At the beginning of the term, a group was created on Edmodo (http://www.edmodo.com), a social learning platform for teachers, students and schools. Edmodo allows teachers to create groups for their classes and post classroom materials, share links and videos, and create quizzes and assignment tasks. The PTs were familiar with Edmodo; thus, there was no need for training on its use.

For the content delivery in the flipped group, lectures of the course were recorded as video podcasts (vodcasts) using Present.me (https://present.me/content/), an online service that allows users to combine slides with audio and video narration and create links for viewers. Each week, an instructor-generated vodcast, typically 40-45 minutes in length, was created and its link was shared on Edmodo. For each vodcast, an online quiz was prepared on Edmodo in order to check PTs' comprehension of the lecture. PTs were supposed to come to class having viewed a lecture vodcast linked on Edmodo, read the assigned chapter(s) in the textbook, and completed the quiz. PTs were reminded to take notes of any questions that arose during their self-study.

Face-to-face class time of the flipped group began with a brief review of the lecture video content. In the remaining time, approximately 40-45 minutes, practice-based interactive tasks were carried out, mostly in pairs or groups. Tasks ranged from problem solving to analysis of case scenarios, from role-playing to watching and commenting on real classroom videos. The aim was to give PTs the opportunity to grapple with real-world problems and apply theory to practice. For example, in a week focusing on different approaches to classroom management, i.e., the Jones Approaches, the Dreikurs Approach or the Behaviourist Approach, PTs learned about the relevant principles, facts and terms from the lecture vodcasts out of the classroom. In-class time was spent on analysing case scenarios that may be potentially faced in a real classroom and working on possible responses based on the approaches covered in the video. More specifically, PTs worked collaboratively in groups of three or four to act out the scenarios they were assigned to and present their responses. After each presentation, whole class discussions were carried out to discuss the applicability of PTs' responses in a real classroom setting. In another week, the focus was on communicating with students and their parents. PTs came to class having learned strategies for successful teacher-student and teacher-parent communications from the assigned vodcast and readings. During the face-to-face class time, PTs worked with their peers and role-played a teacher-parent interaction during a teacher-parent meeting. They were given role cards and expected to follow the conventions for successful communication in teacher-parent meetings.

Description of the traditional instruction

The instruction in the control group was built around in-class lectures. A PowerPoint presentation was used for each lecture focusing on the theory. The content of the presentations used in the flipped and the traditional groups was the same. PTs in the traditional group were supposed to come to class having read the assigned chapters in the textbook. As homework, they were also asked to evaluate teacher responses to classroom management scenarios presented in each chapter and suggest alternative strategies. Due to the limited time and

large class size, not much time could be allocated to the review of the scenarios and only few PTs got the opportunity to share their opinions and/or suggestions.

Data collection and analysis procedure

For the present study, quantitative data came from the Teachers' Sense of Efficacy Scale (TSES) developed by Tschannen-Moran and Hoy (2001) and PTs' final exam scores. Qualitative data were obtained from a focus group interview.

On the first day of class in both groups, the syllabus was reviewed and course requirements were discussed. The flipped group was informed about the flipped approach and instructed on how to access to the vodcasts linked to the group page on Edmodo. The first in-class meeting in each group ended with the administration of the TSES. After completion of the course content and before the final exam, the same scale was applied to both groups.

The TSES, with 24 items grouped in three subscales, aimed to measure PTs' perceived self-efficacy in student engagement, instructional practices and classroom management. Example items for three subscales were as follows: "How much can you assist families in helping their children do well in school?" (student engagement), "To what extent can you use a variety of assessment strategies?" (instructional strategies), and "How much can you do to get children to follow classroom rules?" (classroom management). PTs indicated how much they could do in the given statements on a 9-point Likert scale ranging from 9 (a great deal) to 1 (nothing). The Cronbach alpha reliability coefficient of the overall scale was .94, and the reliability scores for three subscales were .87 for student engagement, .91 for instructional strategies, and .90 for classroom management (Tschannen-Moran & Hoy, 2001).

For data analysis, first, descriptive statistics were conducted using SPSS 21.0 to investigate the overall self-efficacy levels of PTs. Then, an independent samples t-test was used to compare the efficacy levels of the PTs who received the traditional lecture-based classroom management course to those who received the flipped instruction.

