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Keywords

flipped classroom, hands on learning, college students

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Building Collaboration in the Flipped Classroom: A Case Study

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The flipped classroom pedagogy offers opportunities for students by having the majority of class time spent on discussions and group work that enable students to take risks and make mistakes while gaining experience in collaboration and expertise in content. This research study explores students' perceptions of whether student collaboration in a flipped classroom affects learning outcomes, such as critical thinking, time management, and productivity. The mix methods research study involved an interior design history course and a food nutrition course that were adapted in the fall of 2016 to be flipped classroom pilots. Both courses divided the semester into two instructions – flipped classroom and the prevailing traditional lecture format. An online 22 question survey was completed at the beginning and end of the semester that provided quantitative and qualitative data on student perceptions.

INTRODUCTION

Within a rapidly changing digital workplace, today's higher education institutions are tasked with engaging students to be active participants in their learning by promoting higher order thinking, such as creativity and multi-tasking adaptability. Despite the expansion of technology into the everyday life experiences of students, the traditional lecture-driven classroom prevails as the prominent form of learning on higher education campuses today (Butt, 2014). Although the traditional classroom lecture format has allowed instructors to actively teach content and disseminate large amounts of information to students over a limited amount of time, the lecture-driven classroom has also adversely influenced in a negative learning manner by limiting the dialogue between instructor and student. Students passively learn to think within the box and to replicate the thinking of instructors to complete assignments. Student learning furthermore may be uncertain due to learning style and inability to practice the skills students have learned from lectures (Druckman & Bjork, 1994; Bass, 2012; Wallace, Walker, Braseby, & Sweet, 2014).

The flipped classroom pedagogy offers learning opportunities for students by inverting the traditional classroom lecture content delivery. Instructors continue to require homework; however, under the flipped pedagogy, as part of their homework, students are required to read or view pre-record lectures posted online by the instructor so that class time is for student and group-centered activities (Strayer, 2012). Instructors may now repurpose their classroom time towards class discussions and group work that, in turn, encourage students to take risks and make mistakes while gaining experience in collaboration and expertise in content. The collaborative learning fosters critical thinking and self-directed learning, while also leading students to apply and practice technical skill sets learned in their course of study. The active refinement of higher-order thinking such as problem-solving and creativity better prepares students for entering their profession upon graduation.

PURPOSE

The purpose of this study was to explore how students perceive student collaboration in a flipped classroom compared to a traditional classroom at a university's interior design history course and food and nutrition course. In particular, the influence that collaboration may have on enhancing higher order critical think-

ing and creativity. The study explored two particular research questions:

1. Does student collaboration in a flipped classroom affect motivation and learning outcomes, such as critical thinking, time management, and productivity?
2. Does student collaboration promote more meaningful and richer learning in a flipped classroom versus a traditional class?

This study is significant for the following three reasons. First, with flipped classroom learning being an alternate learning method, the study allowed two faculty members to examine firsthand the effectiveness of the flipped course paradigm. Each faculty member taught their respective course the traditional way the first half of the semester, while flipped learning was used the second half of the semester. Secondly, the study guided these two faculty members in their decision on whether the two courses should be adapted in their entirety to be flipped courses. Lastly, the study served as a catalyst for other faculty members in the college to consider the implementation of the flipped classroom pedagogy to foster greater student engagement in the classroom.

REVIEW OF LITERATURE

Flipped Classroom

Research indicates that the flipped classroom model at its core allows instructors to simultaneously teach course content and practice the application of the content (Demski, 2013). The exposure of course context outside of the class provides students with opportunities to experience group discussions and activities in class. This experience, in turn, fosters a connection between application and content, such as lectures, textbook readings, and homework. Class time becomes a platform through which instructors can review student work, engage in student group discussions, and answer students' questions or concerns. This greater interaction between instructor and students along with students' interactions amongst teammates fosters critical thinking skills, communication skills and practical experience (Al-Zahrani, 2015).

Furthermore, through group discussions, students listen to the different viewpoints of teammates and learn through experiences how teammates communicate and process ideas. In the meantime, students are enhancing their processes of organizing,

reviewing, analyzing and evaluating information. Consequently, the nurturing of critical thinking skills through active collaborative learning occurs (Reddan, McNally, & Chipperfield, 2016). Through this open teaching method, students perceive greater control over their learning, students engage in meaningful discussions with their instructors and peers, in-class instructor support, experiential class activities, and following course contents without class constraints (Enfield, 2013; Davies, Dean, & Ball, 2013; Butt, 2014; Sengel, 2016).

