Comparison of Student Performance, Student Perception, and Teacher Satisfaction with Traditional versus Flipped Classroom Models

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As new technologies become available, they are often embraced in educational innovation to enhance traditional instruction. The flipped teaching model is one of the most recent and popular technology-infused teaching models in which learning new concepts takes place at home while practice is conducted in the classroom. The purpose of this study was to investigate how using the flipped teaching model affects student performance, perceptions, and teacher satisfaction in comparison to the traditional model. Sixteen teachers implemented the flipped teaching model in their classrooms and reported the results of the flipped teaching model for the first time. Pretests and posttests were used to measure and compare student performance while student and teacher surveys facilitated data collection on student perception and teacher satisfaction. The results of the study showed that, in most cases, the flipped classroom model demonstrated higher student learning gains, more positive student perception, and higher teacher satisfaction compared to the traditional model. This study adds evidence to the current literature that, if the conditions are properly set, the flipped classroom should have the potential to be an extremely effective learning style.

INTRODUCTION

The flipped classroom is defined as "shifting direct learning out of the large group learning space and moving it into the individual learning space, with the help of one of several technologies" (Hamdan, McKnight, McNight, & Arfstrom, 2013, p. 4). The main idea of the flipped classroom model is to shift the learning of new content and concepts to before class in the form of videos and spending in-class time applying the material through complex problem solving, deeper conceptual coverage, and peer interaction (Gajjar, 2013; Gojak, 2012; Sarawagi, 2013; Strayer, 2012; Tucker, 2012).

In a flipped classroom model, students engage with lectures or other materials outside of the class to prepare for an active learning experience in the classroom. Before class time, students are asked to watch short online lecture videos prepared or selected by their teachers followed by small online activities (a short quiz, online discussion, one paragraph summary, concept map, etc.). During the class, students are asked to engage in concepts by participating in individual and/or group activities with the guidance of the instructor. Individual classroom activities might include polling (iclickers), designing concept maps, or individual problem solving (worksheets). On the other hand, group activities might include think-pair-share, round robin, immediate feedback assessment technique (IF-AT), team matrix, fishbowl discussion, three-step interview, role play, reaction sheets, think-aloud pair problem solving, affinity grouping, dyadic essays, critical debate, case study, peer editing, or group investigation (Barkley, Cross & Major, 2005). The benefits of these individual and/or group activities include content mastery, development of critical thinking and problem-solving skills, and improved interpersonal skills (Johnson, Johnson, & Smith, 1998; Johnson & Johnson, 1999).

The current literature on the flipped classroom teaching model does not show a full agreement on its success. For example, some educational researchers consider the flipped classroom to be the future standard of teaching and learning (Bernard, 2015; Betihavas, Bridgman, Kornhaber, & Cross, 2016; Bishop & Verleger, 2013; Chua & Lateef, 2014; Giannakos, Krogstie, & Chrisochoides, 2014; O'Flaherty & Phillips, 2015; Presti, 2016; Seery, 2015; Zainuddin & Halili, 2016; Zuber, 2016). On the other hand, other researchers suggest that the flipped classroom is an ineffective and undesirable form of education (Chen, 2016; Clark, 2015; DeSantis, Van Curen, Putsch, & Metzger, 2015; Kirvan, Rakes, & Zamora, 2015). Researchers also criticize the fact that most flipped classroom model studies involve only college level courses, faculty, and students and little to no attention is paid regarding K-12 classrooms (Chen, 2016; Clark 2015; Grypp & Luebeck, 2015; Kettle, 2013). In other words, there were very limited (if any) studies, which appear to be inadequate, to inform us about the practice of the flipped classroom approach in K-12 education (Grypp & Luebeck, 2015). Therefore, the purpose of this study was to compare student performance, student perception, and teacher satisfaction in the flipped versus traditional classroom environment in K-12 schools. The following research questions guided this study.
1. Are there any differences in students' learning gains between the flipped and traditional instruction? The null hypothesis for this research question is: There is no significant difference in students' learning gains between flipped and traditional instruction.
2. What are the student perceptions regarding the flipped learning model?
3. Are the teachers satisfied with the flipped teaching model?

CONTEXT AND REVIEW OF LITERATURE

Flipped Classroom Model

The flipped classroom is usually described as events that have traditionally taken place inside the classroom and are now taking place outside the classroom and vice versa (Desantis et al., 2015; Grypp & Luebeck, 2015; Lage, Platt, & Treglia, 2000). However,

merely a re-ordering of the teaching and learning activities is insufficient to represent the practice of this instructional approach. Researchers thus attempt to formulate a definition of the flipped classroom approach as a technology-supported pedagogy that consists of two components: (1) direct computer-based individual instruction outside the classroom through video lectures and (2) interactive group learning activities inside the classroom (Bishop & Verleger, 2013; Huang & Hong, 2016; Kettle, 2013; Kirvan et al., 2015).

