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Design of Flipped Lessons in the Classroom and Opinions of Teachers with Different Degrees of Experience

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Abstract
The flipped classroom approach has gained significant popularity recently due to its ability to facilitate active learning and leverage technology to enhance student's learning habits. Previous research has explored the benefits and drawbacks of this approach, highlighting its potential to improve student engagement, motivation, and achievement. However, despite the growing interest in flipped classroom approach, more is needed to know about teachers' perceptions of this model and how these perceptions may vary based on years of experience.The current study aims to address this gap in the literature by examining 73 Kindergarten through 12th-grade teachers' perceptions of flipped classroom approach and identifying differences in these perceptions based on years of experience. To this end, the study utilized a survey instrument developed by Gough et al. (2017) to gather data on teachers' attitudes toward flipped classroom approach across five domains, including instructional practices, student considerations, technology use, communication, and practice.By analyzing the survey data, the study identified significant differences in teachers' perceptions of flipped classroom approach based on years of experience. Specifically, teachers with 0-3, 3-5, and more than 5 years of teaching experience had different judgments in instructional practices and student considerations. These findings suggest that teachers' perceptions of flipped classroom approach may be influenced by their experience level and that targeted professional development and training may be necessary to support teachers in adopting this approach effectively.Overall, this study contributes to the literature on flipped classroom approach by shedding light on teachers' perceptions of this model and how these perceptions vary based on years of experience. The findings provide insights into the elements that could enhance the effectiveness of flipped classroom approach, such as differentiation, more videos for specific learners, communication with all parties, and practice. The practical implications of these findings for K12 settings are discussed in the subsequent sections of this article.
Keywords: Flipped classroom, teacher perceptions, K12 classrooms, teaching experience
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1. Introduction

Flipped classroom instruction originated in the United States as a result of experiments with hybrid, active, and problem-based learning (Lage et al., 2000; Merrett, 2023). The flipped learning strategy has been gaining popularity in higher education and K12 due mainly to its capacity to increase active learning and student engagement (Bond, 2020; Galindo-Dominguez, 2021). The same authors mentioned that the expansion and wide availability of digital materials in education bring this on. Students watch flipped lessons (videos) outside class time in flipped classrooms to understand the course material. In the classroom, teachers direct learning by responding to queries, supervising projects, and developing student connections (Gelgoot et al., 2020). To support students with varying learning needs in a flipped classroom, teachers must be able to design learning situations that encourage collaborative learning activities (Sointu, et al., 2023)

In a flipped classroom, students interact with lectures and other resources outside of class to prepare for in-class active learning. Before class, students must watch brief online lectures created or chosen by their lecturers, then do quick online activities (a short quiz, online discussion, one-paragraph summary, concept map, etc.). Students are asked to apply knowledge during class by taking part in individual and/or group activities under the direction of their professors. I-clickers, idea maps, and individual problem-solving are examples of classroom activities. Think-pair-share, the three-step interview, fishbowl discussions, role plays, response sheets, affinity grouping, dyadic essays, critical debate, case studies, peer editing, and group investigations are some examples of group activities (Barkley et al., 2005; Unal, et al., 2021).

According to recent studies (Basso-Aránguiz et al., 2018; Gomez-Poyato et al., 2020), the flipped classroom model has led to higher academic achievement than traditional lecture-based learning, in large part because of the development of technological resources like Google Drive, YouTube, Vimeo, Google Classroom, etc. (Chen et al., 2018; Zheng, et al., 2020a). A growing amount of research indicates that the flipped classroom strategy

can raise student involvement in classroom activities, which is the goal of blended learning, which aims to get students more involved in learning activities (Gaughan, 2014; Johnson, 2013; Lai & Hwang, 2016; Missildine et al., 2013; Roach, 2014; Zheng, et al., 2020a).

