

## Teaching and Educational Methods

# Flipping Together: A Collaborative Approach to a Flipped Class

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### Abstract

The flipped classroom approach has been cited as a method for increasing student engagement, enhancing content comprehension, and integrating practical application of concepts. Opponents note its complex nature as a barrier to successful integration. To mitigate this limitation, a faculty member in agricultural economics worked with a faculty member in agricultural education to create and present an upper-level agricultural sales course with flipped and traditional instructional components. The purpose of this study was to assess the impact of delivery methods on student confidence. Impacts of the two approaches were assessed through a pre/post course survey of student perceptions of content topics and confidence in knowledge of individual course topics. Although grades were similar to previous semesters, students had varying degrees of change in confidence and knowledge for information presented through the flipped or traditional methods. The instructor benefited by a reinvigorated approach to a topic that had suffered from stagnation. The benefits to students' confidence and knowledge, and the reinvigorated energy the instructor gained outweighed the costs to the effort of creating the flipped components, and a collaborative approach is recommended for those content experts uncertain of their ability to flip a classroom.

## 1 Introduction

Emphasis on high quality teaching at the postsecondary level has increased over the last two decades (Fry, Ketteridge, and Marshall 2008; Muijs and Reynolds 2017). Researchers have cited high-quality teaching as a factor contributing to increased undergraduate retention levels, graduate school aspirations, and student self-efficacy (Loes and Pascarella 2015). The increased focus on teaching has led many instructors in higher education to look outside traditional lecture-based classroom formats to enhance their teaching methods (Bryson 2016). One of the approaches used commonly as a supplement to lecture-based instruction is a flipped classroom. Flipped classroom methods first gained recognition in secondary education (Bergmann and Sams 2012), and use of them increased in higher education over the course of the last decade (Conner et al. 2014; O'Flaherty and Phillips 2015). The flipped classroom approach can be defined as the design and implementation of blended instruction that moves content learning largely outside of class time and directs students toward active learning and application of knowledge during face-to-face meetings (Lage, Platt, and Treglia 2000; Bergmann and Sams 2012). Most commonly, instructors present asynchronous content via videos, readings, and explanations to students in a digital format available prior to application-based course sessions (Lage, Platt, and Treglia 2000).

Whereas some studies have found positive impacts of this method on student learning (Strayer 2007; Fulton 2012; Honeycutt and Garrett 2013; Mason, Shuman, and Cook 2013; Conner et al. 2014), others have found no impacts (Herreid and Schiller 2013; O'Flaherty and Phillips 2015). Critics of the method point to the amount of work required (Honeycutt and Garrett 2013) and the complexity of the method, and note that only trained experts should attempt it. Compounding the problem is the finding by Smith and Thapa (2017) that many content-area instructors, like agricultural economists or animal

scientists, have little background related to developing curriculum or delivering instruction using sound pedagogical principles. Researchers note the most likely reason for limitation of instructors is that while in graduate school future instructors put their attention to studying their field rather than becoming experts in pedagogy or curriculum development (Jensen, Kummer, and Godoy 2015). One potential solution is to match a content-area expert with a pedagogical expert to overcome the knowledge barrier. Pedagogical experts can be found in education-focused colleagues or in centrally supported resources for teaching excellence (e.g., standalone Centers for Teaching Excellence at many universities).

The purpose of this study was to test the impacts of flipping a classroom on student confidence on course topics, while removing the knowledge barrier of the content-area expert. Course design and topic content development in an introductory agricultural sales course (which had significant application focus in learning outcomes) were crafted for this study through collaboration between faculty members in agricultural economics and agricultural education. To meet the purpose, the study had the following objectives: (1) determine the changes in student confidence in course topics from the beginning to the end of the semester; and (2) compare changes in student perceptions for topics taught using traditional instructional approaches versus topics taught using flipped-classroom instructional approaches

## 2 Background

Using a flipped classroom approach to instruction alters the sequence of information presented and application from the traditional lecture format; lectures and interactive lessons are made available to students to allow them to learn core concepts before class, while classroom time is reserved for students and teachers to work through the application of learned concepts (Barkley 2015).