The flipped classroom model includes different pre-class, in-class, and after-class learning activities depending on the instructor and learning outcomes (Table 1).

Table 1
Subject Area and Grade Levels

	Main Activities	Additional Activities
Pre-Class Activities	• Watching instructional videos • Competing Online Exercises (Taking Notes & Quizzes)	• Reading Text Materials • Completing Online Discussions
In-Class Activities	• Brief Content Review /Short Lecture or Question and Answers • Group Activities (Worksheets and/or projects)	• Individual Practices (Worksheets) • Student Presentations • Quizzes
After-class Activities		• Completing self-evaluation or reflection

The most common pre-class activities in the flipped classroom are watching instructional videos and completing online exercises, such as taking content notes and/or online quizzes. Additional pre-class activities include reading text materials (textbook and teacher notes) and participating in online discussions.

As for the in-class activities, teachers primarily focus on starting with a brief content review or short lecture to help students recall the material and clarify any misunderstandings. This content review is also accomplished with a short question/answer session. Then, most class time is spent on group learning activities that are focusing on applying the knowledge learned from the video lectures, such as solving advanced problems with the support of the teacher and peers or working on projects. Additional in-class activities include but are not limited to individual practices, student presentations, and taking quizzes.

Even though after-class activity is not common in the flipped classroom model, the review of the literature shows that some teachers practice completion of self-evaluation or reflection as an after-class activity (Bhagat, Chang & Chang, 2016; Clark, 2015; Lai & Hwang, 2016; Mazur, Brown & Jacobsen, 2015; Schultz, Duffield, Rasmussen & Wageman, 2014; Wang, 2016).

The benefits of the flipped teaching method in the current literature are listed as follows: (1) students move at their own pace, (2) doing 'homework' in class gives teachers better insight into student difficulties and learning styles, (3) teachers can more easily customize and update the curriculum and provide it to students 24/7, (4) classroom time can be used more effectively and creatively, (5) teachers using the method report seeing

increased levels of student achievement, interest, and engagement, (6) learning theory supports the new approaches, and (7) the use of technology is flexible and appropriate for 21st century learning (Chao, Chen & Chuang, 2015; Chen, 2016; Fulton, 2012; Snyder, Paska & Besozzi, 2014; Tsai, Shen & Lu, 2015).

Effects of the Flipped Classroom Approach on Student Achievement and Satisfaction

When comparing the learning outcomes with traditional teaching, most previous reviews suggest that the flipped classroom approach can improve student performance (Berrett, 2012; Herman & Chang, 2014; Huang & Hong 2016; Leis, Cooke, and Tohei, 2015; Moraros, Islam, Yu, Banow, and Schindelka, 2015; Strayer, 2007, 2012; Warter-Perez & Dong, 2012). For example, after flipping high school math classes, the percentage of students passing the state test had increased from 29% to 73.8% in 2011 (Fulton, 2012). Clintondale (MI) High School flipped all its ninth grade classes in 2010 and realized that failure rates dropped by as much as 33 percentage points (Clintondale High School, 2013; Greg Green, 2012). Physics instructors at the University of British Columbia in Vancouver, Canada, compared the flipped teaching model with the traditional lecture format in a large lecture physics course (with 250 students in each section) and reported that students in the flipped course scored more than twice as well as students in the control group (Aronson & Arfstrom, 2013). On the other hand, the current literature also shows that not all flipped courses result in success/satisfaction. While some studies found no significant difference in student achievement between the flipped classroom and traditional classroom (Chen 2016; Clark 2015; Desantis et al., 2015; Kirvan et al., 2015), others resulted in a detrimental or inferior effect on student achievement (Arnold-Garza, 2014; Frederickson, Reed, & Clifford, 2005; Jaster, 2013; Johnson & Renner, 2012).

Studies show that students are generally satisfied with the use of the flipped classroom approach. Qualitative comments from these studies suggest that the new way of watching videos before class and working through advanced problems in the classroom with peers is the most important feature that contributed to a high satisfaction of the flipped courses (Bhagat et al., 2016; Schultz et al., 2014; Snyder et al., 2014; Clark, 2015).

The literature review summarizes the current empirical studies of the flipped classroom approach. The review provides a definition of the flipped classroom, an overview of flipped learning activities, and the findings of the effects of the flipped classroom method on student achievement and satisfaction. While the number of flipped classroom studies has been increasing (Giannakos et al., 2014), it appears that the research in K-12 education occupies only a small portion of the body of literature. In addition, researchers found very limited studies focusing on perspectives and satisfaction of the teachers adopting the flipped teaching. Current literature asks that more empirical studies are recommended to investigate the effects and challenges for students and teachers of the K-12 flipped classrooms, especially in the context of elementary school (Bhagat et al., 2016; Clark 2015).