The flipped classroom method has several benefits when fostering an atmosphere where students can be intrinsically and extrinsically driven to meet learning objectives (Muir, 2017). The following benefits of the flipped classroom were listed by Fulton (2012): (1) students move at their own pace; (2) doing homework in class provides teachers with better insight into student difficulties and learning styles; (3) teachers can easily customize and update their curricula and immediately provide it to students; (4) classroom time can be used more effectively and creatively; and (5) teachers using this method report seeing increased levels of student achievement. Although the idea of a flipped classroom has existed since the early 2000s, K12 schools started implementing it more frequently after 2010. When students are asked to watch lecture videos before class and then spend in-class time discussing assignments rather than listening to a lecture, Bergmann and Sams, two chemistry teachers, claim that it is possible to engage all students in learning, regardless of the subject matter or individual differences among students (Cheng et al., 2019).

2. Theoretical Framework

According to Gutek (2014), Dewey was a pragmatist, progressivist, educator, philosopher, and social reformer who may have been the most well-known and significant philosopher to have impacted education to date (Theobald, 2009; Williams, 2017). Dewey (1938) thought that traditional classroom environments did not best serve young learners from a developmental standpoint. Dewey believed that schools and classrooms should be realistic representations of real-life situations, allowing children to engage in learning activities interchangeably and adaptable to various social contexts (Dewey, 1938; Gutek, 2014; Williams, 2017). According to learner-centered educators, Dewey's work supports many ideas about how students learn. In this approach, children are viewed as unique individuals, and students are busy constructing their knowledge through personal meaning (Schiro, 2013; Williams, 2017). The flipped classroom method challenges the traditional teacher-centered learning model, transforming teachers into supporters and facilitators who direct students' collaborative or independent learning (Hwang et al., 2015: Zheng et al., 2020a).

2.1 Flipped Learning and Student Achievement

In K12 classrooms, flipped learning is becoming more common (Ash, 2012; Bergmann, & Sams, 2012b; Hao, 2016; O'Flaherty & Phillips, 2015). 71% of Byron High School in Minnesota pupils failed the state mathematics exam in 2006. (Minnesota Comprehensive Assessments). The Mathematics Department decided to do away with textbooks in 2009, and professors were urged to rewrite the curriculum, find resources that were accessible online, and implement flipped learning in their classes (Fulton, 2012). The proportion of students passing the state exam had climbed to 73.8% by 2011. Byron High School won the Intel Schools of Distinction Award for High School Mathematics in 2011 due to this practical approach (Fulton, 2012). Additionally, all the ninth-grade courses at Clintondale High School were turned in 2010 (CSH, 2013). Greg Green, the school's principal, reported that failure rates decreased by as much as 33 percentage points. In addition, there were 187 student disciplinary complaints in 2011 compared to 736 in 2009, a 74% drop in just two years. Following the change in teaching approaches, the number of parent complaints decreased from 200 to 7. After being encouraged by these outcomes, the principal adopted a flipped learning strategy for the entire school in the fall of 2011.

The increased cooperation resulting from flipped classrooms noticeably improves students' problem-solving abilities. According to Strayer (2007), students in flipped classrooms preferred the approach. They demonstrated higher levels of innovation (the ability to develop new and creative ways to solve problems) and cooperation (the ability to work with others to solve problems and discuss ideas) than those in traditional classrooms. Another study by Strayer found that students were more receptive to cooperative learning after adopting the flipped classroom style to study statistics (Strayer, 2012). The flipped classroom promotes cooperative learning and teacher-student interaction (Avery et al., 2018).

In their 2017 analysis of ten studies, Kashada, Li, and Su looked at how the flipped classroom affected students' performance in K12 schooling. They discovered that the flipped classroom had a favorable effect on students' learning achievement (Zheng et al., 2020b). By examining 15 papers, Lo and Hew (2017) reviewed the literature on the flipped classroom in K12 education. They discovered that the flipped classroom model had a favorable or indifferent effect on students' learning ability in grades K12 (Zheng et al., 2020b).