Upon completion of all course content in both groups, a final exam consisting of 20 fill-in-the-blank questions was administered to the PTs in both the control and experimental groups. An independent samples t-test was used to determine whether the groups' learning outcomes differed significantly from one another. The exam included questions measuring both theoretical knowledge and decision making based on given cases.

Qualitative data came from a focus group interview conducted with nine randomly selected PTs from the flipped group. The aim of the interview was to understand PTs' perceptions and experiences of the flipped instruction after receiving it. The interview, which lasted around 40 minutes, was carried out in the PTs' native language (Turkish) and audio recorded for transcription purposes. The transcribed data were translated into English and analysed by repeated reading to identify and report common patterns/themes and divergences within the data, following the procedure of Miles and Huberman (1994).

Findings

Teachers' sense of efficacy scale

In the preliminary analyses, the assumption of normality was assessed with the Kolmogorov Smirnov (KS) test using SPSS software. The KS test results for the pre- and post-test scores were not significant, indicating that the data came from a normally distributed population, verifying the assumption (p = .20, for both).

In order to investigate self-efficacy beliefs of PTs, an independent samples t-test was applied to both groups' gain scores in the TSES. As Table 1 shows, there was a significant difference between the experimental and control groups in their gain scores in the overall scale and the subscales of student engagement and classroom management. For the subscale of instructional strategies, PTs in the experimental group had higher gains compared to the PTs in the control group, though not at a significant level. As the eta squared values indicate, the magnitude of the differences in the means obtained from the overall scale, and the subscales of student engagement and classroom management was moderate (Cohen, 1988).

Table 1. Differences in self-efficacy beliefs

Scale	Group	Test	*M*	*SD*	*df*	*t*	*p*	ŋ²
Student engagement	Experimental (*N* = 32)	Pre	42.41	9.51	60	2.845	.006*	.12
		Post	54.59	7.91				
	Control (*N* = 30)	Pre	45.70	7.12				
		Post	51.70	6.93				
Instructional strategies	Experimental (*N* = 32)	Pre	41.69	10.80	60	1.343	.184	-
		Post	52.97	6.81				
	Control (*N* = 30)	Pre	43.27	8.62				
		Post	50.93	7.37				
Classroom management	Experimental (*N* = 32)	Pre	41.13	10.65	60	2.745	.008*	.11
		Post	55.16	7.75				
	Control (*N* = 30)	Pre	47.10	8.56				
		Post	53.23	6.79				
Total	Experimental (*N* = 32)	Pre	125.22	27.30	60	2.522	.014*	.10
		Post	162.72	21.03				
	Control (*N* = 30)	Pre	136.07	20.40				
		Post	155.87	19.13				

Note. $^{*}p < .05$. ŋ² = Eta squared.

Final exam scores

The study also focused on understanding whether there was a significant difference between the experimental and control group PTs in terms of their exam scores at the end of the study. The preliminary analysis using the KS test revealed that the scores were normally distributed ($p = .089$); therefore, an independent samples t-test was applied to the data. The findings of the t-test displayed that (see Table 2) PTs in the flipped classroom outperformed PTs in the traditional classroom and the difference was statistically significant. The eta squared statistic indicated a large effect size (ŋ² ≥ .14, Cohen, 1988).

Table 2. Differences in final exam scores

Group	*M*	*SD*	*df*	*t*	*p*	ŋ²
Experimental (*N* = 32)	73.38	14.64	60	3.716	.000*	.19
Control (*N* = 30)	58.80	16.24				

Note. $^{*}p < .05$. ŋ² = Eta squared.

Focus group interview

A focus group interview was conducted in order to gain an in-depth understanding of the experimental group PTs' perceptions of and experiences with the flipped instruction. Four major categories emerged from the analysis of the data: perceptions of the efficacy of the flipped classroom model, changes in the classroom environment, benefits of individualised learning, and applicability of the model to language teaching.