METHOD

This is a quasi-experimental study including pretests, posttests, and a descriptive survey focusing on the experiences of 16 in-service teachers adapting the flipped teaching

method in their five-day unit lessons. Quasi-experimental methods that involve the creation of a comparison group are most often used when it is impossible to randomize individuals or groups for treatment and control groups (Cook & Campbell, 1979). Although the independent variable is manipulated, participants are not randomly assigned to conditions or orders of conditions (Cook & Campbell, 1979). Participants (teachers) in this study converted their five-day lessons from traditional to flipped teaching and compared students' learning performances and satisfaction with the traditional students.

Participants

Purposive (convenience) sampling, also known as availability sampling, was used in this study. The purposive sampling is a specific type of non-probability sampling method that relies on data collection from population members who are conveniently available to participate in a study (Marshall, 1996). Sixteen of the 21 graduate students (public school teachers) enrolled in a graduate course EDG6931 Technology and Data during the fall 2015 participated in the experiment. While 16 teachers (with 623 students) serving at the elementary, middle, and high school levels agreed to complete the flipped versus traditional classroom experiment, five elected to complete their action research in another topic due to schedule conflicts (Table 2). Participants reported that they never used a flipped classroom model for instruction before the experiment.

Table 2
Participants' Subject Area and Grade Levels

Grade Level	Mathematics	Science	Social Studies	English/Language
4th Grade	Teachers:1 TR-Students:21 FL-Students:19			Teachers:1 TR-Students:18 FL-Students:19
5th Grade	Teachers:2 TR-Students:36 FL-Students:39	Teachers:1 TR-Students:17 FL-Students:17		
6th Grade	Teachers:1 TR-Students:21 FL-Students:19		Teachers:1 TR-Students:17 FL-Students:20	
7th Grade		Teachers:2 TR-Students:38 FL-Students:35		
8th Grade	Teachers:2 TR-Students:41 FL-Students:42		Teachers:1 TR-Students:20 FL-Students:19	Teachers:1 TR-Students:20 FL-Students:18
9th Grade		Teachers:2 TR-Students:42 FL-Students:43		
10th Grade				Teachers:1 TR-Students:22 FL-Students:19

TR-Students: Number of Students in Traditional Classrooms Model
FL-Students: Number of Students in Flipped Classrooms Model

Procedure

Before the experiment, each teacher designed and prepared five-day lessons for both traditional and flipped student groups. Teachers randomly selected two of their classes to teach the same five-day lessons (unit) in traditional and flipped models. Teachers used their previously taught lesson plans for the traditional group. In the meantime, they re-designed their lesson plans for the flipped teaching model. Before the experiment, lesson plans and videos were peer-reviewed and feedback was provided by other teachers.

All the participants started their experiments at the same date by conducting a pretest for both traditional and flipped classes. Five-day lessons were taught using traditional and flipped models for the two groups of students. Students were then asked to complete a posttest and a questionnaire regarding their five-day lessons. Pretest and posttest results were used to analyze and compare the student learning gains while the student questionnaire was used to analyze and compare student perceptions for the five-day lessons. In addition, each teacher also completed a questionnaire regarding his/her satisfaction from the experiment (Figure 1).

Figure 1
Representation of the Research Experiment

Creating Lesson Videos

After creating their five-day lesson plans (unit), participants created content videos with different approaches depending on the lesson content. Seven teachers created their videos using presentation software (PowerPoint & Keynote) to present their lesson content with teacher commentary. Six teachers selected screen capture software (Screencast & Matic) to record their computer screens accompanied by teacher voice commentary. Three teachers used standard video cameras (camcorder) to record themselves teaching the lesson content in front of a white board. The length of the videos varied from 15 to 25 minutes. After the videos were created, they were uploaded into the classroom websites (Moodle Learning Management System).

Instruments

There are three instruments used in this study.

Instrument 1. Pretest and Posttest

Each teacher created a 10-question test to be used as a pretest and posttest assessment. The tests included eight multiple choice and two open-ended questions from the content of their five-day lessons. The teachers also mapped each question with lesson objectives

to ensure assessment consistency. Teachers shared their test questions with their peers and the instructor for review and revised those questions when needed. The same 10 questions were also used for the posttest implemented at the end of the experiment. The interrater reliability analysis (the degree of agreement among teachers in the same field/degree) showed that the pretest/posttest created and used in this study by 16 teachers was found reliable (10 items; from $\alpha = .71$ to $\alpha = .82$). Even though no long-term validity test applied to this instrument due to the time constraint, internal consistency scores showed positive results (10 items; from $\alpha = .69$ to $\alpha = .79$).