2.2 Negative Sides of Flipped Classroom

The research demonstrates that not all flipped classes are successful and satisfying. Min (2014) concluded that just because flipped learning was used in a class does not necessarily indicate it was successful. This is because there was no discernible improvement in a 6th-grade math class that transitioned to a flipped classroom. Although the instructor in a middle school's flipped classroom observed more involvement during cooperative

exercises, the study discovered minimal variation in the students' conceptual grasp (Kirvan et al., 2015).

Johnson and Renner concluded from their analysis that there are no benefits to flipping a high school computing course (2012). When watching video lectures, students are more likely to become distracted, according to Toto and Nguyen (2009). Although the students preferred traditional face-to-face lectures for their industrial engineering course, they acknowledged that flipped classrooms offer more time for problem-solving and practical exercises. While some sections of an undergraduate technology course received conventional lectures, O'Bannon and his colleagues taught other sections. In terms of student learning, they discovered no appreciable difference (Gough et al., 2017; O'Bannon, 2011). According to Mellefont and Fei (2016), the efficiency of the flipped classroom may be hampered by the student's lack of preparation.

It is crucial to consider how teachers feel about flipped learning. Although some teachers focus more on flipped learning, some teachers prefer to stick with the traditional methods of instruction. According to Eteokleous (2008), teachers are more likely to oppose embracing computer innovations if they think their current approach is reasonable, efficient, and effective. However, flipping classrooms is a component of educational breakthroughs, and incorporating technology in education is inevitable. Students are more active learners and less tolerant of passive learning circumstances since they spend most of their time utilizing technology (Beck & Wade, 2004; Gee, 2003; Snowden, 2012).

3. Methods

This study examined 73 Kindergarten through 12th-grade teachers' perceptions regarding the flipped classroom model and differences in teachers' perceptions based on years of teaching experience.

1- What are the teachers' perceptions of a flipped classroom?
2- What, if any, are the differences among teachers with 0-3, 3-5, and more than 5 years of experience in their flipped classrooms perceptions?
3- What do teachers think of the difficulties they encountered when designing flipped classrooms?
4- What suggestions do the teachers have for enhancing their flipped classrooms?

3.1 Participants

The participants of this study were 73 K12 teachers in a southeastern state with 0-3, 3-5, and teachers with more than 5 years of experience. The sampling in this study was convenience sampling in nature. Convenience sampling is a type of nonrandom sampling where members of the target population meet specific practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate in the study (Dornyei, 2007; Etikan et al., 2016). Groups of students (inservice teachers) from three universities in the southeast United States participated in this study. All participants were K12 teachers seeking their master's degree in the Curriculum and Instruction Program in a southeastern state. One of the researchers was teaching in this program and distributed the online flipped classroom survey to the participants. The survey was administered to the participants through Qualtrics. The link for the survey and cover letter was emailed to the participants. The Institutional Review Board procedure was followed for the data collection. Participation was voluntary for the master's degree students, per IRB approval. The survey was open to the participants for two weeks, and all responses to the survey were anonymous. Table 1 shows the participants of this study.

Table 1. Demographics of the participants

Participants	n	Gender	
		Male	Female
0-3 years of experience	21	3	18
3-5 years of experience	23	4	19
5 and more years of experience	29	7	22

3.2 Instruments

Two different research tools were used to gather information for the study's research questions. The research instruments and questions are displayed in Table 2.

Table 2. Research questions and instruments

Research questions	Instruments	
1. What are the teachers' perceptions of flipped classrooms?	Teachers' survey on flipped classrooms designed by Gough et al. (2017)	
2. What, if any, are the differences among teachers with 0-3, 3-5, and more than 5 years of experience in their flipped classrooms perceptions?	Teachers' survey on flipped classrooms designed by Gough et al. (2017)	
3. What do teachers think of the difficulties they encountered when designing flipped classrooms?		Open-ended question: What were the challenges you faced when creating flipped classrooms?
4. What suggestions do the teachers have for enhancing their flipped classrooms?		Open-ended question: How can your flipped classroom be improved?

