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Flipping Instruction in an Undergraduate Education Course: Findings from an Action Research Study

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This study measured the effectiveness of a blended, flipped instructional approach in an undergraduate education course. Blended learning combines online and face-to-face instruction. Students learned course content online and face-to-face time was used to supplement the course material. This approach was adopted to increase student preparation for and participation in class, to promote higher-order thinking and active engagement in the course material, and to enhance overall class performance. An additional goal was to model effective use of educational technology. Action research was conducted across eight semesters to examine these learning objectives and to make instructional modifications.

Keywords: action research, doctoral education, technology integration, professional development, power users

INTRODUCTION

This article describes the first author's adoption of a blended or hybrid learning approach to flip instruction in her undergraduate, introductory educational psychology course. The course content consists of an overview of many important theories and research in the areas of human development, learning, motivation, and learner differences, with an emphasis on application in the classroom setting. Students are required to read and learn a large amount of information. Traditionally, the course pedagogy has been predominantly lectures interspersed with group activities.

Over the years of teaching the course, the instructor noticed more students coming to class unprepared and unwilling to participate. Many seemed content to just sit back and listen to the lectures, taking a passive rather than active approach to learning. Test scores were below average for many students who tended to wait until right before the test to read the textbook and study the material. Frequent comments from students on course evaluations were too many lectures and too much material to learn. In addition, the instructor was not modeling effective instruction to these future teachers. For these reasons,

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the decision was made to investigate alternative approaches to instructional delivery that would promote more active student involvement in the learning process and, hopefully, more successful learning of the material.

After a careful examination of the research, the instructor decided to use a blended or hybrid learning model that combines both online and traditional face-to-face instruction. Students were given the time equivalency of one of the two classes per week to learn the course content online. The students were required to complete an online assignment and take an online quiz before attending the face-to-face class. During the face-to-face class, students worked in groups on activities that supplemented and applied the content that they learned in the online assignment. This particular technique is called flipping. This blended, flipped approach has been found to increase student engagement and interest in learning by creating a more student-centered rather than teacher-directed instructional focus. The instructor hoped to not only increase active learning of the course material, but to also provide these teacher candidates with the opportunity to experience effective uses of technology for their own learning and, hopefully, transfer this knowledge to their own future classrooms.

The purpose of this study was to find out the effect of the blended, flipped method on students' preparation, participation, and learning as well as any barriers the students encountered when using this new instructional delivery approach. Action research, a systematic way for educators to observe, analyze, and interpret information about student learning and then to use this information for planning and decision-making (Parsons & Brown, 2002), was conducted throughout the eight semesters of implementation of the flipped approach. The research results from this study were used to monitor not only the effectiveness of the strategy in accomplishing the instructor's objectives for using the method, but also to make instructional refinements to the course design.

LITERATURE REVIEW

Picciano (2006) describes blended learning as a combination of online with face-to-face learning activities integrated in a "planned, pedagogically valuable" way, where a portion of the traditional classroom time is replaced by online activities. Blended learning has been found to increase student understanding, interaction, and involvement in the learning process if teachers ensure that both the online and face-to-face components follow good pedagogical practices (Young, 2002; Martyn, 2003; Lin, 2007).

The use of blended instruction is growing in all types of higher education institutions (Young, 2002; Kim & Bonk, 2006) as well as in K-12 classrooms (Watson, 2008). In a meta-analysis of effectiveness studies of face-to-face, online, and blended models of learning, the U.S. Department of Education reported that students in online learning environments performed "modestly better" than those learning the same material in face-to-face situations, and blended instruction gave students a "larger advantage" relative to pure online or face-to-face approaches (U.S. Department of Education, 2010).

Many teachers find blended instruction to be "the best of both worlds", offering the convenience and flexibility of online courses but still keeping the traditional face-to-face, faculty-to-student interaction while in the classroom (Dziuban, Hartman, & Moskal, 2004). An essential part of hybrid learning is finding the right blend of what goes online and what is taught face-to-face (Kaleta, Skibba, & Joosten, 2007). Appropriate integration of online and face-to-face learning is essential to creating environments that are "highly conducive to student learning" (Vaughan, 2007). Students were dissatisfied with hybrid instruction if they did not see the relationship between the face-to-face and the online components (Aycock, Garnham, & Kaleta, 2002) or if they felt the online components just increased the course workload (Kaleta, Skibba, & Joosten, 2007).