Previous research reveals large-scale benefits to the use of a flipped classroom for both students and instructors (Donovan and Lee 2015). There are noted student benefits to using a flipped classroom approach, including increased student engagement (Fulton 2012); increased confidence in content mastery and student self-perception of their efficacy to apply content topics (Honeycutt and Garrett 2013; Conner et al. 2014); improved student course satisfaction (Fulton 2012; Strayer 2012; Mason, Shuman, and Cook 2013); and improved student grades (Wilson 2013). The literature base related to high-quality teaching in postsecondary settings highlights the importance of student engagement for critical learning (Coates 2006; Barkley 2009). Having students engage with the material and peers before class time benefits student learning and primes students to be ready for applying concepts (Owen and Dunham 2015). In a flipped classroom, students are responsible for initiating the learning process, as they bring in content through their own efforts prior to class sessions (Honeycutt and Garrett 2013). Honeycutt and Garrett (2013) outline important concepts for successful integration of a flipped classroom model, including communication strategies, collaboration during pre-work, group clarification for out of class elements, and active student collaboration during class sessions. As a result, the Honeycutt and Garrett (2013) model of flipped classroom design used in this study yields significantly more opportunities for student engagement than traditional instruction (Fulton 2012). Another noted engagement benefit for students in flipped classroom courses is the opportunity to engage with the content at their own pace with flexibility to revisit content. The freedom of consuming instruction without the time limitations of a class session provides more processing time when completing higher-order cognitive tasks (Sousa 2011).

Educational researchers cite student connection, responsibility, and increased efficacy in completing tasks as benchmarks for learner-centered instruction (Owen and Dunham 2015). These concepts are embedded at the core of the flipped classroom approach (Honeycutt and Garrett 2013; Owen and Dunham 2015). Flipped classrooms are often taught at higher cognitive levels than traditional instruction (Gallagher 2014). Instruction delivered at higher cognitive levels can have marked impact on the efficacy gained by students in the learning process (Conner et al. 2014). Students in a flipped classroom are also more likely to participate in active learning strategies (Phillips and Trainor 2014). The design of a flipped classroom allows the opportunity for students to work collaboratively during class

sessions if the instructor chooses (Barkley 2015). If done, these student exchanges may yield increases in overall understanding, especially for complicated concepts (Barkley 2015). Because of the embedded components related to learner-centered instruction, proponents of a flipped classroom approach argue the model provides a simple method for shifting instruction from teacher-centered to learner-centered (Fulton 2012; Strayer 2012; Owen and Dunham 2015).

Several studies have been conducted in which students participating in the flipped model have knowledge gains significantly higher than students in traditional sections of the same course (Wilson 2013). Researchers at Capital University in Ohio used a flipped approach in two of four statistics courses. Although there were no differences in pretest scores between groups, there were significant differences in posttest scores. Students enrolled in the flipped class averaged 6.73 points higher on test grades and 9.99 points higher overall in the class than students enrolled in the sections with traditional instruction (Wilson 2013).

The impact of a flipped classroom model on instructors has also been investigated. Using a flipped approach has been found to give instructors more time during class sessions to address misconceptions about content, and more time to build rapport in their classes (Honeycutt and Garret 2013; Barkley 2015). In addition, instructors employing a flipped classroom model have also reported spending more time with individual students, which could help foster positive student-teacher relationships and increase overall student engagement and interest in the subject (Phillips and Trainor 2014). Many universities advocate using a flipped classroom as an economically viable option for delivering student-centered instruction with existing resources (O'Flaherty and Phillips 2015).

Not all views of a flipped classroom approach to learning are positive. Those who caution against the use of a flipped classroom share three main concerns with this type of instruction. First, there are many who believe that the shift of lecture to outside of class does little to further engage students in the learning process (O'Flaherty and Phillips 2015). Second, although instructors note additional time in class when using a flipped classroom model, preparing content for students to learn outside of class can increase the overall time instructors need to prepare for class each day (Kim et al. 2014). Finally, without proper student motivation, there is no guarantee students will expend the time and effort required to learn the content before each class session (Abeysekera and Dawson 2015).