This study used a teachers' survey on flipped classrooms designed by Gough et al. (2017). It is utilized on a 5-point Likert scale (from 1=strongly disagree to 5=strongly agree). The original survey consists of twenty questions. The researchers added items 21-24 to the survey to obtain more information on teachers' perceptions of flipped classrooms (Reliability: from α=.65 to α=.74). Reliability examines whether the researchers get consistent information. Gough et al. (2017) established the validity by basing the survey on the related research and literature review. Validity examines whether the information the researchers are getting measures what they think it measures. It is documented as a matrix grid correlating with the research questions and related literature. Teacher survey on flipped classrooms underwent a critique process by four teachers and two administrators with flipped classroom experience.

Evaluation of content validity for 24 items included two college professors who teach the flipped classroom preparation, techniques, and strategies as part of their lectures in their courses; and three middle school teachers who use flipped classrooms in their schools. Content validity is a non-statistical type that systematically examines the survey content to determine whether it covers a representative sample of the behavior domain to be measured (Anastasi & Urbina, 1997). Content-related evidence typically involves subject matter experts evaluating survey items against the survey specifications (NBRI, 2019).

In addition to flipped classroom survey, the researchers added two open-ended questions to obtain information on teachers' suggestions to enhance flipped classrooms and the difficulties they encountered when designing flipped classrooms. During the first face of analysis, the researchers conducted color coding in which they read and analyzed line by line all comments. During the second phase of coding, consistent themes were identified. After determining these general categories, the researchers reviewed the data again to locate additional evidence backing up each theme. Finally, the general themes across all data sources were compared during the third coding phase to create broader and more consistent themes.

4. Results

The flipped teaching model is one of the most recent and popular technology-infused teaching models in which learning new concepts occurs at home while practice is conducted in the classroom. This study examined Kindergarten through 12th-grade teachers' perceptions regarding the flipped classroom model and differences in teachers' perceptions based on years of experience.

4.1 Research Questions 1 and 2

1- What are the teachers' perceptions of a flipped classroom? 2- What, if any, are the differences among teachers with 0-3 years, 3-5 years, and more than 5 years of experience in their flipped classrooms perceptions?

Teachers agreed that students benefited from the flipped learning design in many ways, including how it helped absent students, helped struggling students by allowing them to rewatch lessons they did not understand, removed passive learning from the classroom, and made the class more transparent to parents. They also concurred that students learn more effectively in flipped classrooms. While students don't require teachers present for direct instruction, they do need teachers there for problem-solving. When employing a flipped

classroom, discussions with parents focus more on learning than classroom behavior.

ANOVA was conducted to determine if there were significant differences among the three groups. Research question 1 was analyzed using descriptive statistics such as the means and standard deviations of teachers' perceptions of flipped classrooms. Although all of the participants agreed that flipped classroom is an essential aspect of teaching and learning, the results indicated that teachers with 0-3, 3-5, and teachers with more than 5 years of teaching experience had significantly different judgments in the two domains (Table 3).

Table 3. Comparison of flipped classroom perceptions among the groups.

Areas	Teachers with 0-3 years of experience	Teachers with 3-5 years of experience	Teachers with more than 5 years of experience	ANOVA F	p
Area 1. Benefits for students					
Mean	3.71	4.00	4.01	2.038	.138
SD	.54	.67	.46		
Area 2. Instructional considerations					
Mean	3.18	3.65	3.56	6.096	.004*
SD	.48	.40	.51		
Area 3. Learning in flipped classroom					
Mean	3.26	3.68	3.57	2.518	.088
SD	.56	.67	.63		
Area 4. Student considerations					
Mean	3.01	3.10	3.46	5.804	.005*
SD	.51	.52	.48		
Area 5. Parent considerations					
Mean	3.90	3.80	3.79	.236	.790
SD	.49	.68	.60		

*p<.05

The researchers ran a Tukey HSD analysis to understand the significant differences. Table 4 shows detailed results on significant differences among teachers with 0-3, 3-5, and teachers with more than 5 years of experience.