The flipped classroom model capitalizes on the visualization capabilities and forms of technology available to students to promote the exchange of ideas and critical thinking in a collaborative setting (Strayer, 2012; Dean & Ball, 2013; Martin & Schwartz, 2014; Al-Zahrani, 2015). In the flipped classroom environment, creative uses of technology is utilized during class time to reach out to all students to create a participatory environment for collaboration, socialization, and class community regardless of content or context (Jenkins, Purushotma, Weigel, Clinton, & Robinson, 2009; Mazur, Brown, & Jacobsen, 2015). Consequently, flipped learning supports social and collaborative opportunities while nurturing competencies needed for today's workplace (Brunsell & Horejsi, 2013; Hamdan, McKnight, McKnight, & Arfstrom, 2013).

Although research has shown that the flipped classroom pedagogy nurtures and enhances student cognitive skills, literature also suggests that it does not significantly enhance student performances or achievements in the classroom (Enfield, 2013; Davies et al., 2013; Chao, Chen, & Chuang, 2015). According to research conducted by Enfield (2013), Davies et al. (2013) and Butt (2014) students do not read or view the instructor's required assignments outside of class; students expect the instructor to explain tasks during class. Additionally, when comparing traditional classrooms to flipped classrooms, research suggests that students view flipped classrooms negatively because students there will be completing greater amounts of work and preparation in flipped classrooms (Enfield, 2013; Davies et al., 2013; Butt, 2014; Findlay-Thompson & Mombourquette, 2014; Sengel, 2016).

Peer Assisted Collaborative Learning

Employers increasingly require students to have the abilities to work in a collaborative environment, create, and apply ideas that respond to an ever-changing marketplace (Davies, 2009). Literature suggests that along with learning content, peer collaboration within a team is an important part of student learning (Bruner, 1986; Parappilly, Schmidt, & De Ritter, 2015). To parallel workplace sentiment, researcher Bruner (1986) suggested that most learning occurs around socially based interactive activities revolving around a shared common goal. Like in the workplace, the grouping of teams is at the discretion of the instructor. With that, instructors maximize the knowledge base of teams by grouping students according to their various abilities, knowledge, and skill sets (Parappilly et al., 2015).

Each peer on the team brings forth new perspectives and experiences such as problem solving and application of concepts. A team member's prior experience becomes a tool for facilitating peer collaboration (Crouch & Mazur, 2001; Davies, 2009). This diversity amongst peers coupled with immediate feedback elevates peer-to-peer learning by enabling students to grasp course content easier and improving critical thinking skills (Crouch & Mazur, 2001). When peers are in groups, each of these collabor-

ative teams takes on individual social frameworks. Group members agree on team goals and tasks that each member will be responsible for to forge team success. With peer accountability critical to the team's success, students must be fully motivated and vested in the team's success (Ismail & Soliman, 2010; Abeysekera & Dawson, 2014). The sum of each team member's successful contribution leads to the success of the team. As the group succeeds, members will be encouraged and motivated to take ownership in the team's success.

In environments where peers are familiar with other student's abilities, forming working relationships amongst peers brings challenges to teams. According to the literature, a key disadvantage of peer collaboration is students' perceptions of unfair assessment of team projects (Davies, 2009). This negative effect, which researchers Chapman, Meuter, Toy, and Wright (2006) refer to as "the free-rider problem," stems from team members receiving the same grade regardless of work completion, ability to communicate, and work ethics. Examples include teammates not completing tasks effectively or in a timely, unprepared to work, poor time management skills, and inability to communicate or voice concerns (Chapman et al., 2006). Although the free-rider problem is an important issue affecting collaborative peer learning, this issue can also be promptly dealt with frequent evaluations within the team by peer members and outside of the team by the instructor.