In contrast to studies highlighting student knowledge gains, other studies have been conducted in which little or no differences were found in the knowledge gains between students in traditional and flipped sections (Herreid and Schiller 2013; O'Flaherty and Phillips 2015). Student perceptions of flipped classroom instruction have also been mixed. Some students have noted an appreciation for the structure that comes with organized pre-class materials typical of flipped classrooms (Sohrabi and Iraj 2016), while others have cited difficulty learning content when there is not an instructor present to clarify their understanding (Sohrabi and Iraj 2016; Yilmaz 2017).

Flipped classroom teaching approaches are complex (Honeycutt and Garrett 2013). Opposition to using flipped classroom approaches in higher education often cite a lack of instructor knowledge related to educational theory and pedagogical principles as a barrier to successfully flipping postsecondary courses (Jensen, Kummer, and Godoy 2015; Sohrabi and Iraj 2016; Yilmaz 2017). The initial setup of a flipped style class can be very time consuming as instructors must develop lectures and interactive materials related to core understanding for students to access before class (Owen and Dunham 2015). Quizzes, readings, and activities also require more thoughtful construction for many instructors compared to delivering a lecture (Bishop and Verleger 2013). The time commitment is so prominent that some experts estimate development of quality material for a flipped classroom can take years of instructor time to perfect (O'Flaherty and Phillips 2015). Instructors in higher education already struggle to maintain a healthy work/life balance, and the extra time needed to initiate a flipped class can create additional stress (Owen and Dunham 2015).

A common limiting factor to the development of a flipped class is having enough support for instructors (Owen and Dunham 2015). Institutions with larger numbers of support staff related to instructional design had shorter lead times to implement a flipped class than those with fewer support

members (O’Flaherty and Phillips 2015). Owen and Dunham (2015) found there can be differences in learning outcomes designed for students and the goals of a teacher for a given course. For example, a student learning outcome might be for students to be able to define a concept or focus on awareness or application of a concept while a goal of the instructor may be to improve electronic access of content. A lack of pedagogical background in higher education can amplify challenges in implementing a flipped classroom approach, as development of flipped classrooms typically requires a large amount of pedagogical knowledge (Owen and Dunham 2015). Kanuka (2006) stated the importance of incorporating strong concepts of instructional design into higher education courses. Enlisting the help of a pedagogical expert can help to merge both content with instructional design (Kanuka 2006).