Table 4. Tukey HSD Analysis of flipped classroom perceptions of teachers

Flipped Classroom	Groups									
	Groups	Mean	SD	Comparison Groups		Mean Diffe	Std. Error	Sig.	95% Con Interval Lower	Upper
Aera 1	0-3	3.71	.54	0-3	3-5	-.285	.169	.216	-.690	.119
	3-5	4.00	.67	0-3	5+	-.297	.160	.160	-.681	.087
	5+	4.01	.46	3-5	5+	-.011	.156	.997	-.385	.362
Area 2	0-3	3.18	.48	0-3	3-5	-.469	.143	.005*	-.812	-.127
	3-5	3.65	.40	0-3	5+	-.380	.135	.018*	-.706	-.055
	5+	3.56	.51	3-5	5+	.088	.132	.780	-.228	.405
Area 3	0-3	3.26	.56	0-3	3-5	-.411	.190	.085	-.866	.044
	3-5	3.68	.67	0-3	5+	-.304	.180	.217	-.737	.127
	5+	3.57	.63	3-5	5+	.106	.175	.818	-.314	.527
Area 4	0-3	3.01	.51	0-3	3-5	-.091	.152	.820	-.458	.274
	3-5	3.10	.52	0-3	5+	-.454	.145	.007*	-.801	-.106
	5+	3.46	.48	3-5	5+	-.362	.141	.033*	-.701	-.023
Area 5	0-3	3.90	.49	0-3	3-5	.100	.181	.846	-.335	.536
	3-5	3.80	.68	0-3	5+	.111	.172	.795	-.302	.525
	5+	3.79	.60	3-5	5+	.011	.168	.998	-.391	.414

*p<.05

The findings of the Tukey HSD calculation demonstrated that in terms of Area 2 Instructional Consideration in the flipped classroom, teachers with 3-5 and teachers with more than 5 years of experience were significantly higher than those with 0-3 years of experience. Teachers with 3-5 and teachers with more than 5 years of experience focused more on the fact that flipped classrooms boost teacher-student contact and free up time for direct instruction, active learning, and topic covered. Time created for in-class activities in the flipped classroom allowed for more active learning and increased higher-order thinking for students. The flipped classroom allows teachers more time to personalize instruction for students and increases teacher and student interactions. Flipping the classroom creates time for direct instruction, active learning activities, and content coverage. On the other hand, teachers with 3-5, and teachers with more than 5 years of experience agreed that preparing flipped learning materials was time-consuming, and it was challenging to ensure that students had truly watched the videos.

Regarding Area 4 Student Considerations in the flipped classroom, the Tukey HSD calculation also revealed that teachers with more than 5 years of experience outperformed those with 0-3 and 3-5 years of experience. Teachers with more than 5 years of experience agreed that flipped classrooms have fewer discipline issues and that children prefer them to traditional classrooms. Students are responsible for their learning and come prepared for class. The flipped classroom allows students to develop better peer relationships through cooperation and collaboration. Teaching flipped classroom models was more enjoyable than teaching traditional classrooms. The flipped classroom helps teachers communicate with the students better than the traditional classroom. On the other hand, teachers with more than 5 years of experience agreed that the flipped classroom is challenging for some students due to the additional technology required outside of school.

As mentioned above, there are no differences among the three groups in Areas 1, 3, and 5. Flipped classroom Area 1 is about benefits for students in the flipped classroom, such as absent students benefit from a flipped classroom, and recorded lectures aid struggling students. According to Area 3, students learn better in a

flipped classroom since it eliminates passive learning from the classroom. Flipped classroom Area 5 is parent considerations such as video lectures making the class more transparent to parents, and discussions with parent center more on learning than they do on classroom behavior when using a flipped classroom.