METHODOLOGY

Methods and Instrument

In this study, both qualitative and quantitative research methods were part of the study's design. The study sequentially synthesized the data to explore how students perceive student collaboration in a flipped classroom when compared to a traditional classroom in a university's interior design history course and food and nutrition course. The study considered two specific research questions. First, does student collaboration in a flipped classroom affect motivation and learning outcomes, such as critical thinking, time management, and productivity? Second, does student collaboration promote more meaningful and richer learning in a flipped classroom versus a traditional class? The study's instrument was a 22 questions online survey created by the researcher. The questions included integrated quantitative closed-ended questions with open-ended qualitative questions. The quantitative phase dealt with 19 closed-ended questions that uncovered general demographic information and ranked students' perceptions measured with a 5-point Likert-type scale ranging from (1) *strongly agree* to (5) *strongly disagree*. By administering the same survey at the beginning and end of the academic semester, the study was able to explore and gain a richer understanding of students' attitudes and perceptions toward flipped classroom learning and collaboration.

In the meantime, the qualitative phase consisted of questions 20 through 22, which provided information on the participants' best and worst experiences of learning in a flipped classroom environment, while also allowing additional comments on flipped classroom experiences. The researcher transcribed the data, noted, and coded by hand similar phrases and content. The researcher then performed a cross-case comparative analysis of the data collected, following the procedure recommended by Patton (2002) for qualitative analysis. Next, the data were broken into topics, and similar statements coded, leading to the identi-

fication of themes. The researcher found regularities within the data that validated the accuracy of the themes and represented the most prominent components of themes, which affected participants' experiences.

Research Content and Participants

The participants were undergraduate and graduate students at a large public university in the southeastern section of the United States. The 26 participants were all females, and either enrolled in an interior design history course or a food and nutrition course. Of the 26 students, 15 students were from the senior level food and nutrition course, while 11 students were from the junior level interior design history course.

Limitations

Although efforts were made to make the study as comprehensible as possible, limitations were unavoidable. First, the study was limited to one semester. A greater length of time would have provided for more robust data gathering by exploring flipped learning for an additional semester or a longer period of time. Second, the study's focus on two courses provided a small participant sample number, which means that the research cannot be generalized to the larger student population.

Procedures

At the university where the study occurred, the flipped classroom model is relatively new instruction pedagogy. This inequality and the opportunity to bring an alternate learning experience to the design history class this researcher teaches, where memorization is the traditional model for learning, is what propelled the researcher to conduct this study. Just before the 2016 fall semester, the researcher became aware of two other faculty members who were contemplating the adaptation of one of their respective courses to the flipped learning model for the fall semester. Consequently, after the researcher explained the study to the two faculty members, both agreed to open their courses to the research study, namely a food and nutrition course and a textile course. However, because the researcher was unable to recruit research participants from the textile course, the study ultimately examined two courses—the food nutrition course and the interior design history course. Once students volunteered to be a part of the study and signed a consent form, students completed the same online survey at the beginning and end of the academic semester. The researcher shared links to the online pre- and post-surveys with students via email and consent form. Using SPSS 22 descriptive statistics and Wilcoxon signed rank tests; the researcher was able to analyze survey responses, while the qualitative data were reviewed for common themes.

Course Projects

Food and nutrition course

Traditional classroom phase. The traditional learning environment phase was lecture, student presentations, and deadline driven. Individual student projects revolved around solving a daily issue affecting the members of the family.

Flipped classroom phase. The instructor for this class allowed students to select their teammates. This phase focused on student group discussions aimed at designing a mobile food cart to be used by local K-12 schools to educate students on nutrition. Students participated in in-class group assignments

that were research and discussion based to solve issues affecting family nutrition and the design of the food cart. Student groups would then proceed to present their solutions to the class. Additionally, students read lectures and readings before class in preparation for the in-class group discussions and assignments.

Interior design history course

Traditional classroom phase. Students during this phase learned using the traditional activities of lectures and PowerPoint presentations. In addition, students were required to complete homework and reading assignments before class. Students completed three in-class tests to measure their knowledge of the coursework.