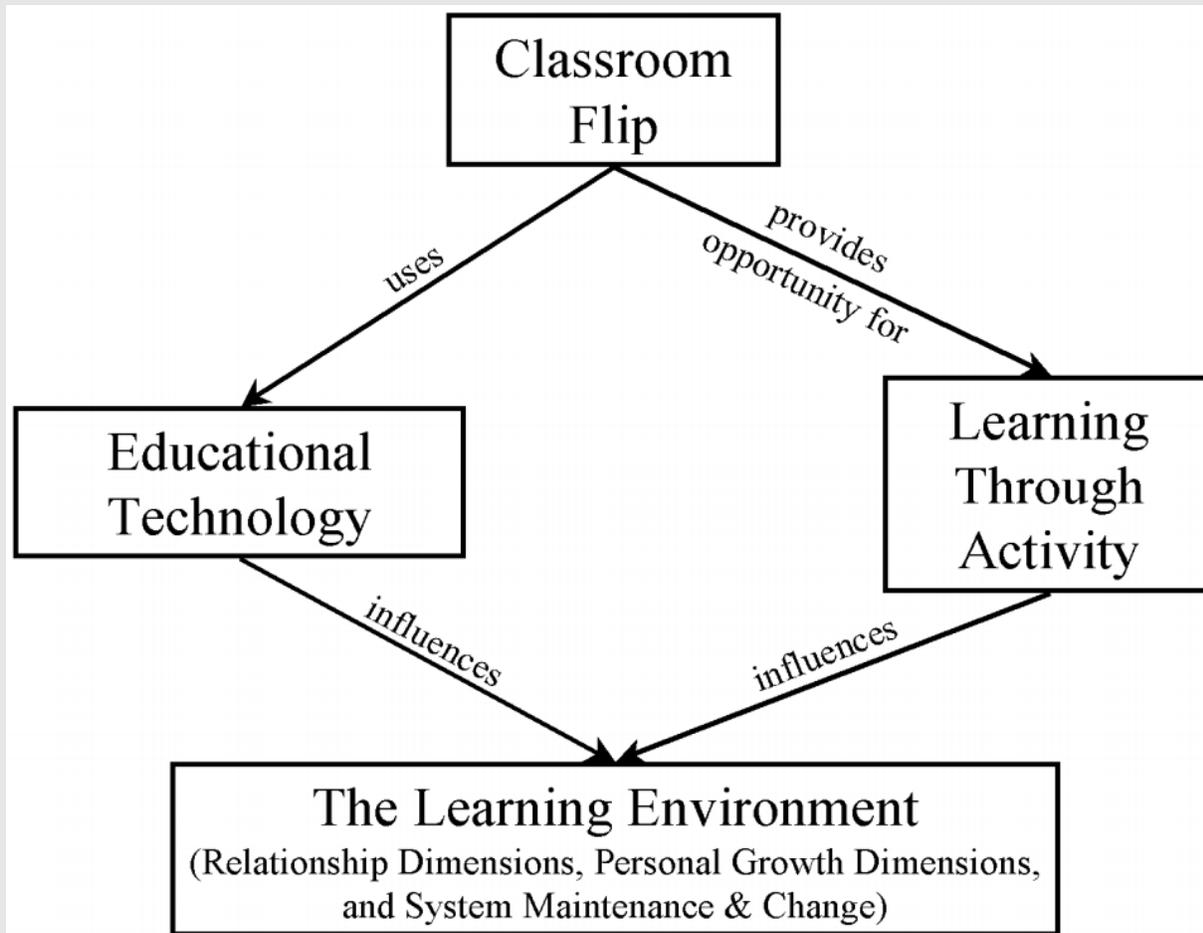
### 3 Methods

Successfully executing the flipped classroom approach to instruction method relies heavily on combining educational technology and active learning strategies to enhance student learning (Strayer 2007). Yet many content-area instructors have little background in pedagogy or curriculum development (Smith and Thapa 2017). To overcome this barrier, course design and topic content development for this study were conducted through collaboration between faculty members in agricultural economics and agricultural education. This pairing was designed to take advantage of content-area and pedagogical expertise in designing flipped components for a class. The paired faculty members followed Strayer’s (2007) model for flipped classroom instruction (shown in Figure 1). Strayer’s (2007) model includes the contributions of both educational technology and active learning to the overall learning environment. The study design allowed us to examine the increase in student confidence from individual topics when flipping some topics and presenting others in traditional instructional methods.

This study was conducted using descriptive survey methods. The population for this study included a census of students ( $N = 53$ ) enrolled in the Spring 2017 section of an introductory sales course at University of Idaho. The course is included as one option of four courses of which agribusiness students must select two. It also meets the requirement for an elective in many College of Agriculture and Life Sciences degree plans, as well as an elective in the College of Business and Economics’ marketing minor. Project setup included obtaining Institutional Review Board approval for this research.

The agricultural economics faculty member was the sole instructor of the course but worked with the faculty member in agricultural education to provide expertise in the pedagogical setup of course instruction. The faculty team determined which components would be taught using a flipped approach (content delivered outside of course sessions) and which would be taught using a traditional approach (content delivered during class sessions). Decisions on which topics to flip were made by selecting an even distribution of topics that students in previous semesters found easier or more difficult, to create a balance of easy and difficult topics presented in both flipped and traditional methods. Methods for assessing student completion of the outside of class components, formative assessments of learning, and course dates and deadlines were also determined and carefully designed to meet the learning outcomes of the course with attention to rigorous content and strong adherence to sound pedagogical principles (i.e., matching learning outcomes to assessment, course pacing, timely feedback). The result of course planning included the identification of eleven specific course topics, and a determination that six topics would be taught using a flipped approach and five would be taught with a traditional approach. Topics were taught intermixed throughout the timeline of the semester, to prevent topics in one approach from being more likely retained due to proximity to the post-survey at the end of the semester. Course topics and their method of instruction are shown in Table 1.