There are two common types of blends used by teachers. In one type of blend course content is taught in a traditional way during class time, and students extend their knowledge online through critical thinking activities and discussions (Aycock, Garnham, & Kaleta, 2002). Another blend requires students prior to the face-to-face sessions to complete activities online in order to ensure that everyone shares a common information base. Then during class time, the content is supplemented and enriched with application and problem solving activities (Smart & Cappel, 2006). The face-to-face time can be used to learn the material at a deeper level as well as connect the content to broader topics (Collopy & Arnold, 2009). Requiring students to learn basic content outside of class using technology tools, which frees class time for other learning activities, is referred to as "flipping" instruction. Flipping, first used by Jonathan Bergmann and Aaron Sams at Woodland Park High School in Colorado, USA (Fulton, 2012), is being used more frequently in both college and in K-12 classrooms (Herreid & Schiller, 2013; Goodwin & Miller, 2013). The flipped learning model provides a way for teachers to "…shift from teacher-driven instruction to student-centered learning" (Hamdan, McKnight, McKnight, & Arfstrom, 2013; Talbert, 2012). Instructional technology has enabled teachers to provide materials and resources that personalize instruction, making learning more active and "ubiquitous" and promoting students' ability to learn content online (Woolf, 2010).

Since flipped instruction is a new way of teaching and learning, it requires adjustment for both educators and students. Teachers need to be more aware of the content they are teaching, and the classroom environment needs to be more "flexible" allowing students more choice in when and where they learn (Bennett, 2013). Flipped instruction requires educators to cater to a variety of learning styles, shifting their focus to the learner. Teachers must decide on what content can be learned independently, use more active learning techniques, and reflect on the effects of their instructional approach, making necessary modifications to promote learning (Hamden, McKnight, McKnight, & Arfstrom, 2013; Kenney & Newcombe, 2013). According to Fulton (2012), flipped classrooms support the research on effective learning, allowing teachers to use classroom time in ways that are more creative. Using educational technology is "appropriate for 21st century learning" where students will use technology throughout all aspects of their lives and will expect to be able to access information anytime, anywhere. Students must take a more active approach and more self-responsibility for their own learning (Talbert, 2012). According to Goodwin and Miller (2013), flipping is changing the "entire paradigm of teaching" from viewing teachers as "imparters of knowledge" to viewing teachers as "coaches", guiding students in the learning process.

A strong scientific research base supporting flipped classrooms is still accumulating (Goodwin & Miller, 2013). Most studies, so far, have been positive, indicating that both teachers and students are seeing the benefits of this new instructional approach, especially in fostering student-centered learning. In their review of the research on flipped instruction in higher education, Hamden, McKnight, McKnight, and Arfstrom (2013) found the technique promoted increased and more in-depth content coverage, more interactive classrooms and resulted in better test scores than traditional delivery approaches. Riddick (reported in Herreid & Schiller, 2013) found that students in a flipped college, pre-preparatory, chemistry course had higher final exam scores and better overall success than students in traditional sections of the course.

Teachers using the approach are reporting increased levels of student achievement, interest, and engagement. Lage, Platt, and Treglia (2000) found that students in an introductory economics course preferred inverted classrooms, and the instructors reported that students appeared more motivated and more comfortable asking questions in class. The inverted classroom can incorporate a wide variety of learning styles and allows more one-on-one interaction with students without sacrificing the coverage of course material.

Davies, Dean, and Ball (2013) compared a flipped approach to a traditional approach in an introductory college-level information systems spreadsheet course. They found student perceptions of the flipped approach were slightly but not significantly more favorable than the regular approach. An advantage of the flipped approach was that it allowed for individual pacing through the material. Finding the right pace for delivering material to students of various technology backgrounds can often be a challenge for instructors in a traditional classroom format. The researchers also were surprised to find that motivating students to recognize the importance of studying the material was not as difficult as they expected it would be in a flipped format.

Strayer (2012) did a comparative study of two college-level, introductory statistics courses, one using a traditional approach, and one using a flipped delivery method. He found that students in the flipped classroom were more open than the students in the traditional class to learning environments that were innovative and cooperative. However, they were not as satisfied with how the approach oriented them to the learning tasks. Strayer assumed that, with time, students would adjust to the approach and see connections between the online and in-class learning activities. He emphasized the importance of providing support to help students and teachers monitor learning and see the relationship between the online and face-to-face activities. Other studies report that a major barrier to successful online learning is the lack of student self-discipline and self-regulatory learning behaviors (Allen & Seaman, 2006; Barnard, Paton, & Lan, 2008).