Flipped classroom phase. Although the instructor assigned individuals randomly to teams, students were very familiar with their peers' knowledge and skills because the program is small and students are quite friendly with one another. Pre-class activities, including reading instructor-provided PowerPoints, watching YouTube videos, and reading textbook chapters, exposed students to key concepts before classes and fostered student preparedness for class activities. In-class activities concentrated on discussions, group problem-solving exercises, informal class presentations, and instructor feedback. These in-class activities were created as platforms for pre-class activities applications to enhance an understanding of how historical architectural stylistic concepts and their applications to modern-day built environments. Every in-class assignment consisted of designing a furniture piece, textile pattern, or area of a contemporary interior environment according to historical stylistic characteristics. The design charette model allowed brainstorming sessions that encouraged high order thinking skills such as creativity and communication abilities. Furthermore, the classes were held outside whenever the weather permitted. Additionally, dividing the students into small groups afforded students greater interaction opportunities to exchange ideas, receive peer feedback, and engage in team problem solving. Therefore, the content of class projects, instructor's questions, and take home test assessed comprehension of concepts to ensure that students fully grasped course material.

FINDINGS AND ANALYSIS

Quantitative Analysis

Research question 1 (RQ1). Does student collaboration in a flipped classroom affect motivation and learning outcomes, such as critical thinking, time management, and productivity?

HO1 (null hypothesis): There is no significant difference between student collaboration in a flipped classroom and a traditional classroom regarding the effect on motivation and learning outcomes, such as critical thinking, time management, and productivity.

HA1 (alternate hypothesis): There are significant differences between student collaboration in a flipped classroom and a traditional classroom regarding the effects on motivation and learning outcomes, such as critical thinking, time management, and productivity.

With survey questions one and two pertaining to demographic information, survey questions three through eight sought to answer research question one (RQ1). The researcher per-

formed a reliability test to determine whether survey questions three through eight measured the same construct. The researcher found a Cronbach's alpha of 0.935 for the pre-study and 0.854 for the post-study survey responses, indicating that the construct is reliable in both surveys. Descriptive statistical analyses were done to find the mean scores for the responses to both surveys. From these six items, the mean for the post-study survey was lower than the mean of the pre-study survey, indicating that participant understanding in the flipped classroom environment increased for the combined participants. Additionally, participants had a more positive learning experience in the flipped classroom environment than they expected before (see Table 1).

the semester (Table 2). The test revealed that pre-study students were ambivalent about both flipped and traditional classrooms except for the variety of course material. Findings showed that at the beginning of the semester there are statistically significant differences in terms of the perception variety in course material.

However, when the students' perceptions were reviewed after they had experienced both flipped and traditional learning, the findings suggested that by the end of the semester there was a significant preference apparent in terms of wanting to be in a flipped classroom because of course material variety, greater understanding of material through collaboration, and more produc-

Table 1. RQ 1 Mean Responses to Survey Questions Conducted Pre and Post Study

Survey Questions	Pre-Study Mean	Pre-Study SD	Pos-Study Mean	Post-Study SD
3. I have more variety in course material in a flipped classroom than in a classroom because of the hands-on classroom activities.	2.3462	1.05612	2.0000	.40000
4. I have more understanding of course content while working on collaborative team projects in a flipped classroom than in a traditional classroom.	2.8462	1.08415	2.4615	1.02882
5. I have more motivation to complete the workload in a flipped classroom than in a traditional classroom.	3.0385	1.34107	2.7692	1.06987
6. I have more productive classroom time in a flipped classroom than in a traditional classroom.	2.9231	1.23038	2.3846	1.02282
7. I am more positive about managing my workload in a flipped classroom than in a traditional classroom.	3.1154	1.24344	2.7308	1.11562
8. I am more looking forward to being in a flipped classroom than in a traditional classroom.	3.1538	1.25514	2.5000	1.02956

The researcher also conducted an overall "team preference" rating to explore further student perceptions on flipped classrooms. All of the means for the pre-study project were tallied for an overall "team preference", while the same was completed with the post-study project means. The pre-project overall team preference was a mean of 17.42, which was higher than the post-project overall team mean of 14.38. This finding suggests that after experiencing both flipped and traditional classrooms, students were more positive about their learning experience in a flipped classroom than in a traditional classroom; thus, reinforcing the findings shown in Table 1

Wilcoxon signed rank tests were conducted to explore whether there was a clear participant preference for the flipped classroom both before and after the flipped classroom portion of

the semester. At the end of the semester the p values for questions 3, 4, 6 and 8 were less than .05; thus, the null hypothesis for those cases is rejected. In summary, after experiencing the course in flipped and traditional classroom formats, participants had grown to prefer flipped classroom to traditional classroom. Student motivation and workload management (questions 5 and 7) were unaffected by flipped classroom learning.

