Factors Influencing Student Decisions to Recommend Flipped Courses

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A required undergraduate course in operations management was taught to 234 students as a flipped class from the fall semester of 2013 to the fall semester of 2015. The results of survey analysis and focus groups indicated that students overwhelmingly preferred the flipped over the traditional method of instruction. However, 12% of these students also indicated that they would not recommend the flipped-format class course to a friend. The willingness to recommend translates to students' overall satisfaction with the course. Students' satisfaction in turn leads to better educational results. The objective of this paper is to identify the factors that influence the students' decision to recommend the flipped class. The overarching purpose is to generate meaningful knowledge that will assist in developing and implementing classroom strategies to increase the ratio of students willing to recommend flipped learning. To achieve this objective, questionnaires were administered and analyzed and two focus groups were conducted. As will be explained, the primary influencing factors that were identified included prior dislike for collaboration and lack of teaming/leadership skills.

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I. INTRODUCTION

Supply chain and operations management courses are quantitative in nature and tend to engender anxiety and fear in students. This apprehension creates definitive obstacles that prevent students from being fully engaged with their learning, and often results in frustration by students and instructors alike.

The fear and anxiety that many students experience in their supply chain and operations management courses is directly attributable to the prevalence of math and statistics anxiety in the United States population. It manifests itself as early as elementary school (Ramirez, Gunderson, Levine, & Beilock, 2013) and remains present in college students regardless of major (Hamza, Tanta, & Hagstrom, 2011). Business school undergraduates have identified statistics as their single most difficult and least pleasant business course (Zanakis & Valenzi, 1997).

Instructors who teach supply chain and operations management are actively seeking ways to overcome this quantitative anxiety that is obstructing their students (Tarasi et al., 2013). Recent research demonstrates that the flipped classroom can yield greater average student satisfaction and better average learning results than the traditional lecture method (Asef-Vaziri, 2015; Swart & Wuensch, 2016; Swart, 2017). Although there has been some

debate amongst scholars in defining the concept of the flipped classroom, at the core, most can agree that this model consists of face-to-face time spent in the classroom which is devoted to some form of active learning. During the out-of-class segment of class, students view online lectures that can be delivered on demand via modern technologies. This starkly contrasts with the traditional classroom arrangement, where the face-to-face time is customarily reserved for delivery of lecture, and out-of-class time is devoted to homework. Thus, the flipped classroom combines and synergizes the best features of face-to-face and online learning methods (Asef-Vaziri, 2015).

The same studies which conclude that average learning and satisfaction are improved in the flipped classroom also reveal to us that an average of 12% of students participating in those studies would not recommend the flipped classroom to their friends. According to the Sloan Consortium (Lorenzo & Moore, 2002), willingness to recommend is a useful measure of student satisfaction. Student satisfaction in a course leads to greater engagement and learning while also reducing drop rates from courses. Thus, we find this to be an important measure for students, instructors, and administrators alike (Swart & Wuensch, 2016).

While an 88% satisfaction rating may appear to be impressive, in this paper we take the position that a 12% dissatisfaction rate is not acceptable. Thus, the objective of this research is to identify the factors that influence the student decision to recommend or to not recommend the flipped classroom to their friends. A more complete understanding of these factors will help lead to better ways and means to improve the flipped classroom experience for students so that a greater percentage of students can realize the many benefits with this style of learning.

II. LITERATURE REVIEW

Bishop & Verleger (2013) and Hamdan et al. (2013) published extensive reviews of the literature on flipped learning. They concluded that there was a need for greater and better quantitative and qualitative theory-based research to examine the influence of a flipped classroom on learning outcomes. Asef-Vaziri (2015) conducted conceptual research that provided statistical evidence that a flipped course, when implemented in a quantitative and analytical course, can outperform its traditional counterpart.

Michael G. Moore's Theory of Transactional Distance (1993) provided the theoretical foundation, and Auxiu Zhang's Scale of Transactional Distance (2004) provided the instrument whereby to measure learning results in online classes which were later extended to flipped classes. Michael G. Moore's theory defined transactional distance as "a psychological and communications space to be crossed, a space of potential misunderstanding between the inputs of the instructor and those of the learners" (Moore, 1993). He postulated that this transactional distance was created by the interaction of three sets of variables: Structure, Dialog, and Autonomy. Zhang (2003) restated transactional distance as a measure of the obstacles found by students to their engagement with learning in the online environment. These obstacles were the results of the interaction between: 1) students and students, 2) between students and the instructor, 3) between students and the course content, and 4) between students and the instructional technology. Zhang developed a 36-item statistically valid and reliable scale to measure those interactions and then demonstrated that these were highly and significantly correlated with student perception of satisfaction, student learning, and educational goal attainment.