Research studies on flipped instruction are promising, but studies that are more scientific are needed (Goodwin & Miller, 2013). The instructor decided to conduct her own action research, and collected data on student perceptions of the instructional approach across the eight semesters of implementation and used these findings to make course improvements. How this approach fulfilled the goals of the instructor to increase student ownership and active involvement in the learning process will be examined.

RESEARCH QUESTIONS

The study's findings presented in this article focus on answering the following research questions that reflect the instructor's objectives for switching to a blended, flipped format:

1. Did the online assignments and quizzes help to increase student preparation for the face-to-face classroom activities and for the course exams? Did the face-to-face activities help prepare students for the course exams?
2. Did the blended, flipped approach increase student participation during the face-to-face class sessions?
3. Did the blended, flipped approach increase student engagement and interest in the course material?
4. Did the face-to-face activities provide students with a chance to extend their knowledge on the topics? Did the students see the relationship between the online assignments and face-to-face activities?
5. Did blended, flipped approach contribute to student learning of the course material?
6. Did the approach help students manage their learning of the course material more effectively?
7. Were there any strong correlations between the student responses to contribution to learning and their responses to preparation, participation, engagement, knowledge extension, and management of learning?
8. What were some of the barriers to successful learning using the flipped method?

METHOD

PARTICIPANTS

One hundred seventeen students (50% males and 50% females) taking the instructor's undergraduate educational psychology course during the two most recent semesters participated in the study. The majority of the students were undergraduate education majors in their sophomore or junior year that had never taken a blended or distance course. Most of the students considered themselves at least somewhat proficient in their level of technology expertise and expected to get an A or B in the course.

INSTRUMENTS

The survey consisted of a five-point Likert scale with the following options: strongly disagree, disagree, neutral, agree, or strongly agree. The students also used a checklist to indicate what the barriers were to the success of their blended learning experience.

PROCEDURES

The instructor began using a blended, flipped instructional approach in her educational psychology course during the spring 2010 semester. This course is part of the professional education core and is often the first course that students take in education. The majority of students that take the course are education majors in their sophomore year. There are about the same number of males and females that take the course.

During this first semester of implementation, the instructor decided to start small and pilot-test a flipped, blended approach during one, three-week unit, in one section of the course. The three-week unit selected covered the topic of cognitive development. Fifty-six students filled out a survey measuring their perceptions of the method and the majority recommended that the instructor continue using it. Based on the positive survey feedback, the instructor expanded the approach to four out of the five units in the course and used it in all four of her sections. The instructor decided to keep the first unit of the course face-to-face to allow both the students and the teacher to get to know each other and to begin to build a learning community.

For the online assignments, students were required to read the textbook, listen to narrated PowerPoint lectures, view video clips, and read relevant articles. They could use class time to asynchronously do the assignment and then take the online quiz that was due the night before the face-to-face class session. The online quiz tested the students on the material they learned during the online assignment and held them accountable for doing the online assignment and being prepared for the in-class activities. The online quiz also allowed the instructor to check students' understanding of the material and determine what needed to be reviewed during class. The quiz gave the students the opportunity to see which areas needed more careful study.

The in-class activities reinforced and extended the information the students learned online, and gave them opportunities to apply the information and engage in higher-order thinking skills. Analyzing classroom videos and case studies, solving classroom scenarios, researching topics, creating concept maps and Venn diagrams, and discussing controversial educational issues were some of the different types of activities used in class.

The instructor surveyed students at the end of each of the semesters that she has been using the approach. Participation in the survey was voluntary. Students were asked respond thoughtfully and truthfully to the questions and that responses would be anonymous. The instructor used the student feedback from these surveys refine to continually refine the

online assignments and face-to-face activities and to measure the effectiveness of the approach.