The survey instrument used in this study included four sections. Section one included items to gather demographic information including gender, major, and time left in degree program. The second section allowed respondents to share their background in sales and agricultural sales. Section three included questions about course decision and overall sales perceptions, and section four asked students to rate their level of confidence in their knowledge for each of the eleven topics covered in the course on



**Figure 1. Theoretical Framework for Flipped Classroom Design (Strayer 2007)**

a Likert-type scale from 1 (not confident at all) to 4 (completely confident). A four-point scale was deemed appropriate because the confidence of students was likely initially low and the use of narrower ordinal scales in confidence can prevent respondents from falsely inflating scores (Sullivan and Artino 2013). Although scores on tests and quizzes arguably offer a great measurement of learning, without a standardized test that mitigates all other factors (including the difference in the nature of any given two topics) that can be used consistently across semesters, assessment scores from one topic to the next may

**Table 1. Content Areas and Method of Instruction**

Topic Area	Chronological Order	Method
Sales Eras	1	Flipped
Marketing vs. Sales	2	Flipped
Prospecting	5	Flipped
Understanding Customers	4	Flipped
Probing	7	Flipped
Communicating Value	8	Flipped
Strategy & Planning	3	Traditional
Opening a Sales Call	6	Traditional
Closing the Sales Call	10	Traditional
Customer Satisfaction	11	Traditional
Dealing with Resistance	9	Traditional

or may not reflect mastery of content but other factors such as student aptitude. Lacking such a standardized test, student confidence in their knowledge was chosen as the measurable outcome.

Sections one through three of the instrument were piloted in the Spring 2016 semester. The instrument was evaluated for face validity by a panel of experts in both agricultural sales and agricultural education and deemed to be appropriate as a measure of student self-reported content area confidence. The instrument was administered online using Qualtrics survey software. Distribution practices were guided by the tailored design method, including five points of contact as prescribed by Dillman Smyth, and Christian. (2014). Contact points included: prenotice, survey initiation, and three follow-up reminder notifications. Students were notified about the option for participation during the initial class section and sent individual survey links to access the instrument. Two reminder emails were sent to nonresponders. Participants who completed the survey were incentivized with five extra credit points toward their total points earned in the class, which equates to approximately 0.5 percent of the overall grade in the course. Participants completed the instrument twice; as a pretest in the first week of the course and as a posttest in the final week of the course. Of the 53 students in the course, 50 completed both the pre- and post-surveys, yielding a 94 percent response rate.

Results were compiled from the Qualtrics software and analyzed using IBM SPSS v 23 to determine descriptive and comparative data. Student changes in confidence were calculated from the beginning to the end of the semester for each of the eleven course topics, and a matched pairs *t*-test was conducted to determine if changes were observed between topics taught using a flipped approach and those taught using a traditional approach.

An additional component of this study included the analysis of comments from the University of Idaho mandated student evaluations of instruction for the course used in the study. Comments were provided by students anonymously the last three weeks of the course and were analyzed to determine the frequency and percentage of topics.

## 4 Results

The first objective of this study was to determine the changes in student perceptions of course topics from the beginning to the end of the semester. To accomplish this objective, we calculated the descriptive information from pretest and posttest surveys for each of the eleven course topics. Results of this analysis are shown in Table 2. The topic with the largest change in student confidence was Probing ( $M = 1.44$ ,  $SD = 1.14$ ), while the topic with the least change in student confidence was Understanding Customers ( $M = 0.48$ ,  $SD = 0.95$ ). Overall, students reported increases in confidence for all topic areas, with a mean increase of  $M = 0.99$  ( $SD = 0.76$ ) across all topical areas. Of the eleven topics under consideration, six showed less than one-point movement between pre- and post-surveys. The six topics include: Understanding Customers, Customer Satisfaction, Communicating Value, Closing the Sales Call, Marketing vs. Sales, and Dealing with Resistance.

