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Korean Pre-service Teachers' Flipped Learning Experiences in a Teacher Education Program

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Abstract: This study explores Korean pre-service teachers' perceptions, attitudes, and satisfaction with flipped learning courses in a teacher education program. A mixed research method was used to collect the end-of-semester survey (n=62) and individual interview data (n=4). Guided by the four pillars of flipped learning (FL), study results are followed. First, Korean pre-service teachers believed that flipped learning format provided a flexible learning environment where pre-service teachers (PSTs) learn course materials in their own space. This result indicated that their learning happened without the limits of time and space. Second, pre-service teachers showed that their self-directed learning could be enhanced while watching pre-recorded videos before attending the class. Most PSTs agreed that their self-directed learning could be enhanced after participating in the flipped learning courses. Third, pre-service teachers evaluated that the FL course instructor was a professional educator who conveyed the intentional content effectively. Fourth, pre-service teachers were generally satisfied with the FL courses and were willing to take the FL courses again in the future.

Keywords: *Flipped learning, higher education, pre-service teachers, self-directed learning, teacher education.*

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Introduction

In the 21st century, flipped learning (FL) appeared as part of educational innovation. FL is a form of blended learning in which learners can acquire course content with short lecture videos before attending the class. After completing pre-class tasks, students interact with instructors and other learners with various in-class activities to achieve academic success and meaningful learning (Bergmann & Sams, 2009). The idea of FL has attracted much attention because FL could create a flexible learning environment by using computers and mobile devices to overcome the limitation of time and space in face-to-face (F2F) classrooms (Arslan, 2020; Bergmann & Sams, 2009; Han & Røkenes, 2020).

Recently, COVID-19 has called for innovative changes in the educational environment worldwide. For example, university professors and faculty had to give up traditional F2F education, and all classes had to be conducted online (Collado-Valero et al., 2021; Khan & Abdou, 2021). To respond to the urgent transformation of the educational environment, it is necessary to actively implement flexible learning and teaching methods, such as FL, for various subjects in higher education. Many studies have examined the effectiveness of FL (Ceylaner & Karakus, 2018; Martínez-Jiménez & Ruiz-Jiménez, 2020). Furthermore, these studies have shown that redesigning the traditional course format to online instruction should conduct a careful instructional design to provide learners with a meaningful learning experience (Han & Røkenes, 2020).

Many scholars emphasized that pre-service teachers (PSTs) are the core of applying innovative teaching methods for teacher preparation programs (McLaughlin et al., 2016). Therefore, this study explores Korean secondary PSTs' perceptions, attitudes, and satisfaction toward the FL in a teacher education program. The specific research questions are as follows.

RQ1: What are the perceptions and attitudes of secondary Korean pre-service teachers after taking flipped learning courses?

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RQ2: What are the satisfactions of secondary Korean pre-service teachers after taking flipped learning courses?

Literature Review

Fulton (2012) described several advantages of FL in higher education. First, learners can study at their own learning pace in FL classes. Second, when learners work on various assignments in face-to-face courses, FL instructors can closely check the students' learning progress and observe their learning difficulties. Third, FL instructors can provide individualized and customized learning for diverse learners. Fourth, face-to-face class hours can be transformed into an effective and meaningful learning time with various collaborative and team-based activities. Finally, learners can improve their learning autonomy to enhance self-directed learning skills by watching pre-class materials.

Flipped Learning Network (2014) proposed four pillars of FL, including (a) flexible environment, (b) learning culture, (c) intentional content, and (d) professional educator. The flexible environment indicates that FL instructors should create flexible learning spaces for learners. Additionally, FL educators should have flexible expectations regarding assignment timelines and assessments of students' learning outcomes. Learning culture indicates that in-class time needs to be focused on topics in-depth and create meaningful learning opportunities. Thus, learners actively engage in knowledge construction through collaborative and team-based activities. Intentional content means that FL educators carefully determine which content and materials learners work with independently before the class. The intentional content in FL should maximize student-centered and active learning strategies. Finally, a professional educator should observe students' learning progress and provide instant feedback. These professional educators should have the expertise and knowledge to conduct the FL courses effectively.