Survey results from the last two semesters of implementation (spring and fall 2013) were used to address the instructor's action research questions. These semesters were selected because, by this time in the adoption process, the instructor was experienced in using the approach, and had made several course refinements based on the student feedback from the previous semesters. In addition to the survey results, test scores were used to measure how the approach affected student learning of the course material. During the spring 2012 semester, the instructor did not use the blended, flipped approach in one of her four class sections. Comparisons of the test scores on the three course exams between the three sections that were flipped and the one section that was taught in a traditional way were used to measure the effects of the approach on test performance.

RESULTS

This section presents the data aggregated across these two most recent semesters of implementation for each of the research questions.

PREPARATION

Did the online assignments and quizzes help to increase student preparation for the face-to-face classroom activities and for the course exams?
Did the face-to-face activities help prepare the students for the course exams?

As can be seen in Table 1, the majority of the students agreed or strongly agreed that the online assignments and quizzes helped to prepare them for the in-class activities and for the course exams. The face-to-face activities were even more beneficial than the online assignments or quizzes for exam preparation.

Table 1. Student survey responses for preparation

Survey Question	Strongly Agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)
I felt more prepared for the face-to-face sessions after doing the online assignments.	44 (38%)	41 (35%)	19 (16%)	10 (8%)	3 (3%)
The online quizzes helped to prepare me for the face-to-face activities.	28 (24%)	42 (36%)	24 (21%)	17 (15%)	5 (4%)
The online assignments helped to prepare me for the exams.	29 (25%)	49 (42%)	22 (19%)	14 (12%)	2 (2%)
The online quizzes helped to prepare me for the exams.	28 (24%)	52 (45%)	11 (10%)	18 (16%)	6 (5%)
The face-to-face activities helped to prepare me for the exams.	37 (32%)	51 (44%)	19 (16%)	9 (8%)	1 (1%)

CLASS PARTICIPATION

Did the blended, flipped approach increase student participation during the face-to-face class sessions?

The percentages in Table 2 reveal that most students felt their participation in class was helped by the blended, flipped approach. However, these percentages were not quite as high as the percentages for preparation, and a larger percentage of students were "neutral" indicating that increasing class participation was not as strong an outcome of the approach as increasing students' preparation for class sessions and exams.

Table 2. Student survey responses for participation

Survey Question	Strongly Agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)
My participation in class increased as a result of doing the online activities.	21 (18%)	43 (37%)	25 (21%)	22 (19%)	6 (5%)
I felt more comfortable expressing myself in class after doing the online activities/assignments.	27 (23.5%)	43 (37%)	27 (23.5%)	16 (14%)	2 (2%)

STUDENT ENGAGEMENT

Did the blended, flipped approach increase student engagement and interest in the course material?

Fifty-percent (50%) of the students answered, either "strongly agree" or "agree" when asked if they felt more engaged and interested in the course material as a result of using the flipped approach (see Table 3). Approximately a quarter of the students (26%) were "neutral". This outcome was also not as strong as preparation.

Table 3. Student survey responses for engagement

Survey Question	Strongly Agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)
I felt more engaged and interested in the course material with the blended approach.	23 (20%)	35 (30%)	30 (26%)	17 (15%)	11 (9%)

KNOWLEDGE EXTENSION

Did the face-to-face activities provide students with a chance to extend their knowledge on the topics?
Did the students see the relationship between the online assignments and face-to-face activities?

As displayed in Table 4, over 80% of the students either strongly agreed or agreed that the face-to-face sessions provided them with the chance to extend their knowledge about the topics covered and they were able to see the relationship between the content that they learned online and the in-class activities that supported and extended the content. As the research suggests, using class time to extend knowledge and ensuring that there is a strong relationship between online and classroom activities are essential elements for effective blended, flipped instruction (Aycock, Garnham, & Kaleta, 2002; Fulton, 2012). These survey results indicate that the instructor was able to incorporate these elements into the

course's design. Requiring students to come to class already knowing basic content enabled the instructor to incorporate higher-order thinking activities into the face-to-face sessions rather than concentrating on lectures. These activities were also more effective because students had already been exposed to the content upon which the activities were built. As mentioned previously, a large percentage of the students (76%) reported that these face-to-face activities were helpful in preparing them for the course exams.