Instrument 2. Student Survey

All the participants (teachers) and the course instructor prepared a 10-question survey to collect data regarding the experiences of the students. Question types in the survey varied from Likert-style to multiple choice. The survey was prepared only for the group of students that were taught in the flipped model. Each teacher then created his/her online survey using the SurveyMonkey online survey service. Teachers shared their online surveys with their peers and the instructor to get feedback on technical errors. A test data collection was implemented on each survey. The interrater reliability analysis showed that the student survey created and used in this study for 16 teachers was found reliable (10 items; $\alpha = .74$). No validity test applied to this instrument due to the time constraint.

Instrument 3. Teacher Survey

Another 10-question survey was also designed by the course instructor to collect data regarding the experiences of the teachers on flipped teaching. The survey was shared with the teachers and corrections and additions were made. Question types in the survey varied from Likert-style to multiple choice to open-ended questions (e.g., What did you like/dislike most about the flipped teaching?). The interrater reliability analysis showed that the teacher survey created and used in this study for 16 teachers was found reliable (10 items; $\alpha = .77$). No validity test applied to this instrument due to the time constraint.

FINDINGS

Analyzing and Comparing Student Learning Gains (Pretest and Posttest)

To understand the differences in students' learning gains between the flipped and traditional instruction, researchers examined the pretest and posttest scores. In the data analysis of the pretest and posttest scores, *t*-test and analysis of variance (ANOVA) were used. The *t*-test analysis was used to determine whether a significant difference exists between the pretest and posttest scores of each student group. In addition, ANOVA was used to determine whether a significant difference exists between the traditional and flipped classroom posttest scores (Marshall, 1996).

According to the comparison of the pretest and posttest results, 10 teachers scored significantly higher on their flipped classrooms, while one teacher scored significantly higher on his/her traditional classroom. In addition, there were no significant differences in the score comparison of the five remaining teachers (Table 3).

Table 3
Pretest Posttest Comparison of Traditional and Flipped Models

	Traditional Model Pre & Post	Flipped Model Pre & Post	Traditional Posttest vs Flipped Posttest	Results
	T-test	T-test	Anova	Explanation
Teacher 01	.000	.000	.000	Flipped scored higher
Teacher 02	.000	.000	.000	Flipped scored higher
Teacher 03	.000	.000	.000	Flipped scored higher
Teacher 04	.000	.000	.006	No difference
Teacher 05	.000	.000	.010	No difference
Teacher 06	.000	.000	.001	Traditional scored higher
Teacher 07	.000	.000	.000	Flipped scored higher
Teacher 08	.000	.000	.011	No difference
Teacher 09	.000	.000	.000	Flipped scored higher
Teacher 10	.000	.000	.000	Flipped scored higher
Teacher 11	.000	.000	.000	Flipped scored higher
Teacher 12	.000	.000	.000	Flipped scored higher
Teacher 13	.000	.000	.005	No difference
Teacher 14	.000	.000	.001	Flipped scored higher
Teacher 15	.000	.000	.041	No Difference
Teacher 16	.000	.000	.001	Flipped scored higher

$P <= .001$

Figure 2 shows the mean scores of the pretests and posttests for both the traditional and flipped classrooms.
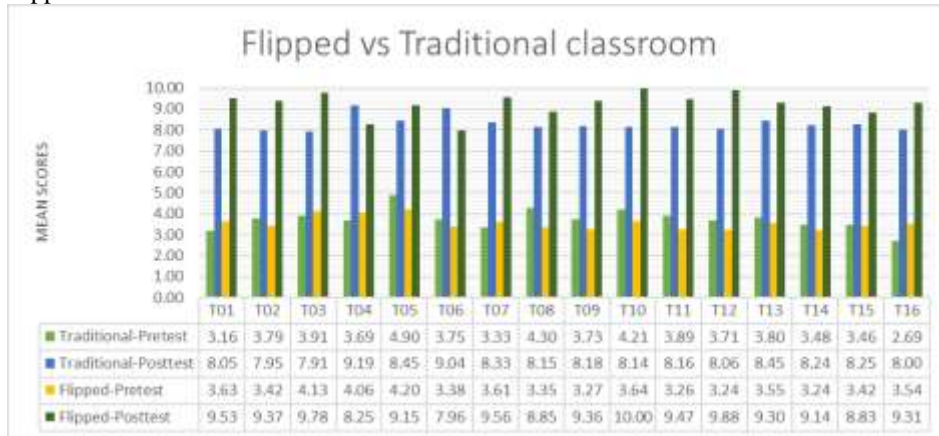

Figure 2
Flipped versus Traditional Classroom

Figure 3 shows the learning gain comparison of traditional versus flipped teaching.

Figure 3
Learning Gains for Traditional versus Flipped Teaching

Understanding Student Perceptions of the Flipped Learning Model (Student Survey)

To investigate students' perceptions toward the flipped classroom approach, researchers examined students' self-reported data on student surveys. The online survey data was collected at the end of the experiment by the classroom teachers. Each teacher accessed his/her own student survey data, while researchers accessed all the student surveys. The researchers found that students were generally satisfied with the use of the flipped classroom approach and provided detailed information regarding their perception of the experiment.