Previous studies on PSTs' FL in teacher education programs can be divided into three categories. The first category explores the educational impacts of PSTs in FL classes. The second category examines the perception and satisfaction of PSTs in FL classes. The third category concerns FL applications and class designs for PSTs in teacher education programs. Regarding the educational impact of FL on PSTs, Almodaires et al. (2019) investigated the effectiveness of FL in pre-service teacher education. This study used a quasi-experimental method with 128 students from two classes taught using the FL approach (experimental group) and 67 students taught using traditional in-class lectures (control group). Study results showed that PSTs in the FL group had positive attitudes toward flipped learning. Also, they performed better in academic achievement than the traditional lecture group. Ozudogru and Aksu (2020) also demonstrated that PSTs in flipped learning group obtained significantly higher achievement test scores and final grades than the traditional instruction group.

Regarding the perception and satisfaction of PSTs in FL, Jeong et al. (2018) found a statistically significant difference in all assessments with the flipped-classroom PSTs, performing higher on average, showing favorable perceptions, and demonstrating positive emotions about the flipped-classroom model. In another study, Lee et al. (2022) showed PSTs' positive satisfaction with online FL because they recognized the importance of online education during the pandemic. Also, PSTs were more likely to implement online FL because the class in this study provided guidelines, helpful tips, and tools to try out online FL for future purposes. Adedoja (2016) argued that PSTs have a positive attitude toward the flipped classroom strategy. The results show that the flip classroom allows PSTs to study at their pace; it creates an avenue for them to acquire relevant and specific support and deep interaction with the learning content and colleague. The disposition of the PSTs indicates that the FL strategy promotes active learning and makes the learning content more accessible to PSTs.

Previous studies on PSTs' experiences of FL in teacher education courses summarized that FL could provide a flexible learning environment where a student-centered classroom was conducted (Lee et al., 2022). As a result, PSTs showed a positive perception and satisfaction toward the FL (Jeong et al., 2018). Finally, PSTs could improve their learning interests and motivation about the content in FL classes (Almodaires et al., 2019).

Methodology

Research Context

The study was conducted at a local private university in Korea. 62 Korean PSTs registered for the "teaching methods and educational technology course." This course was one of the mandatory courses for PSTs to receive a teaching certificate. Traditionally, this course was taught in a F2F setting without an online component. However, due to COVID-19, the instructor decided to redesign the course format via flipped learning. Specifically, lecture videos were distributed before the F2F class. As a result, all PSTs wore masks and participated in the F2F class. In addition, an online survey was conducted at the end of the 2022 Spring semester to examine Korean PSTs' experiences after completing the FL. After the survey, four participants voluntarily participated in individual in-depth interviews to further show their thoughts and opinions of the FL. In terms of individual interviews, the research assistant in the education department conducted an in-depth interview with four PSTs in Korean. Table 1 shows the interview participant's information.

Table 1. Interview Participants

Number	Gender	Grade	Major	Previous Flipped Learning Experience
S1	Male	Sophomore	Math Education	No
S2	Female	Sophomore	Early Childhood Education	Yes
S3	Female	Sophomore	Early Childhood Education	Yes
S4	Female	Junior	Special Education	No

Designing FL Classes

The FL course was two credits for two hours a week, and 15 weeks of classes were offered per semester. FL course was divided into three stages: pre-class, in-class, and after-class. The pre-class stage is a self-directed learning time for PSTs to study for about 20 minutes independently. Before class, PSTs must watch pre-recorded lecture videos by the FL instructor and read lecture materials through a learning management system (LMS). During the in-class time, PSTs were randomly divided into groups of 3-4 people to complete various collaborative and team-based activities. These activities include group discussions, creating lesson plans, textbook presentations, and making the Google classroom. Finally, PSTs were required to reflect on their learning and post their reflections in the course LMS after the class. Table 2 shows the structure of FL implementation.