Table 4. Student survey responses for knowledge extension

Survey Question	Strongly Agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)
The face-to-face sessions provided a chance for me to extend my knowledge about the topics.	42 (36%)	54 (47%)	13 (11%)	6 (5%)	1 (1%)
I could see the relationship between the online assignments and the face-to-face activities.	39 (33%)	57 (49%)	14 (12%)	5 (4%)	2 (2%)

LEARNING AND MANAGEMENT OF COURSE MATERIAL

Did blended, flipped approach contribute to student learning of the course material?
Did the approach help students manage their learning of the course material more effectively?
Were there any strong correlations between the student responses to contribution to learning and their responses to preparation, participation, engagement, knowledge extension, and management of learning?

As Table 5 shows, the majority of the students agreed that the blended, flipped approach contributed to their learning. More students (39%) strongly agreed that the face-to-face activities contributed to their learning in comparison to the online activities (25%), but when the strongly agreed and agreed responses were combined, these differences disappeared and about the same percentage of students reported that both the online and face-to-face portions of the course were important for their learning.

Table 5. Student survey responses for learning of course material

Survey Question	Strongly Agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)
The online activities contributed to my learning.	29 (25%)	62 (53%)	14 (12%)	9 (8%)	3 (3%)
The face-to-face activities contributed to my learning.	45 (39%)	47 (40%)	17 (15%)	7 (6%)	1 (1%)
Overall, the blended approach contributed to my learning.	29 (25%)	51 (44%)	23 (20%)	9 (8%)	5 (4%)
The blended approach helped me to manage the coursework more effectively, enabling me to keep up with the course reading and learning the course material.	27 (23%)	58 (50%)	16 (14%)	11 (9%)	5 (4%)

In addition to the survey results, test scores showed that the blended, flipped approach contributed to learning the course material. During the spring 2012 semester, the instructor used a traditional, face-to-face format to teach one section of the course. This section only met once a week and would not be conducive to a blended format. The other three sections of the course met twice a week and were taught using a blended, flipped approach. The demographics of the students in both the traditional and flipped sections were similar, providing the opportunity to compare the exam scores between the two different instructional methods. Looking at the first of the three exams, the traditional section had a higher average score than (*N*=17; *M*= 57.06) the flipped sections (*N*=69; *M*=55.96). For exam 2 the flipped sections had a higher average score (*M*=78.13) than the traditional section (*M*=71.65). This was also the case for exam 3 (*M*=54.88 for flipped; *M*=50.41 for traditional). These findings indicate that as the students became more experienced in using the blended approach, they were able to learn the material, and, on average, do as well or better than the traditional section on exams. Both the student responses on the survey and the exam results support other research studies that show the flipped approach to be an effective way for students to learn course material.

Almost three quarters (73%) of the students agreed that the blended delivery format helped them manage their learning of the course material better by requiring them to keep up-to-date with readings and assignments (see Table 5). Management of course material had the strongest correlation *(r*=.735) with contribution to learning, followed by preparation for class (*r*=.571). Other course objectives such as participation in class, engagement in material, and extension of knowledge were not as strongly correlated. These results indicate that the strongest outcome of the blended format was promoting preparation for classes and, in turn, helping students to more effectively manage the coursework and learn the material.

BARRIERS TO SUCCESSFUL LEARNING

What were some of the barriers to successful learning using the flipped method?

Table 6 (see next page) lists the barriers to learning encountered by the students when using the blended, flipped approach. The two barriers mentioned by the majority and largest percentage of students were managing their time effectively (52%) and self-discipline or taking responsibility for their own learning (52%). Adapting to a new style of learning (48%) and having less opportunity to interact with the teacher (47%) were also mentioned as barriers for many of the students. These results are consistent with other research findings on the types of obstacles that can block student success when using this new approach to learning (Allen & Seaman, 2006; Barnard, Paton, & Lan, 2008; Talbert, 2012). Even though students realized that one of the major ways that the blended approach contributed to their learning was through preparation and management of coursework, they found this to be a difficult skill to acquire and implement.

Some very interesting lessons were learned from the results of the eight semesters of action research. The instructor found that starting with a small pilot-test during the first semester and then using action research to expand and guide the evolution of the course were critical elements contributing to the overall success of the blended, flipped method (Kenney & Newcombe, 2013). Positive survey feedback and test scores indicate that course refinements are improving the effectiveness of the approach and that the flipped strategy is fulfilling the instructor's objectives. Barriers to learning provided valuable information on the types of support needed by students to be successful learners using this new type of instructional format. How the instructor interpreted these results and used them to improve her course is further discussed in the next session.