Research question 2 (RQ2). Does student collaboration promote more meaningful and richer learning in a flipped classroom versus a traditional class?

Table 2. RQ 1 Wilcoxon Signed Rank Test for Pre and Post Studies

Survey Questions	Pre-Study Z score	Pre-Study P value	Post-Study Z score	Post-Study P value
3. I have more variety in course material in a flipped classroom than in a classroom because of the hands-on traditional classroom activities.	-2.739	.006	-4.735	.000
4. I have more understanding of course content while working on collaborative team projects in a flipped classroom than in a traditional classroom.	-.696	.486	-2.379	.017
5. I have more motivation to complete the workload in a flipped classroom than in a traditional classroom.	.252	.801	-1.089	.276
6. I have more productive classroom time in a flipped classroom than in a traditional classroom.	-.195	.845	-2.583	.010
7. I am more positive about managing workload in a flipped classroom than in a traditional classroom.	.473	.636	-1.183	.237
8. I am more looking forward to being in a flipped classroom than in a traditional classroom	.750	.453	-2.210	.027

HO2 (null hypothesis): There is no significant difference between student collaboration promoting meaningful and richer learning in a flipped classroom versus a traditional class.

HA2 (alternate hypothesis): There are significant differences between student collaboration promoting meaningful and richer learning in a flipped classroom versus a traditional class.

Survey questions nine through 19 were used to answer research question two (RQ2). To determine whether survey questions nine through 19 measured the same construct a reliability test was performed. The researcher found a Cronbach's alpha of 0.904 for the pre-study and .727 for the post-study survey responses, which indicated that the construct is reliable in both surveys. Descriptive statistical analyses were used to find the mean scores for the responses to both surveys.

From these 11 items, the mean for pre-study questions 11, 12, 13, 15 and 16 were lower than the post-study responses, which indicated that participants at the beginning of the semester felt more positive about speaking to peers, being on creative projects, understanding class content, communication skills, and being more marketable because of the collaboration experience. Yet, the data also indicated that participants by the end of the semester gained a more positive view of flipped classrooms in terms of time management, for instance being easier for catching up on work, providing more control of student success, better preparation, more willing to work in teams, and improved time management (See Table 3)

means for the pre-study project were tallied for an overall "team preference", while the same was completed with the post-study project means. The pre-study overall mean of 28.84 was slightly lower than the post-study overall mean of 29.11. This finding suggests that after experience both flipped and traditional classrooms, students were slightly more open and positive toward flipped classroom learning at the beginning of the semester (Table 3). The slight difference in overall mean can also be interpreted as students being very positive and negative on some issues, as suggested in Table 3.

The Wilcoxon signed rank test identified five areas that at the beginning of the semester students perceived were significant differences in the depth and richness of flipped and traditional classroom learning (Table 4). Findings of p values that are less than .05 for questions 12, 13, 15, 16 and 17 suggest a significant preference for the flipped classroom in terms of remembering course material, open conversation, improved communication, analytical skills, and working on creative projects. Therefore, the null hypothesis is rejected.

In the meantime, post-study findings for questions 9, 10, 16, 17 and 19 reject the null hypothesis because of the significant differences that occur between student collaboration with catching up with work, improved verbal and analytical skills, greater control of work, and better time management. In those cases, the null hypothesis is rejected. It is interesting to note that responses to questions 16 and 17 are the only responses that have consistently shown students to have significant differences in improved communication and analytical skills.