The very first question on the student survey was "You have just completed a week-long new learning model called 'flipped learning' in which you were asked to watch videos at home and complete homework in class. In your opinion, was flipped learning model success for you?" Most of the students (94%) reported that the new learning format was successful for them. Naturally, the following two questions asked what students liked/disliked about the new flipped classroom model. The responses were grouped into statements and are provided below (Tables 4 and 5).

Table 4
What did you like most about flipped classroom learning?

Statements	Percentage
Flipped classroom model provides opportunity to work at my own pace (I can rewatch or pause videos as many times as needed.)	88.46%
Content learning with lesson videos is better than text-based materials	79.24%
Doing homework in class rather than at home is better because we (students) can ask questions to teacher or other students.	64.74%
Flipped classroom provides better opportunity to interact with classmates and teacher during class meetings.	47.44%
Flipped classroom model provides more time for questions, discussions and projects.	39.74%
Flipped classroom model eliminates the unnecessary wasted class time spent by teacher re-teaching to those who do not get it at once.	12.18%

Table 5
What did you like least about flipped classroom learning?

Statements	Percentage
I am not used to learning at home prior to the class. I prefer learning in class.	11.25%
Watching video was time consuming and overwhelmed my time at home	8.77%
I do not like homework regardless of its model	5.77%

In the next question, to collect more information about their flipped learning experiences, students were asked to rate five statements on the scale from strongly agree to strongly disagree to indicate their opinion (Table 6).

Table 6
Student agreement or disagreement with each statement

Statements	Mean	SD
Flipped classroom was more enjoyable than traditional classroom.	4.79	1.17
I am more motivated to learn in flipped classroom.	4.73	1.13
Based on my experiences so far, given the choice between this new flipped and traditional classroom, I would prefer flipped classroom for my next classes.	4.65	1.24
I would recommend flipped classroom to other students.	4.78	0.89
The flipped classroom helped me communicate with my teacher and other students better than traditional classroom.	4.71	1.22

Rating Scale: 5. Strongly Agree, 4. Agree, 3. Neutral, 2. Disagree, 1. Strongly Disagree

In the following question, students were asked *where* they watched the online lessons/videos. Most of the students (81%) reported that they viewed the lesson videos at home, while 13% watched the videos at school, 4% watched at the public library (outside of school), and 2% used their mobile devices (smartphones).

In the next question, students were asked about the *time* they watched online lessons/videos. While 34% of the students reported that they watched the videos at home right after school, 23% watched at home before bedtime, 19% watched at home in the morning, 17% watched at school before class, 6% watched at school during class, and 1% watched on the way to school or home.

Finally, students were asked about the *type of the device* the students used to watch the lesson videos. While 44% of the students reported that they watched the videos using a desktop computer, 29% used a laptop computer, 24% used a tablet, 2% used an iPod, and 1% used a smartphone.

Understanding Teacher Perceptions of the Flipped Learning Model (Teacher Survey)

To understand teachers' perception of the flipped classroom approach, researchers also examined teachers' self-reported data on the teacher surveys. The online survey data collected at the end of the experiment showed that teachers were mostly satisfied with the use of the flipped classroom approach and provided detailed information regarding their perception of the experiment.

The very first question on the survey was "You have just completed a week-long new teaching model called 'flipped learning' in which you asked students to watch lesson videos at home and complete homework in class. In your opinion, was the flipped learning instruction model successful for you?" All the teachers except one (94%, 15 teachers) reported that the new teaching format was successful for them. Similar to the student survey, the following two questions asked what students liked/disliked about the new flipped classroom model. The responses were grouped into statements and are provided below (Tables 7 and 8).

Table 7
What did you like most about flipped classroom learning?

Statements	Percentage
My students learned better, scored higher	93.75%
Flipped classroom provided better opportunity to interact with students during class (student engagement).	81.25%
Flipping my unit was a lot of work but it was a creative experience and I liked getting away from lecturing.	62.5%
My students come to class more prepared and they are more engaged	56.25%
Preparing videos helped me learn more about the content	31.25%
I am more excited about teaching the content	31.25%

Table 8
What did you like least about flipped classroom learning?

Statements	Percentage
Preparing flipped learning materials was time consuming	87.5%
It was difficult to ensure that students had truly watched the video.	62.5%

In the next question, teachers were asked to rate five statements on the scale from strongly agree to strongly disagree to indicate their opinions (Table 9).