Table 6. Student survey responses for barriers to learning

Barrier	Number of Responses n (%)
Time management skills	57 (52%)
Self-discipline/responsibility for learning	57 (52%)
New style of learning	52 (48%)
Less opportunity to interact with the teacher	51 (47%)
Less opportunity to interact with other students	29 (27%)
Technology issues	28 (26%)
Understanding the material/unable to get immediate feedback	26 (24%)

DISCUSSION

LESSONS LEARNED

In general, the action research results supported the use of the blended, flipped learning approach. The instructor's objectives for using the approach - to increase preparation, participation, engagement, and learning - were met. These results support previous research on flipped learning (Hamden, McKnight, McKnight, & Arfstrom, 2013). When asked what they liked best about the approach, students particularly liked the ability to learn the material at their own pace and the convenience of the approach, which also supports the findings from other studies (Davies, Dean, & Ball, 2013).

However, there were barriers that the instructor encountered. The major barriers reported by students in the surveys were self-discipline, time management, and adapting to a new style of learning. It took students awhile to become comfortable with the approach, and to be responsible for their own learning. Even though the students indicated that, the approach contributed to their learning, in the latest survey only 38% preferred learning the course material online and 34% were neutral. Forty six percent (46%) preferred traditional approaches (38% were neutral). Students did not find the approach to be more difficult than traditional formats, but about half of the students indicated that blended formats required more work/time than traditional face-to-face formats. These findings reflect some of the same issues that were found in other research studies (Allen & Seaman, 2006; Barnard, Paton, & Lan, 2008; Strayer, 2012).

Below is a summary of some key lessons that the instructor learned from her experiences with flipping. Flipped methods of instruction can be effective if certain factors are taken into consideration:

- Do not assume that students know how to use technology for learning or that they are accustomed to taking an active approach to learning. Be prepared to provide support in the areas of time management and self-directed learning.
- Explain to students why you are using the flipped method and how it will benefit their learning. Some students may think that the instructor is just trying "to get out

of teaching" the content. They need to understand that actively learning the content online is better than passively listening to lectures in class.

- Ensure that students see the relationships between the content they have learned online and the activities provided during class. They need to see the importance of learning the content before coming to class so they can engage in the face-to-face sessions that will allow them to clarify, reinforce, extend, and apply the content, and learn it at a deeper level. When students are first exposed to information in a lecture, they often are not even aware of what they understand and what is confusing. By learning the information ahead of time, they are more likely to know what questions to ask the instructor during class.
- Use action research to measure what works and what does not and use the findings to refine the course design to promote active learning. Student perceptions of whether the blended, flipped format contributed to their learning improved over the eight semesters of implementation. During the most recent semester, 77% of the students either strongly agreed or agreed that the blended approach contributed to their learning compared to only 55% of the students during the first semester of implementation. This increase can be attributed to the course modifications made by the instructor based on the action research results. However, because a large percentage of students still indicated that, they prefer traditional approaches; more course modifications may need to be made. The instructor is currently focusing her research on examining the types of learning supports that will help students adapt to this new, more student-directed instructional approach that requires self-regulated learning skills.

CONCLUSION

The action research data collected over the eight semesters of implementation provided valuable feedback from students to make the course more effective. The data also further supports the accumulating research that shows the success of flipped classrooms in promoting student engagement, participation, and learning. In addition to student surveys, future research studies could include other ways to measure the impact of flipped learning. Observing and recording student behaviors in the classroom, such as the amount of participation in the face-to-face activities or the number of times student's access classroom materials and resources on the lesson webpage could be measured. Comparing student scores on exams and final course grades in traditional versus flipped instructional formats would be ways to measure the effects of blended learning on the acquisition and retention of course content.

A significant finding of this study was the importance for students to "buy in" to the approach to make it successful. Flipped instruction must be designed so students can easily see its benefits. Instructors should provide the support that students will need to change their traditional, teacher-directed view of learning to an active, student-directed perspective. Time management and self-responsibility for learning may not come easily for all students, and some students will need more scaffolding from the instructor. Developing online assignments that are engaging and allow for active learning, and face-to-face sessions that build on these online assignments are crucial for the success of a flipped approach. A side benefit of flipped classrooms is that it gives students the opportunity to experience effective uses of technology for learning. This is especially important for the preparation of pre-service teachers who will be required to use educational technology in their own future classrooms.

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