Because they are more familiar with where to access information, videos, quizzes, assignments, and other learning resources than teachers with 1-3 years of experience, teachers with 3-5 and teachers with more than 5 years of experience scored higher in Areas 1, 2, 3, and 4.

4.2 Research Question 3

What do teachers think of the difficulties they encountered when designing flipped classrooms? Teachers described the difficulties they encountered when planning and implementing flipped classrooms. The most frequent challenges the teachers encountered included finding level-appropriate videos for each student's level, in-depth materials for a particular topic, and videos that teach the skills that the students intended to practice.

The teachers raised concerns regarding their workload. Many of them stated how having more students, bigger classes, and busier schedules affect their ability to do their jobs. Another challenge in this study was the heavy effort placed on teachers while producing resources for flipped learning.

The fact that some students need more maturity for a self-directed lesson or test presents another challenge. The requirements of flipped classrooms include watching instructional videos, finishing some assignments, and taking assessments at home. However, the teachers in this study reported that their students' maturity levels for self-motivation and involvement with learning varied.

Lack of technology at home and a lack of resources for the students were other challenges teachers faced. The other issues in flipped classrooms were related to the student's lack of enthusiasm for learning outside class.

4.3 Research Question 4

What suggestions do the teachers have for enhancing their flipped classrooms? The researchers posed an open-ended question to teachers to gain insight into their opinions on how flipped classes could be improved.

Teachers stated that because some videos are so long, students struggle to concentrate while watching them. Teachers suggested that they need a method to enhance the flipped classroom is to find a mechanism to confirm that students are watching the videos at home and finishing other home assignments. Using actual video lessons that classroom teachers record each day is another way to improve flipped classrooms.

Teachers in this study agreed that there is variation in learning needs, socioeconomic level, and culture in today's classrooms. The best strategy to differentiate instruction is to focus on the strengths and weaknesses of each student. Compared to traditional classrooms, flipped classrooms enable more differentiation of instruction. Teachers believed that more videos for certain learners, communication with all parties, and practice are necessary to improve the flipped classroom.

Teachers also agreed that interactive learning and hands-on activities are additional elements that require improvement for deeper learning. Teachers stated that flipped classrooms must include more interactive learning and hands-on activities. During interactive learning and hands-on activities, students work together, improving their understanding of the subject materials, and social skills.

5. Summary and Discussions

Teachers in this study had favorable opinions about flipped learning. They concurred that children learn more effectively in flipped classrooms because passive learning is eliminated. A flipped classroom is advantageous for absentee students and English language learners, and recorded lectures help struggling students because they can revisit the parts of classes they don't comprehend. Teachers agreed that flipping the classroom removes passive learning, and students learn better in flipped classrooms.

Teachers believed they covered the content and made the lectures more transparent to parents by applying flipped classroom strategies. The importance of incorporating parent videos, online newsletters, and emails into flipped learning approaches is demonstrated by Raths (2014). As a result, parents become enthusiastic about their kids' education and support the teachers. When examining the crucial roles that impact the effectiveness of a flipped classroom, Cheng and Weng (2017) concentrated on parental engagement. Fulton's survey from 2012 found that 84% of parents favored flipped classrooms for the delivery of instruction. According to the same author, parents can view instructional movies with their kids and remember what they learned about the same or related topics many years ago.

On the other side, this study's findings indicate that creating the materials for a flipped classroom requires time. As Schmidt and Ralph (2016) noted, flipped classrooms need a lot of work. According to a report on flipped classrooms published in 2018 by the Yale University Center for Teaching and Learning, flipping the classroom did not free up more teacher time. They must spend more time producing lecture videos, extracurricular activities, in-class exercises, and effective assessment techniques. K12 history instructors raised concerns about the time required to create new activities and resources (Aidinopoulou & Sampson, 2017;

Townsend, 2010).