Table 9
Teacher agreement or disagreement with each statement

Statements	Mean	SD
Teaching Flipped model was more enjoyable than traditional classroom.	4.93	.25
I am more motivated to teach in flipped classroom.	4.8	.56
Based on my experiences so far, given the choice between this new flipped and traditional classroom, I would prefer flipped classroom for my next classes.	4.86	.51
I would recommend flipped classroom to other teachers.	4.86	0.35
The flipped classroom helped me communicate with my students better than traditional classroom.	4.8	1.56

Rating Scale: 5. Strongly Agree, 4. Agree, 3. Neutral, 2. Disagree, 1. Strongly Disagree

DISCUSSION

Educators are continually challenged to find new strategies for engaging students in the classroom to increase the effectiveness of the learning process. A flipped learning model inverts the normal learning process. It moves the lectures outside the classrooms and

uses learning activities to move practice with concepts inside the classroom (Strayer, 2012).

Student Learning Gains

This study showed that the new flipped classroom instructional approach can help students perform significantly better overall than students in traditional classrooms, supporting the results of previous studies (Bhagat et al., 2016; Chao et al., 2015; Schultz et al., 2014; Tsai et al., 2015).

Student Perceptions

Findings regarding the student perception of the flipped classroom approach on this study showed that students were satisfied with the new flipped learning model. The student survey provided a lot of detailed information regarding what contributed to the success of the new model. For example, most students agreed that the flipped classroom model was more enjoyable and motivational than the traditional classroom. It provided them with the opportunity to work at their own pace because they could re-watch or pause videos as many times as needed (Grypp & Luebeck, 2015; Huang & Hong, 2016). In addition, students reported that watching lesson videos was better than reading text-based materials (Snyder et al., 2014). The flipped classroom approach helped them increase their interaction with the classmates and the teacher during class meetings and helped eliminate unnecessary wasted class time spent by the teacher.

Student Related Challenges

In addition to their satisfaction, students also reported their concerns with the new flipped learning model. For example, some of the students reported that they are not used to "learning at home" prior to the class, and they prefer to "learn in class." This exact concern was also reported in previous studies. Researchers suggested that some of the student participants will hold the conventional view of learning because of their unfamiliarity of the flipped classroom model (Snyder et al., 2014; Wang, 2016). To overcome this problem, teacher-student communication is necessary to promote students' acceptance of the new flipped instructional approach. Specifically, teachers should detail the goal of the flipped classroom approach as well as its routines and procedures. Demonstrating to the students how to learn through the flipped classroom method is very important for successful implementation (Clark, 2015; Mazur et al., 2015).

Some students (5%) also reported that "watching videos was time consuming" and "students do not like homework regardless of its model." Researchers explained this type of concern in two dimensions. As a solution, Wang (2016) and Clark (2015) suggested that, in the flipped teaching model, teachers sometimes create instructional videos that are too long for students to focus. These long videos then become boring and passive for students. Therefore, creating minimum length videos that are meaningful and cover the lesson content is a key step. This might require teachers to revisit their lesson videos (Clark, 2015; Wang, 2016). On the other hand, Grypp and Luebeck (2015) suggested that, even in the video format, there will be students who will prefer to avoid

homework. They suggested that teachers provide opportunities for students to view the short lesson videos in class (Grypp & Luebeck, 2015).

Teachers' Perceptions of the Flipped Learning Model

The teacher survey results showed that teachers also felt very positive about the new flipped teaching model and described their experience as a "success." Most teachers felt more motivated to teach in the flipped model. They reported that teaching the flipped model was more enjoyable that the traditional model, and they would prefer the flipped classroom for their next classes. When asked for specifics, similar to other studies, most teachers in this project indicated that the flipped teaching model provided their students better personalized learning, improved mastery and retention of information, and better opportunities for communication and collaboration with their students (Huang & Hong, 2016; Kettle, 2013). Teachers reported that, even though flipping their course content was a lot of work, they enjoyed getting away from lecturing and working on a creative experience (Chen, 2016; Clark, 2015). They also reported that they learned more about the course content during the preparation of the videos, and they felt more excited about their teaching (Lai & Hwang, 2016; Snyder et al., 2014).

Teacher Related Challenges

When teachers were asked about the downsides of their experiment, they mentioned that the flipped teaching model has challenges, such as heavy front-end preparation. Teachers reported that preparing the flipped learning materials was time-consuming. This challenge is also reported in a lot of previous studies (Chen, 2016; Grypp & Luebeck, 2015; Kettle, 2013). As a solution, Chen (2016) and Kettle (2013) explained that going from the traditional to flipped classroom model requires additional work and new skills for the instructor. This learning curve could be mitigated by entering the model slowly and preparing the flipped learning materials progressively.

The second concern from teachers was the difficulty in ensuring that students truly watch the videos before class. Again, Grypp and Luebeck (2015) suggested that even in the video format, students might prefer avoiding homework and suggested that teachers provide opportunities for students to view the short lesson videos in class.