The next objective of this study was to compare changes in student perceptions of course topics taught using traditional and flipped-classroom instructional approaches. The descriptive information for change in confidence based on type of instructional approach is shown in Table 3. Based on the descriptive information, change scores appeared similar between topics taught in a flipped content approach and those taught using a traditional approach. To further examine potential differences between student confidence scores based on the method of instruction, a matched pairs *t*-test was conducted. Results of that analysis revealed no differences in student confidence for course topics based on instructional approach ( $t = 4.23$ ,  $p = .08$ ). Further, differences were tested using a two-step cluster analysis. Results of the cluster analysis yielded one homogenous group, indicating no pattern of change in confidence differences across the students.

**Table 2. Descriptive Statistics for Student Confidence in Topic Areas**

Topic Area	Method	Pre-Survey		Post-Survey		Change	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Sales Eras	Flipped	1.52	0.61	2.80	0.76	1.28	0.99
Marketing vs. Sales	Flipped	2.28	0.73	3.24	0.59	0.96	0.88
Prospecting	Flipped	1.94	0.79	3.10	0.71	1.16	0.96
Understanding Customers	Flipped	2.74	0.75	3.22	0.79	0.48	0.95
Probing	Flipped	1.68	0.79	3.18	0.64	1.44	1.14
Communicating Value	Flipped	2.48	0.89	3.30	0.61	0.82	1.04
Strategy & Planning	Traditional	2.06	0.62	3.16	0.65	1.10	0.79
Opening a Sales Call	Traditional	2.08	0.88	3.30	0.73	1.22	1.11
Closing the Sales Call	Traditional	2.16	0.73	3.08	0.60	0.92	0.94
Customer Satisfaction	Traditional	2.82	0.69	3.40	0.57	0.58	0.86
Dealing with Resistance	Traditional	2.08	0.70	3.06	0.71	0.98	1.02
Overall		2.16	0.83	3.16	0.68	0.99	0.96

Note: Confidence scores were collected on an ordinal scale as follows; 1 = not confident at all, 2 = somewhat confident, 3 = fairly confident, 4 = completely confident. *M* = mean, and *SD* = standard deviation.

**Table 3. Means for Change in Confidence Based on Instructional Method**

Topic Area	<i>M</i>	<i>SD</i>
Flipped Content Areas	1.02	1.04
Traditional Content Areas	0.96	0.97

Note: *M* = mean, and *SD* = standard deviation.

## 5 Discussion

This study focused on the changes in student perception and confidence in a partially flipped agricultural sales class. Despite student confidence for course topics increased across the board with a mean increase of nearly one point on a four-point Likert scale, there was no statistically significant change between the confidence increases based on either a traditional or flipped instructional approach. This finding was consistent with other studies on this topic (Herreid and Schiller 2013; Jensen, Kummer, and Godoy 2015; O’Flaherty and Phillips 2015). Although not statically significant, every topic area had an increased confidence score, and some, like Opening a Sales Call, showed practical significance in the increased score. Therefore, we believe the positive results from student confidence scores indicate including flipped components in a class does not negatively impact the student learning.

Besides, some experts argue that flipping any component in a class can have positive influences on all other instruction (Honeycutt and Garrett 2013). The exposure to flipped classroom material arguably can produce a positive externality on the overall student learning experience in a course. Perhaps flipping a portion of the course for this group of students was enough to carry increases in confidence throughout nonflipped subjects. This possible explanation adds to the argument for teaching portions of courses in the flipped modality while noting the limited risk to making the change.

As for individual topic areas, there are six topics that had less than one-point change from pre- to post-course evaluation (less than 25 percent given a four-point Likert scale). With the exception of Marketing vs. Sales, these topics are complex and have a degree of subjectivity in determining the application. For example, students are required to make contextual judgments as to which closing method is best for a given scenario. This judgment is based on perception and feel, leaving many students

wanting more concrete decision tree style application. This contextual judgment requirement is certainly different than the more formulaic activity in other topics like Strategic Planning (which has a clearly defined process) and Prospecting (which has a strict process that includes a formula for assessing the potential of prospects).