The first theme emerging from the data was about PTs' positive perceptions of their experiences in the flipped learning environment. All PTs reported to be highly satisfied with the method of instruction they received. Two major factors that led to satisfaction were their perception of better learning and their enjoyment of the flipped class model. They stated that watching the videos prior to in-class meetings helped them learn the material better and was more enjoyable compared to doing assigned reading. One PT said:

> *I feel more motivated to watch the lecture from a video. Reading a chapter or an article is usually boring. I learn better from the videos. During the term, I enjoyed attending the class knowing the material and feeling ready for discussion.*

Another PT stated that:

> *Most courses in our program are theoretical. When the focus is on theory, I memorize the content and forget it easily. In this course, I learned the theory at home and we had a lot of practice in class. This way, I could connect theory and practice. They were complementary. I feel I can confidently put my theoretical knowledge into practice in a real classroom environment.*

In relation to the efficacy of the model, the following comment came from another PT:

I really enjoyed the course, especially our in-class meetings. I felt that I was learning. Activities such as case analysis and role-playing contributed to our learning and prepared us well for a real classroom. I will remember what I have learned in this course in the future.

PTs' comments also focused on the classroom environment. They mentioned that in the flipped approach, the classroom environment was student-centred, more positive and less stressful. One PT stated the following about the student-centred learning environment:

In a traditional class, we rarely talk during the lesson. Teachers do most of the talking. They ask some questions but not much time is spent on the answers, so usually it is hard to get a chance to talk in the class. In this course, we had a lot of time to talk and share our opinions. Hearing others' opinions also helped us gain a different perspective.

In their opinion, the chance to work with peers also contributed to the positive classroom environment. As they reported, in group work, PTs felt more comfortable and "did not have the fear of saying wrong things." One PT explained why she felt less stress in the flipped classroom as follows:

In a lecture-based course, I easily get lost and miss some information. This creates a lot of stress for me. In this course, I felt relaxed because I did not have to follow the teacher's lecture during classroom time.

The third theme emerging from the data was the benefits of individualised learning. In their comments, PTs emphasized the importance of self-pacing. They all appreciated watching the lectures at any time they wanted and being able to decide on their own pacing. They paused, rewound and replayed the video lectures as they needed. Here are PTs' comments illustrating these points:

I do not feel ready to learn all the time. I watched the video lectures when I felt ready.

I watched the lectures whenever I wanted- sometimes while travelling on the bus, sometimes while playing a game or eating.

Before the exam, I watched all the videos again. They really helped me prepare for the exam.

While watching the lectures, I replayed the sections that were complicated again and again.

During the interview, as PTs were discussing how much they benefitted from the flipped instruction, the idea of applying it to their future classes emerged as the fourth theme in the data. Although PTs did not exactly know how to flip a language class, they all believed in its advantages for students' learning and engagement. They all mentioned the lack of time for practice in language classrooms and stated that in Turkey, language classes are mostly teacher-centred, and students do not get enough opportunities to practice their language skills. Here are the relevant comments of the PTs:

Students can watch some grammar videos at home and do practice activities in the classroom.

In crowded classrooms, students do not always get the chance to talk. This situation demotivated me when I was in high school. The flipped model can be a solution to this problem.

The flipped class model is very enjoyable. Students would love it.

I will do some research about flipping a language classroom. I believe my future students will benefit from it. Today's students love learning with technology, so the flipped model will be very engaging for them.

Discussion of the findings

The present study was designed to measure the efficacy of the flipped classroom model as applied to a classroom management course in a pre-service English teacher education program. The flipped classroom was compared to a traditional lecture-based classroom in order to determine its effect on PTs' perceived self-efficacy beliefs and learning outcomes. Findings revealed that the PTs in the flipped classroom had more developed self-efficacy beliefs and scored higher on the final exam than the PTs in the traditional classroom. The flipped group PTs also felt well prepared and confident about dealing with classroom management issues in their future classes; moreover, their perceptions of the flipped classroom approach were positive.

Tschannen-Moran and Hoy (2001) defined a teacher's efficacy belief as "a judgment of his/her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated" (p. 783). The vast majority of research has indicated self-efficacy as one of the important predictors of teachers' instructional effectiveness and behaviour management (e.g., Gibson & Dembo, 1984; Welch, 1995). In the present study, the flipped group PTs' self-efficacy beliefs improved more than the beliefs of the control group PTs. The improvement was statistically significant according to the overall scale and the subscales of student engagement and classroom management.