Table 2. Designing FL Structure

FL Stages	Student's Activities	Assessment	Time
Pre-class (asynchronous)	- Watching pre-recorded videos - Reading course textbooks and materials	- Online quizzes	20 mins
In-Class (F2F)	- Team-based discussions - Collaborative activities - Making Teaching Portfolio - Lesson plan, Micro-teaching	-Informal assessment: Classroom participation - Formal assessment Micro-teaching	90 mins
After-Class (asynchronous)	- Posting PSTs' reflection - Online discussion	- Formal assessment PSTs' reflection notes	20 mins

Data Collection and Analysis

A mixed research method was implemented for this study. First, an online survey was conducted at the end of the 2022 Spring semester using a Google survey to explore the perception, attitudes, and satisfaction of Korean PSTs toward FL classes. The survey was revised and reconstructed based on existing surveys from previous studies (Hew et al., 2021; Youhasan et al., 2021). The FL survey comprised six areas, including 35 questions, personal information, a flexible learning environment, a learning culture, intentional content, a professional educator, and class satisfaction. All questions except personal information were measured using a Likert-scale 5-point scale of 5 (strongly agreed) to 1 (strongly disagreed). Table 3 shows detailed information about the reliability of the survey.

After obtaining the study participant's consent, the individual interview was conducted. The quantitative data of this study were analyzed using IBM SPSS Statistics (Version 26) for descriptive statistics. The qualitative interview data was analyzed based on thematic analysis (Clarke & Braun, 2018). First, all interview data sources were transcribed. Video recordings listened to several times for accurate transcription. Interview sources were saved to a Dropbox folder and imported into the Nvivo software. As a second step, several codes and sub-codes were developed while working through the data. The third stage was theme development. Many codes were read and reread at this stage to identify significant broader patterns of meaning or potential themes. Fourth, these themes were aggregated into small numbers and further reduced to the most frequently referred to categories. As a fifth step, themes were defined and renamed for abstraction and data reduction. In the last step, all data analysis was triangulated to create a final report.

Table 3. Information About the Survey

Components	Contents	Total Questions	Cronbach's α
1. Flexible learning environment	- Educators create flexible spaces where students choose when and where they learn.	5	.815
2. Learning culture	- Students are actively involved in knowledge construction as they participate in and evaluate their learning.	5	.889
3. Intentional content	- Educators use intentional content to maximize classroom time to adopt student-centered, active learning strategies, depending on grade level and subject matter.	4	.904
4. Professional educator	Professional educators must observe students, provide instant feedback, and assess their work.	8	.932
5. Class satisfaction	- Students' attitudes, perceptions, and satisfaction with the FL	8	.965

Results

Survey Results

The survey focused on four pillars of FL to understand Korean PSTs' perceptions and course satisfaction with the FL course. The descriptive statistics results are shown in Table 4.