Table 3. RQ 2 Mean Responses to Survey Questions Conducted Pre and Post Study

Survey Questions	Pre-Study	Pre-Study	Post-Study	Post-Study
9. I have an easier time catching up with my coursework if I miss a flipped class.	3.2692	1.21845	2.5000	1.02956
10. I am more likely to have to have more control over how successful I am in a flipped classroom than in a traditional classroom.	3.3462	1.16421	2.5385	1.02882
11. I am more likely to be more marketable as a student graduate because of the collaboration experience I gained in a flipped classroom than in a traditional classroom.	2.6154	1.20256	3.1923	.98058
12. I am more likely to remember course content while collaborating with my peers in a flipped classroom than in a traditional classroom.	2.5385	.94787	3.0769	1.12865
13. I am more likely to work on very creative collaborative projects in a flipped classroom than in a traditional classroom.	2.3846	1.02282	2.6923	1.08699
14. I am more likely to be prepared for a collaborative team project in a flipped classroom than in a traditional classroom.	2.8846	1.03255	2.7308	1.00231
15. I am more likely to speak more freely to my peers while working on collaborative team projects in a flipped classroom than in a traditional classroom.	2.4615	.94787	2.9615	1.03849
16. I am more likely to improve my verbal communication skills in a flipped classroom than in a traditional class.	2.0000	.69282	2.1154	.65280
17. I am more likely to develop more analytical skills on collaborative team projects in a flipped classroom than in a traditional classroom.	2.3462	.84580	2.3462	.74524
18. I am more likely to have more of a positive attitude about working on collaborative team projects in a flipped classroom than in a traditional classroom.	3.1154	1.03255	2.7692	1.06987
19. I am more likely to have improved my time management skills in a flipped classroom than in a traditional classroom.	3.1154	1.03255	2.1923	.63367

The researcher also conducted an overall "team preference" rating to explore further whether flipped classroom collaboration promotes more meaningful and richer learning than in a traditional classroom by the end of the semester. All of the

QUALITATIVE ANALYSIS

Whereas the quantitative analysis indicated an overall participant perception of the flipped classroom, survey questions 20 through 22 provided a clearer, qualitative understanding of the experi-

Table 4. RQ 2 Wilcoxon Signed Rank Test Pre and Post Studies

Survey Questions	Pre-Study Z score	Pre-Study P value	Post-Study Z score	Post-Study P value
9. I have an easier time catching up with my coursework if I miss a flipped class.	1.111	.266	-2.210	.027
10. I am more likely to have more control over how successful I am in a flipped classroom than in a traditional classroom.	.976	.329	-2.111	.035
11. I am more likely to be more marketable as a student graduate because of the collaboration experience I gained in a flipped classroom than in a traditional classroom.	-1.535	.125	1.000	.317
12. I am more likely to remember course content while collaborating with my peers in a flipped classroom than in a traditional classroom.	-2.233	.026	.298	.766
13. I am more likely to work on very creative collaborative projects in a flipped classroom than in a traditional classroom.	-2.610	.009	-1.421	.155
14. I am more likely to be prepared for a collaborative team project in a flipped classroom than in a traditional classroom.	-.592	.554	-1.347	.178
15. I am more likely to speak more freely to my peers while working on collaborative team projects in a flipped classroom than in a traditional classroom.	-2.562	.010	-.192	.847
16. I am more likely to improve my verbal communication skills in a flipped classroom than in a traditional classroom.	-4.153	.000	-4.124	.000
17. I am more likely to develop more analytical skills on collaborative team projects in a flipped classroom than in a traditional classroom.	-3.145	.002	-3.400	.001
18. I am more likely to have more of a positive attitude about working on collaborative team projects in a flipped classroom than in a traditional classroom.	.629	.531	-1.089	.276
19. I am more likely to have improved my time management skills in a flipped classroom than in a traditional classroom.	.585	.559	-4.041	.000

ences of participants. Tables 5 through 7 identify the themes and subthemes in order of frequency that emerged after reviewing pre- and post-study participant’s comments for questions 20, 21 and 22. The following statements by participants provide an additional student voice toward understanding students’ perceptions of flipped classroom learning versus traditional learning.

The following four participants’ statements were given as responses to the question number 20, which was included as, “List the two best aspects of flipped classroom compared to traditional learning”:

Participant 1 stated “*Encourages teamwork and verbalizing ideas.*”

Participant 2 stated the following “*It breaks up the routine lectures, so I’m more attentive. It also facilitates better discussion.*”

Participant 3 shared “*Retain information better, listen more attentively to my peers*”

Participant 4 stated “*I enjoyed learning from my other classmates, I enjoyed the change of pace.*”

Table 5 shows the summary of themes and subthemes gathered from the question 20 responses.