CONCLUSION

As the flipped classroom model is becoming more popular, it constitutes a role change for instructors, who give up their front-of-the-class position in favor of a more collaborative and cooperative contribution to the teaching process (Lai & Hwang, 2016). In this study, 16 public school teachers implemented a new teaching model – the flipped classroom – for the first time in their career. The study aimed to analyze and compare student learning outcome differences between the flipped and traditional classrooms and understand student and teacher perceptions of the implementation of this new model.

Like previous research, the results of this study showed significant learning gain differences mostly in favor of the flipped classrooms because it promotes active learning, which requires students to solve problems using what they learned before class.

The findings regarding student and teacher perceptions toward the flipped classroom approach were mostly positive. Both teachers and students believed that the experiment of teaching and learning with the flipped model was successful, exciting, and motivational. On the other hand, feedback from students and teachers also highlighted the challenges with the new instructional approach. Students reported the following challenges (1) unfamiliarity with the flipped classroom model, (2) watching long and boring video lectures, and (3) having no time to watch videos at home. Teacher related challenges were (1) time spent on preparation and (2) students not watching the videos. To address the student- and teacher-related challenges, based on previous research, the researchers in this study make the following recommendations.

Before flipping a traditional classroom, teacher-student communication must be in place. Teachers should demonstrate to the students how to learn through the flipped classroom. A short training session for both the teacher and students is necessary. In addition, teachers should prepare the flipped learning materials progressively rather than try to do everything at once. They should focus on creating short separate videos rather than one long video to increase the possibility of students watching the videos without being bored. Teachers should also provide opportunities for students to view the short lesson videos in the classroom before the class session starts.

This study has limitations. The 16 teachers in this research implemented the flipped classroom model for only one unit (five days). Perhaps, a similar study with a long-term implementation of the flipped model (a semester or a year-long study) and a larger sample might provide more generalizable results. The researchers collected only general data on what each teacher used for before, during, and after class activities during their flipped teaching. Investigating and comparing specific learning activities implemented during the flipped teaching would have made this study more generalizable. The researchers suggest that future research might address the limitations of this study.

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Turkish Abstract
Geleneksel, Teknolojik Olarak Zenginleştirilmiş Sınıf Modelleriyle Öğrenci Performansının, Öğrenci Algısının ve Öğretmenin Memnuniyetinin Karşılaştırılması

Bu araştırmanın amacı, teknolojik olarak zenginleştirilmiş öğretim modelinin öğrencilerin performansını, algılarını ve öğretmen memnuniyetini geleneksel modele kıyasla nasıl etkilediğini araştırmaktır. Bu araştırmada on altı öğretmen, teknolojik olarak zenginleştirilmiş öğretim modelini dersliklerinde uygulamış ve sonuçları bildirmiştir. Ögrenci ve öğretmen anketleri öğrenci algılaması ve öğretmen memnuniyeti üzerine veri toplamayı kolaylaştırırken öğrencilerin performanslarını ölçmek ve karşılaştırmak için ön test ve sontest kullanılmıştır. Çalışmanın sonuçları, çoğunlukla, teknolojik olarak zenginleştirilmiş sınıf modelinin, geleneksel modele kıyasla, yüksek öğrenci öğrenme kazançları, daha pozitif öğrenci algısı ve daha yüksek öğretmen memnuniyei elde edildiğini göstermiştir.

Anahtar Kelimeler: teknolojik olarak zenginleştirilmiş sınıf, teknolojik olarak zenginleştirilmiş öğretim, online öğretim, online öğrenme, öğrenci algısı, öğretmen memnuniyeti

French Abstract

Comparaison de Performance(Prestation) d'Étudiant, Perception d'Étudiant et Satisfaction de Professeur de Traditionnel contre Modèles de Salle de classe Donnés un petit coup

Le but de cette étude était d'examiner comment l'utilisation du modèle d'enseignement donné un petit coup affecte la performance(prestation) d'étudiant, des perceptions et la satisfaction de professeur en comparaison du modèle traditionnel. Seize professeurs ont mis en œuvre le modèle d'enseignement donné un petit coup dans leurs salles de classe et ont rapporté les résultats du modèle d'enseignement donné un petit coup pour la première fois. Pretests et des post-tests ont été utilisé pour mesurer et comparer la performance(prestation) d'étudiant tandis que l'étudiant et le professeur examinent la collecte de données facilitée sur la perception d'étudiant et la satisfaction de professeur. Les résultats de l'étude ont montré que, dans la plupart des cas, le modèle de salle de classe donné un petit coup a démontré l'étudiant plus haut apprenant des gains, la perception d'étudiant plus positive et la satisfaction de professeur plus haute comparée au modèle traditionnel.