Beyond the statistics, positive impacts for flipping the class were found. First and foremost, students commented on evaluations that they appreciated the interactive class sections and felt as though they were more engaged than they were in a traditional lecture. For the instructor, the opportunity to engage in pedagogical discussions where theory and practice were discussed in depth provided great insight and furthered the instructor's understanding of instructional design and delivery. In addition, the changing of activities in the class helped to refresh some of the content. This resulted in a refreshed engagement and enthusiasm for the course by the instructor. Ultimately, the instructor had greater job satisfaction and arguably more frequent and better quality engagement with students one on one.

Because the flipped mode of teaching content was shown to be at least as impactful as traditional lecture mode, the potential compounded impact on the overall student experience, and the benefit to the instructor from engaging the material differently, we recommend a continued use of the flipped classroom approach in courses for instructors in higher education settings. By combining a subject-matter expert (agricultural economics faculty member) with a faculty member who has the training to properly design flipped content (agricultural education faculty member), students were delivered a course which embodied the expertise of both faculty members. In addition, given that this study shows the combined effort does no harm, properly flipping a course may be a way for instructors to refresh their approach for teaching a subject for which their previous approach may have become stale or around which they have mental fatigue. This new perspective might reinvigorate their excitement for engaging students.

Through our work, we noted additional areas that could warrant future research efforts. We followed the recommendation of Honeycutt and Garrett (2013), who suggested looking for opportunities to flipping components of classes as an alternative to flipping all content in a course. Based on the results of this study, we recommend further research into the use of "partially-flipped" courses to help examine the impact that flipping some portions of a class could have on the overall learning in the course. For example, are there characteristics of topics or concepts that make the flipped instruction method more or less effective? Further research should also be conducted to determine if the flipped content had impact on the adjacent nonflipped content area. More research should also be conducted to establish whether some topics more easily integrate into a flipped approach than others, or if there are differences between courses that are partially flipped and those taught exclusively with traditional or flipped instructional approaches. Of course, the expansion of this research over a longer period of time and across institutions and instructors would add to the validity and generalizability of the findings.

Finally, confidence in the concepts presented in the course is only one area of concern; additional aspects of student benefits should be considered. Student engagement might be a factor of conformance (e.g., "I will learn it to gain the desired grade even if it kills me") or a factor of genuine interest (e.g., "I really am curious about this content and want to know more"). Factors like interest in the content lead to further pursuits in that field, maybe to the point of influencing students' careers. Future research could allow an examination of all student benefits stemming from flipped or partially flipped courses. The specialized content in this study without a standardized assessment is noted as a limitation to this study. While outside the scope of this study, we recommend implementing this process within a course where preexisting pre- and posttest data is well established to examine the effectiveness of a flipped classroom on knowledge factors.

Student performance, in addition to confidence, should also be considered. In this study, student overall course scores for the semester where the flipped curriculum was delivered were approximately 35 percent higher than in previous semesters, even though the point values and assignments for the course stayed the same. Additional research could help to determine the cause of the grade increase. It is

possible that the attention given in the setup of this class resulted in an improvement to the overall quality of instruction for all components over previous semesters. This improvement in instructional quality could have masked any differences between instructional approaches, as focusing on improving curriculum to meet the demands of research can often improve the overall quality of all instruction related to the study (Creswell 2017). We also recommend studying the effects of flipped curriculum embedded in a sequential degree plan, within multiple classes, as a way to examine the effectiveness of a flipped classroom when systematically implemented.

Research should be conducted to realize if purposeful planning is important to students and can help them to increase their engagement. The study did highlight the importance of integrating active learning with the flipped style class in order to increase both knowledge and confidence in a topic. The pairing of faculty members with content knowledge and pedagogical expertise was a success in this situation. Both faculty members noted ease in designing the class and the improvement in overall student engagement in the course from previous semesters. In practice, we recommend future collaborative efforts between instructors in higher education who are content-area specialists and those who have a background in instructional design and planning to overcome many of the challenges associated with designing a flipped course, or any course for that matter. By flipping the course together, students experienced the expertise of two faculty members, engaged more with the content topics, and had more opportunity to apply their newfound knowledge to real-world situations.

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