Table 4. Descriptive Statistics for Survey Questions

Components	Questions	M	SD
Flexible Environment	1. I can participate in online learning anytime, anywhere.	4.26	0.695
	2. Online education provides a flexible learning environment.	4.49	0.571
	3. I can pause or rewatch the pre-recorded video whenever I want.	4.63	0.555
	4. I was able to learn at my own learning pace.	4.44	0.682
	5. During class, the professor provided us with various learning activities.	4.42	0.653
Learning Culture	1. I watch the pre-class videos and read textbooks in advance (before class).	4.12	0.965
	2. Before class, I prepare the course materials in advance.	4.23	0.846
	3. I can freely express my thoughts and opinions during class.	3.93	0.904
	4. I started self-directed learning due to FL classes.	3.93	0.942
	5. During class, I actively participated in various learning activities.	4.09	0.786
Intentional Contents	1. The length of the pre-class video is appropriate.	4.42	0.755
	2. The content and structure of the pre-class video are effective for learning.	4.35	0.813
	3. The amount of pre-class learning is appropriate.	4.47	0.684
	4. The pre-class video helped me to understand the learning content.	4.51	0.759
Professional Educator	1. The professor often encourages or praises us during learning activities.	4.09	0.851
	2. The professor answers students' questions appropriately during class.	4.40	0.753
	3. The professor helps or encourages us to check if the learning process is appropriate.	4.23	0.846
	4. The professor listens carefully to the student's thoughts and opinions.	4.47	0.684
	5. The professor helps us to understand the learning content easily.	4.54	0.657
	6. The professor's evaluation methods are properly informed.	4.63	0.522
	7. The professor provided feedback to individuals or groups of students.	4.53	0.630
	8. The professor encouraged us to study deeply.	4.35	0.719
Class Satisfaction	1. I like this FL class because I can learn new things.	4.11	1.047
	2. I have the confidence to do well in this FL class.	4.04	0.925
	3. I became interested in studying subjects through this FL class.	4.07	0.923
	4. This FL class is effective in achieving the learning goals.	4.23	0.802
	5. My learning outcome through this FL class is positive.	4.3	0.778
	6. Overall, I am satisfied with the FL course.	4.25	0.786
	7. I am willing to take another FL course in the future.	4.18	0.909
	8. If I want to become a teacher, I will conduct an FL course.	4.21	0.921

The survey results are as follows. First, Korean PSTs rated the FL course provides a flexible learning environment. Especially pre-class videos offered by the FL course instructor were effective because PSTs could stop or rewatch recorded lectures as they wanted (4.63±.555). Also, PSTs in FL could participate in online materials without time and space constraints and limits (4.26±.695). As a result, PSTs evaluated that FL provided a flexible learning environment (4.49±.571). Second, Korean PSTs rated that FL classes enabled them to enhance self-directed learning skills. PSTs responded that they could prepare the course materials before class (4.23±.846) and learn the pre-class materials in advance (4.42±.755). In addition, they actively participated in various collaborative learning activities during the FL course (4.09±.786). Third, Korean PSTs rated that the pre-class lecture video length (4.42±.755) and amount (4.47±.684) were appropriate and evaluated that the content was also effective for learning (4.35±.813). Specifically, PSTs answered that pre-class videos helped them better understand the learning content (4.51±.759). Fourth, Korean PSTs evaluated the FL instructor's expertise with systematic knowledge and instant feedback. PSTs responded that the FL course instructor provided instant feedback during in-class activities with individual learners (4.53±.630). Also, students' questions can be answered or addressed appropriately (4.40±.753). As a result, PSTs evaluated the FL instructor, who explained the contents effectively (4.54±.657) and continuously checked the students' learning status (4.23±.846). Finally, Korean PSTs showed a positive perception of FL because FL allows them to learn new knowledge and skills (4.11±1.047). Furthermore, PSTs responded that they could achieve learning goals (4.23±.802). Therefore, PSTs were generally satisfied with the FL (4.25±.786). Lastly, if there is an opportunity, they showed a strong willingness to take the FL classes again in the future (4.18±.909).

Interview Findings

The interview findings were divided into three themes. These are (a) PSTs' perception of FL, (b) the educational impact of FL on PSTs, and (c) PSTs' satisfaction with FL. First, PSTs mentioned that FL could provide a resilient and flexible learning environment. This finding indicated that pre-class videos in FL are very flexible, where PSTs can freely watch the video at their own pace and at any time. Here is one example from the interview transcript.

> *I think it's great to be able to watch pre-class videos repeatedly. When I take the F2F class while taking notes, there are things I can miss. However, when I can watch and listen to the pre-class videos repeatedly, it's really good for my self-study. I prefer to watch videos again during the exam period (S2).*

In addition, Korean PSTs answered that the FL instructor's pre-class content was effective. They also mentioned that the FL instructor could explain learning content easily. As a result, they evaluated that the FL instructor has the expertise to give feedback on learners' questions or assignments instantly. Here is one example from the interview transcript.