The following four participant statements are responses to question number 21, which was listed as, “List the two worst aspects of flipped classroom compared to traditional learning”:

Participant 1 stated, “*You rely on a majority of information to come from students who don’t know what exactly is needed to be taught and the professor doesn’t seem as involved in teaching the class what is needed to know.*”

Participant 2 responded, “*Discussion of [the] subject is shallow, and it is easy to get lost in the class.*”

Participant 3 indicated “*Relying on other students [for] information rather than the teacher. Feels like the teacher should be the one teaching us.*”

Participant 4 shared “*It seemed a little disorganized. It made the tests more confusing.*”

Table 6 shows the summary of the responses collected associated themes and subthemes for question 21.

Questions 22 asked, “Please write down any additional information you would like to add about your experience in a flipped classroom.” Table 7 shows responses collected and their associated themes and subthemes.

The following represents participants’ responses to question 22:

Participant 1 stated “*Overall, I have struggled in the flipped classroom setting. I feel like I have not learned any of the material well.*”

Participant 2 shared that “*I don’t think flipped classes are good because of having to rely on other students to provide the information, and I also think it is a waste of time when the professor could just go over everything.*”

Participant 3 indicated that “*I really didn’t like or dislike it in general. It helped in some ways, and not in others. I did think that it allowed for better discussion of material after presentations.*”

Participant 4 stated, “*I enjoy it but am more ‘used’ to a traditional classroom setting.*”

Although students perceived the theme of learning as both the best and worst feature of a flipped classroom, the findings suggested that the social interactions between teammates are central to the learning experience of teammates. Students perceived the variety and frequency of classroom activities as advan-

Table 5. Qualitative Themes for Pre- and Post-Project Survey Question 20

Themes			
Pre-Project		Post-Project	
Themes	Subthemes	Themes	Subthemes
Learning	Variety of teaching activities	Learning	Different learning method
	Able to apply content		Retain more information
	Deeper learning		Encourages teamwork
	Explain content to peers		Learning from peers
	Instructor's support		Variety of activities
	Promotes hands-on learning		
	Encourages teamwork		
Communication	Greater student engagement with peers and instructor	Class activities	Adaptive to changes
			Facilitates discussion
Life skills	Improved communication		
	Time management		
		Connectivity	More attentive to peers
			Support from teammates

tageous, and a welcomed alternative to traditional lecture-driven lessons. Students grew to become more attentive of the contributions peers provided to the team, which helped refine their communication skills. By the end of the semester, students perceived the work-ethics and skill-set differences amongst teammates to be a disadvantage and a negative aspect to learning in a flipped classroom. Students did not like their inability to be in full control of the project's outcomes; thus, the dependency of others dictated academic success. In that same vein, students also perceived their reliance upon teammates to learn through discussions and collaboration made learning shallow, disorganized and confusing, leaving students yearning for the instructor to guide the lessons.

CONCLUSION AND DISCUSSION

The study's findings suggest that student perception in team collaboration within a flipped classroom became more positive over time due in part to the variety of class activities, the greater interaction between classmates, and the social aspect of getting to know teammates. The various and frequent team collaborative activities, greater opportunities to complete assignments in class, and improved time management skills assisted students in constructing a greater understanding of course material as

Table 6. Qualitative Themes for Pre- and Post-Project Survey Question 21

Themes			
Pre-Project		Post-Project	
Themes	Subthemes	Themes	Subthemes
Learning	Easily overlook key concepts	Learning	Learning is shallow
	Less prepared for class		
	Teacher should teach class		
	Coursework not defined		
	Stressful		
	Limited explanation of content		
Dependency	Rely on peers to learn	Dependency	Depend more on peers to learn
	Rely on self to learn		
Coursework	More work	Class content	Unproductive time
	Stressful		Appears disorganized
	Easy to get behind		Confusing tests, homework
	Limited time for review		
Class context	Wasted time		
	Unorganized class		
Life skills	Poor time management		

well as improve verbal and analytical skills. Additionally, students were able to nurture their creativity and adaptability to working with others leads to a more overall positive outlook toward learning in a flipped classroom. These findings support research conducted by Al-Zahrani (2015) that suggests student interactions amongst student collaborative groups foster critical thinking skills, communication skills, and practical experience. By providing students with in-classroom discussion and hands-on problem-solving opportunities, students were able to learn from and engage the various viewpoints and approaches of their teammates as well as explore a greater number of possible solutions to course assignments. This finding parallel research findings produced by Crouch and Mazur (2001) that suggest the collaborative efforts gain strength from the diverse knowledge, experience, and viewpoints that each team member brings to the team. Thereby, in turn further strengthening the learning outcomes of collaborative team environments.