Teachers were also concerned that because some kids did not have access to the necessary technology, they did not watch educational videos at home. Schmidt and Ralph (2016) noted that in a flipped classroom, students are expected to be prepared to begin problem-solving, text-analysis or solution-investigating after watching videos, using PowerPoints, and finishing readings at home. However, many of their students need an internet connection or even a home computer has startled some professors. They also mentioned how difficult it is to verify whether the students watched the videos at home.

This study found that students need to learn strategies to use their time efficiently at home, be aware of their responsibility for their learning, and interact with peers and teachers to benefit more from flipped classrooms. Teachers need to communicate with all parties involved to create flipped classroom lessons. The idea of a flipped classroom, which incorporates teachers, parents, and students, is essential and has great potential benefits for everyone involved.

5.1 Conclusion

The instructor and the curriculum are crucial for encouraging technological instruments (King-Sears, 2009; Roschelle et al., 2010; Suh, 2010). Dick and Hollebrands (2011) state that effective technology utilization improves teaching and learning. This study examined teachers' perceptions of flipped classrooms. According to the study, flipped classrooms are advantageous for teachers and students. Before implementing this innovative technique, teachers and students must develop their knowledge and abilities in using flipped classrooms efficiently. Students must develop time management skills at home, understand their learning responsibility, increase active learning, and communicate with peers and teachers. The purpose of the flipped classroom should be to encourage students to become independent researchers and self-learners (Franciszkowicz, 2008). According to Gough et al. (2017), students are more engaged in their studies and devote more time to higher-order thinking skills in a flipped classroom format.

Teachers have discussed flipping classrooms to demonstrate their commitment to the idea and belief that it may benefit everyone involved. According to the responses to the open-ended questions in this study, teachers should practice more flipped classroom strategies in their lessons. To aid students in their learning, every teacher should be able to learn how to implement flipped classroom techniques. According to O'Flaherty and Phillips (2015), the flipped classroom is seen as a strategy that can genuinely improve the student learning experience through increased interactivity, which increases the pressure on many educators to update their curriculum using a method that they might not fully understand.

The flipped classroom method is a promising technology-based method for teacher preparation (Bergmann & Sams, 2012a; Brunsell & Horejsi, 2013; Ray & Powell, 2014). According to NCTM (2020), professional development and teacher education programs must regularly refresh practitioners' knowledge of technology and its use to promote learning. These include creating classes using technologically advanced environments and incorporating digital tools into regular classroom training (Nelson et al., 2009; Pierce & Stacey, 2010). Computer-based instruction can enable flexibility to individualize instruction, boost student enthusiasm, and promote teacher productivity (Bloom & Hanych, 2002).

5.2 Future research

This study has limitations. Results cannot be generalizable with the small sample size (n= 73). In this study, the participants (teachers) were enrolled at universities in a southeastern state to pursue their master's degrees. To help generalize the results to a larger audience from other states, expertise levels, and topic areas, future studies could duplicate this study.

Future studies should consider choosing samples from various institutions representing the target population. More studies investigating flipped learning across subject areas are recommended (Akcayir & Akcayir, 2018; Bond, 2020). In addition to subject areas like Math, Science, Social Studies, English Language Arts, etc., more research on flipped classrooms at the elementary, middle, and high school levels has to be considered. According to studies, there is very little information on flipped classrooms at all grade levels (Alpay & Gulati, 2010; Avery et al., 2018; Bergman & Sams, 2012a; Flumerfelt & Green, 2013; Fulton, 2012; Gough et al., 2017; Heilesen, 2010; Hew, 2009; Johnson & Renner, 2012; Milman, 2012; Redekopp & Ragusa, 2013). It is essential to understand how flipped classroom characteristics may vary across grade levels and how those characteristics may relate to satisfaction across grade levels. Pulley (2019) stated that after almost two decades of teachers implementing flipped classroom models, more research is needed at grade levels 6-12.

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