> *I think I was able to speak freely during team-based activities. If I do not understand something during the class, I can ask questions to the course instructor, and he gives us directions or feedback immediately. (S4)*

Second, PSTs mentioned that FL classes could increase content comprehension and improve self-directed learning skills. Also, they preferred the learning culture in FL, where collaborative team activities occur with team members during the class.

> *I got used to studying independently, thanks to the FL course. Before taking FL, I was not a student who previewed course materials diligently. However, in FL, I had to follow pre-class work. This practice made me a more self-directed and independent learner (S1).*

> *I enjoyed various team activities during the FL because of the collaborative learning culture. For example, making a lesson plan and shooting a mock-teaching video was a meaningful learning experience (S3).*

Third, PSTs showed positive responses and high satisfaction with the FL. In addition, they are more willing to take FL classes if there is an opportunity in the future. They mentioned that they would like to implement FL in their future classrooms when they become in-service teachers.

> *It was my first time in an FL class... It was difficult at first, but I got used to it later. So I want to take more FL classes and recommend FL to my friends next time. (S4)*

> *I think that I can implement the FL in my future classrooms. This course format effectively encouraged my prospective students to learn about their interests and motivation. Therefore, I like to explore my own FL in the future (S1).*

Discussion

This study explored Korean pre-service teachers' learning experiences of taking FL courses in a teacher education program. The study aims to understand the perception, attitudes, and satisfaction of PSTs toward FL courses. The study results are as follows. First, PSTs responded that FL could provide a flexible learning environment (4.26±.700). Also, recorded lecture videos for pre-class assignments can be watched at their own pace (4.47±.783). In addition, pre-class learning activities (4.13±.820) were efficient and made PSTs actively participate in various collaborative activities during the class (4.00±.830). Thus, FL was evaluated as a learner-centered class where a flexible learning environment is constructed. PSTs also responded that pre-class materials' instructional videos helped them better understand the learning content in FL classes (4.24±.670).

These findings are consistent with previous research regarding efficient FL classes (Adedoja, 2016; Fulton, 2012). In addition, previous studies have summarized that PSTs in the FL group had more opportunities to watch and rewatch some parts of lecture videos whenever needed. Therefore, it is argued that this flexible learning environment could increase PSTs' satisfaction instead of PSTs in the traditional lecture format.

Second, this study showed that FL classes could improve PSTs' self-directed learning skills. According to the interview findings, FL could gradually increase PSTs' self-confidence in understanding the content to enhance self-directed learning skills. These findings are consistent with the previous studies (Ceylaner & Karakus, 2018). Specifically, previous literature has shown that FL could have a meaningful impact on PSTs' self-directed learning skills and learner autonomy, which made PSTs have more confidence in the learning process. For instance, Lee et al. (2022) concluded that PSTs prefer taking the synchronous FL because it could positively enhance their self-directed learning process while working on pre-recorded lecture videos by the FL course instructor. The authors also explained that PSTs could be actively engaged in class due to the effective structure of FL course formats. Thus, many studies have shown a positive impact of FL on PSTs, such as meaningful learning on the self-directed learning experience.

Third, this study revealed that PSTs highly satisfied with FL classes (4.31±.882). As a result, the willingness to take FL classes in the future (4.16±.909) was strong. In the end, PSTs are more likely to apply FL to future teaching classrooms (4.15±.989). These results are consistent with PSTs' high satisfaction with FL courses. Many studies have shown PSTs' positive perception and assessment of FL in teacher education programs. For instance, Jeong et al. (2018) found a

statistically significant difference in all assessments with the flipped-classroom PSTs, performing higher on average, showing favorable perceptions, and demonstrating positive emotions about the flipped-classroom model. The results show that the flipped classroom allows PSTs to study at their pace; it creates an avenue for them to acquire relevant and specific support and deep interaction with the learning content and colleague. The disposition of the PSTs indicates that the FL strategy promotes active learning and makes the learning content more accessible to PSTs.