Among the sources influencing teachers' self-efficacy beliefs are (1) mastery experience, (2) vicarious experience, (3) verbal or social persuasion, and (4) physiological arousal or emotional state (Bandura, 1977). Mastery experience, defined as satisfaction with professional performance, is considered to be the most important determinant of self-efficacy. Bandura (1977) state that "successes raise mastery expectations; repeated failures lower them" (p. 195). PTs in the flipped classroom worked collaboratively to role-play classroom management scenarios. They developed classroom management strategies to deal with given situations and applied them in their demonstration. They also reflected on the strategies employed in terms of their potential effectiveness in a real classroom setting. Acting as a teacher, applying a strategy to a behaviour problem, and evaluating its possible consequences might have provided PTs with authentic evidence of their performance in such classroom situations. Vicarious experience has been identified as the second most potent influence on one's self-efficacy beliefs. Vicarious learning occurs by observing the behaviours of others (Bandura, 1977). In this study, PTs in the flipped classroom observed their peers' demonstrations of classroom scenarios and analysed video-recorded lessons particularly focusing on the use of classroom management strategies. Social persuasion in terms of feedback received from others represents another important source of self-efficacy beliefs (Bandura, 1977). PTs in the flipped group received constant feedback from their peers and the instructor on their instructional choices and classroom management strategies, which might have contributed to their self-efficacy development. Finally, physiological states such as stress and anxiety also provide information about self-efficacy beliefs (Bandura, 1977). In the present study, the flipped group PTs emphasized the positive learning environment they were engaged in and stated how relaxed and confident they felt in the classroom. As mentioned in the interview, PTs were not afraid of making a mistake or wrong decision. They shared their opinions comfortably and always received constructive feedback from their peers and the instructor.

Another major finding of the study was about the flipped group PTs' significantly higher achievement on the final exam. This finding showing an improved learning outcome confirms the findings of several studies that focused on the efficacy of the flipped classroom method on improving students' academic achievement (e.g., Davies et al., 2013; McLaughlin et al., 2014; Marcey & Brint, 2012). In the present study, PTs stated that they watched the lecture videos any time they wanted and as many times as they needed. They also moved through the content at their own pace. As the ability of pausing, rewinding, fast-forwarding and replaying has been shown to increase students' engagement (Day & Foley, 2006), the increase in PTs' learning outcomes might stem from the self-pacing opportunity in the learning environment.

PTs' comments in the interview revealed an increase in their perceived engagement, which confirmed the findings of McLaughlin et al. (2014), Strayer (2009), and Rowe, Frantz and Bozalek (2013). Similar to the subjects in those studies, PTs in the present study perceived themselves to be more motivated in the flipped classroom compared to the traditional lecture-based classroom. As they stated, their preference for the flipped classroom was due to its allowance for active participation in the classroom. PTs found sitting passively and listening to a lecture boring. Instead, they preferred being actively engaged in the lesson.

In the interview, PTs also discussed flipping their future classrooms considering the benefits they experienced in the flipped course. Learning in such an environment helped them gain first-hand experience of the flipped classroom approach. PTs' use of technology throughout their teacher education experiences has been found to be the most significant predictor of their technology integration (Brent, Brawner, & Van-Dyk, 2002; Snider, 2002). Therefore, PTs' involvement in the flipped instruction might contribute to their future practices with technology.

Conclusion

The call for reform in higher education due to the advent of new technologies requires changes to traditional pedagogy. The flipped classroom approach allows for such a pedagogical shift to create a student-centred, individualised learning environment based on the constructivist theory of learning. The present study adds to the growing field of literature about the flipped approach. Furthermore, it confirms the findings of similar studies by

presenting evidence for PTs' improved self-efficacy beliefs, academic achievement and favourable perceptions about the flipped classroom as an innovative instructional approach in a teacher education course.

The flipped course model in this study might inform the instructional design and delivery in higher education institutions by proposing a framework based on the principles of constructivism and differentiated instruction. In- and out-of-class activities used in this study also have the potential to guide instructors in their own designs as the activities considered various aspects of student engagement and learning in the flipped approach. Moreover, this study is unique in terms of the context in which it was embedded. To date, there are no studies clearly depicting the flipping process of a teacher education course in the Turkish context. Therefore, a detailed description of the planning and implementation processes might be informative for the design of similar instructional models in this specific context.

The study has its limitations too. First, the sample size was relatively small with 62 total participants, 32 in the experimental group and 30 in the control group. For this reason, some caution should be taken when generalising the findings. Second, since the instructor of the course was also the researcher, unintended bias may have influenced the outcomes.

To conclude, the flipped classroom might be applied to other teacher education courses as a viable pedagogical model for reversing the design of a classroom to enhance PTs' learning experiences and their future teaching practices in the 21st century.

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