Although students perceived their communication skills to have improved through frequent collaborative activities in the flipped classroom, students also saw their motivation unaltered by collaborative teams in the flipped classroom. In other words, students were not inspired to work any harder in a flipped classroom than in a traditional classroom. This finding is significant

Table 7. Qualitative Themes for Pre- and Post-Project Survey Question 22

Themes			
Pre-Project		Post-Project	
Themes	Subthemes	Themes	Subthemes
Learning	Not a useful learning model	Learning	Not able to fully learn
	Feel lost with peers teaching class		Instructor not able to teach
	Flipped learning is entertainment		
	An adjustment to learning		
		Learning style	Prefer traditional style
			Neutral on flipped style
Group activities	Peers should pick their teammates		
		Life skills	Improved communication

because researchers Ismail and Soliman (2010) and Abeysekera and Dawson (2014) suggested that for teams to succeed, each teammate has to be fully motivated to complete their work so that the team as a whole succeeds. Even though the students in this study chose their team members or were familiar with their peers' abilities before work started, students were no more motivated to work in a flipped classroom than in a traditional classroom. This finding may stem from students' perception that they have no control over teammates' completing their tasks and are dependent upon someone else's ability to manage their responsibilities. The implication becomes why should students be motivated to work harder on a team if not every teammate puts in the same effort and motivation to succeed? Consequently, causing frustration amongst teammates, regardless of whether teammates are friends or not.

The findings showed that by being able to work with peers whether familiar with in terms of friendship and abilities, students grew to be more attentive of their teammates, spoke more freely in discussions, and gained a positive view of collaborative efforts. The flipped classroom provided greater opportunities for group collaboration whereby students were able to connect with their teammates in a more meaningful learning environment. Yet, by the end of the semester, "learning" was mentioned as the primary worst aspect of flipped classrooms. Students had grown to feel that peers rather than instructors were teaching them, which resulted in shallow learning. Students came to perceive the flipped classroom as encouraging wasted time and disorganization in the classroom as well as leading students to be dependent upon peers for academic success. The result shows students preferring the traditional instructor-led classroom for learning.

RECOMMENDATIONS AND FUTURE RESEARCH

Recognizing that learning does not occur in a vacuum, but rather it is a sharing and merging of experiences and inspirations from various sources, the findings suggest that the collaboration-driven flipped classroom is a viable and strong alternative for learning compared to the traditional classroom lecture pedagogy. However, the findings also lead one to postulate that an even stronger learning environment is one that combines features from both the flipped and traditional classrooms. The flipped classroom features to use are in-class discussions and collaboration along with a variety of activities and connectivity between students coupled with instructor-led learning from the traditional classroom. The combination of flipped and traditional classroom pedagogies allows students to guide their learning within the team environment, while also having the instructor facilitate learning within a collaborative environment. The combination of these two pedagogies promotes learning, in particular, collaborative problem-solving thinking and communication that are needed in today's workplace. Thereby, preparing students for the 21-century employer that is exceedingly expecting students to have a deeper understanding of content and expertise as well as skills sets to solve real-world problems while collaborating with peers.

In addition to the recommendations aforementioned that focus on combining flipped and traditional learning strategies into classroom environments. The following recommendations for future research studies stem from the study's limitations. First, the present study focused on a total of two classes over the span of one semester. With that said future studies should focus on a greater number of classes over two semesters or the equivalent of one academic year. This is being recommended in an effort to further explore the role that length of time in a learning environment that combines flipped and traditional strategies may play on student learning over one or more academic years. Second, it is recommended that future studies explore flipped learning focusing on various disciplines in order to measure whether the flipped learning pedagogy is more effective in one area of study versus another. Although the present study and literature has shown the academic benefits of flipped learning across disciplines, future research questions could focus on (a) is flipped learning more beneficial is one discipline versus another and (b) if so, can curriculum in that discipline be adapted to nurture and support flipped learning over a long period of time. Lastly, potential innate personal characteristics, such as life and work experiences, interests and preferences may play a role in the research study's findings. Therefore, it is recommended that future studies have a more rigorous research design that accounts for the various personal characteristics of participants.

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