To sum up, regarding the effectiveness of FL implementation in teacher education, previous studies have shown that PSTs are generally satisfied with FL courses when the four pillars of FL are effectively implemented in teacher education programs. These include the flexible learning environment, learning culture, international content, and professional educators. In addition, when FL instructors provide intentional content to boost PSTs' learning experience in teacher education courses, the motivation and satisfaction of PSTs in FL could be enhanced.

Conclusion

This study explores Korean pre-service teachers' perceptions, attitudes, and satisfaction with flipped learning courses in a teacher education program. A mixed research method was used to collect the end-of-semester survey (n=62) and individual interview data (n=4). Guided by the four pillars of Flipped Learning (FL), the study results are as follows. First, Korean pre-service teachers believed that flipped learning format provided a flexible learning environment where PSTs learn course materials in their own space. This result indicated that their learning happened without the limits of time and space. Second, pre-service teachers showed that their self-directed learning could be enhanced while watching pre-recorded videos before attending the class. Most PSTs agreed that their self-directed learning could be enhanced after participating in the flipped learning courses. Third, pre-service teachers evaluated that the FL course instructor was a professional educator who conveyed the intentional content effectively. Fourth, pre-service teachers were generally satisfied with the FL courses and were willing to take the FL courses again in the future.

Recommendations

Based on the results of this study, several recommendations are provided for implementing effective FL classes in teacher education programs. First, it is necessary to create the appropriate length of pre-class lecture videos so that PSTs can watch them several times at their own learning pace. Also, the pre-class video should include interesting content so that PSTs focus on the content without losing their concentration. Previous studies have suggested that the most important lesson when creating a pre-class lecture video for FL is the length and amount of the video that can increase the engagement of PSTs (Brewer & Movahedazarhouligh, 2018). Also, video materials should contain interesting content to increase PSTs' motivation before attending the class (Collado-Valero et al., 2021). Thus, future research should explore creating meaningful learning materials before the in-class activities.

Second, the FL course instructor should regularly check PSTs' pre-class materials' learning progress. Many studies have stated that the pre-class phrase is the key to the success of FL implementation. Thus, the FL instructor has to examine PSTs' completion of pre-class assignments through the LMS, including a quiz, reflection, etc. In addition, studies have shown that PSTs may not engage in pre-class work if the FL instructor does not regularly track PSTs' assignment progress (Inan et al., 2019). Also, PSTs may lose interest or motivation to work on a pre-class assignment at the end of the semester. Thus, it is suggested that providing quizzes is the most often used assessment to check PSTs' completion of the pre-class assignment. In addition, future research should explore how to effectively manage PSTs' learning process in the flipped learning classroom. Lastly, follow-up studies are needed to verify the educational impacts of FL involving different grades and majors of diverse PSTs in teacher education programs (Wang & Zhu, 2019). Finally, future studies need to examine the progress of PSTs' content understanding with various measurements before and after the implementation of the FL (Ozudogru & Aksu, 2020).

Limitations

Although this study provided several implications for effective FL, some limitations should be addressed. First, the study was conducted on secondary school Korean PSTs attending a private university in Korea. Thus, it is hard to generalize these results to all other universities worldwide. In addition, this study's survey sample number was relatively small. Therefore, a follow-up study with a larger sample size should examine diverse PSTs' FL experiences in teacher education programs.

Ethics Statements

The studies involving human participants were reviewed and approved by the Woosuk UniversityUniversity. The participants provided their written informed consent to participate in this study.

Authorship Contribution Statement

Lee: Conceptualization, First draft. Jeong: Editing, final draft. Li: Data collection and analysis.

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