Mots Clés: salle de classe donnée un petit coup, enseignement inversé, enseignement en ligne, apprentissage, performance d'étudiant, perception d'étudiant, satisfaction de professeur

Arabic Abstract

مقارنة أداء الطالب، تصور الطالب، ورضا المعلمين عن نماذج الفصول الدراسية التقليدية مقابل الفصول المقلوبة

وكان الغرض من هذه الدراسة هو التحقيق في كيفية استخدام نموذج التدريس انقلبت يؤثر على أداء الطلاب، التصورات، ورضا المعلم بالمقارنة مع النموذج التقليدي. وقام ستة عشر مدرسا بتطبيق نموذج التعليم المقلوب في فصولهم الدراسية، وأبلغوا عن نتائج نموذج التعليم المقلوب لأول مرة. واستخدمت الاختبارات التمهيدية والاختبارات اللاحقة لقياس ومقارنة أداء الطلاب في حين سهلت الدراسات الاستقصائية للطلاب والمعلمين جمع البيانات عن تصور الطلاب ورضا المعلمين. وأظهرت نتائج الدراسة أنه في معظم الحالات، أظهر نموذج الفصول الدراسية المقلوب ارتفاع مكاسب تعلم الطلاب، وإدراك الطالب أكثر إيجابية، وارتفاع رضا المعلم بالمقارنة مع النموذج التقليدي.

الكلمات الرئيسية: انقلبت الفصول الدراسية، التدريس مقلوب، والتعلم عبر الإنترنت، والتعلم، وأداء الطلاب، تصور الطالب، ورضا المعلم

German Abstract

Vergleich der Student Performance, Schülerwahrnehmung und Lehrer Zufriedenheit mit traditionellen versus Flipped Classroom Modelle

Der Zweck dieser Studie war es, zu untersuchen, wie die Verwendung des flipped Lehrmodells die Schülerleistung, die Wahrnehmung und die Lehrerzufriedenheit im Vergleich zum traditionellen Modell beeinflusst. Sechzehn Lehrer führten das flipped Lehrmodell in ihre Klassenräume und berichteten die Ergebnisse des flipped Lehrmodells zum ersten Mal. Pretests und Posttests wurden verwendet, um die Schülerleistung zu messen und zu vergleichen, während Schüler- und Lehrerumfragen die Datenerfassung über die Schülerwahrnehmung und die Lehrerzufriedenheit erleichterten. Die Ergebnisse der Studie zeigten, dass in den meisten Fällen das umgedrehte Klassenzimmer-Modell höhere Schüler Lerngewinne, mehr positive Schüler Wahrnehmung und höhere Lehrer Zufriedenheit im Vergleich zu den traditionellen Modell gezeigt.

Schlüsselwörter: flipped classrooms, flipped teaching, online-unterricht, lernen, schülerleistung, schülerwahrnehmung, lehrerzufriedenheit

Malaysian Abstract

Perbandingan Prestasi Pelajar, Persepsi Pelajar, dan Kepuasan Guru dengan Model Tradisional dan Flipped Classroom Models

Tujuan kajian ini adalah untuk mengkaji bagaimana menggunakan model pengajaran Flipped mempengaruhi prestasi pelajar, persepsi, dan kepuasan guru berbanding dengan model tradisional. Enam belas guru melaksanakan model mengajar di bilik darjah mereka dan melaporkan hasil model pengajaran Flipped untuk kali pertama. Tinjauan semula dan posttest digunakan untuk mengukur dan membandingkan prestasi pelajar manakala tinjauan pelajar dan guru memudahkan pengumpulan data mengenai persepsi pelajar dan kepuasan guru. Hasil kajian menunjukkan bahawa, dalam kebanyakan kes, model bilik darjah membuktikan peningkatan hasil pembelajaran pelajar, persepsi pelajar yang lebih positif, dan kepuasan guru yang lebih tinggi berbanding dengan model tradisional.

Kata Kunci: bilik kelas, pengajaran flipped, pengajaran dalam talian, pembelajaran, prestasi pelajar, persepsi pelajar, kepuasan guru

Russian Abstract

Сравнение Производительности Учащихся, Студенческого Восприятия и Удовлетворенности Учителей Традиционными против Перевернутые Классные Модели

Цель этого исследования состояла в том, чтобы исследовать влияние перевернутой модели обучения на успеваемость учащихся, восприятие и удовлетворенность учителей по сравнению с перевернутой моделью. Шестнадцать учителей применяли перевернутую модель обучения в своих классах и сообщали результаты первой модели обучения. Претензии и посттесты использовались для измерения и сравнения успеваемости учащихся, в то время как опросы студентов и учителей способствовали сбору данных по восприятию учеников и удовлетворенности учителей. Результаты исследования показали, что в большинстве случаев перевернутые классная модель демонстрировала более высокие успехи в обучении студентов, более позитивное восприятие учеников и более высокую удовлетворенность учителей по сравнению с традиционной моделью.

Ключевые Слова: перевернутый класс, перевернутое обучение, онлайн-обучение, обучение, успеваемость учащихся, восприятие ученика, удовлетворение учителей