Swart & Wuensch (2016) showed through the use of Relative Proximity Theory (Swart et al., 2014) that students perceived statistically significant higher satisfaction in the

flipped classroom compared to a traditional classroom. They also found that the greatest single predictor of student satisfaction was the transactional distance between students and students (e.g. collaboration). Swart et al. (2015) adapted and used an instrument developed by Wengrowicz et al. (2014) to measure satisfaction with group collaboration in online courses to identify the factors that influenced student satisfaction with the group collaboration in the flipped classroom. This instrument, referred to as the COLL-TD/F scale, was statistically valid and reliable, and was developed through the use of Structural Equations Modelling (SEM). The results indicated that three factors were statistically significant predictors of student satisfaction with collaboration in the flipped classroom: 1) communication between students and the instructor, 2) understanding between students and the instructor, and 3) the student's attitude toward group collaboration. The results were surprising in that they defied the conventional wisdom that assumed the relationship between students on a team had played a role in determining student satisfaction with collaboration. However, the results were consistent with the findings of Kim et al. (2014) which emphasized the instructor's role as an initiator and facilitator for building a good community and collaborative learning culture.

III. COURSE DESCRIPTION AND RESEARCH METHOD

3.1. Course Content and Pedagogy

The subject course discussed in this paper is OMGT 3223, Business Decision Modelling, a 3-credit undergraduate required course for all business students at East Carolina University. The course devotes 3 weeks each to decision theory, simulation, forecasting, and optimization and requires an extensive use of Excel, including the Data Analysis and Solver add-ins. For the past four years, the course has been taught as a flipped class. Prior to each face-to-face session, students are required to watch a video lecture, study a set of specially written lecture notes, referred to as "Socratic Lecture Notes" (Swart & MacLeod, 2016), and read a mini-case study that requires understanding of the material contained in the lecture notes and video-lectures. Having sufficiently prepared for the day's course materials, students can then attend the face-to-face session and immediately join their group to collaboratively work on their mini-case study. The instructor does not deliver a prepared lecture during the classroom time since students were expected to have already watched the lecture on video prior to class. Instead, the instructor acts as a learning coach and intervenes whenever groups are perceived to be going "in the wrong direction" in their collaborative efforts. The instructor also acts as a consultant to groups who have specific questions about the mini-case assignment. In either role, students receive help "Just-In-Time" (JIT) when they need the additional support to make progress on their case study. Whenever a group completes their case study, it is reviewed in its entirety by the instructor. If the work is determined to be satisfactory, then each member of the group proceeds to take an online quiz. The quizzes are administered on an individual basis rather than for the collective group. In structuring this portion of the assignment in this manner (i.e. not giving group grades), students learn to use collaboration as a tool for individual learning.

The theme of using collaboration as a tool for individual learning was also extended to out-of-class assignments such as projects and exams. Exams consisted of case studies which required spreadsheets (created with Microsoft Excel) to be prepared. However, the exam itself consisted of a random set of business questions whose answers required the correct interpretation of the Excel spreadsheets. Group collaboration outside of class was permitted for the preparation of the spreadsheets (a non-

graded activity); however, the exam was an individual assignment and each student in a group was allowed the use of their jointly prepared spreadsheet to answer the exam questions.

3.2. Research Method

Quantitative and qualitative research methods were used to achieve our desired research objectives. Quantitative analyses were performed using SPSS 24 statistics software to statistically compare responses from the COLL-TD/F instrument results from students who would and would not recommend the flipped classroom to their friends.

Qualitative data was collected through focus groups (Stevens et al., 1993). The focus groups in this case consisted of groups of students who were nearing completion of a flipped learning course for the purpose of gathering and sharing their feelings and perceptions about various aspects of the course. In order to maximize participation and productivity with the focus groups, every effort was made to encourage and promote interaction between the participants (Creswell, 2011).

3.2.1. Quantitative Research Method

The quantitative research consisted of administering the statistically valid and reliable COLL-TD/F instrument developed by Swart et al. (2015) to 234 students who took OMGT 3223 (Business Decision Modelling), a required junior level undergraduate business course, between the fall semester of 2013 and the fall semester of 2015. The assessment also contained a list of 27 questions (shown in Table 1) that are intended to provide insight into the nature of the obstacles to active engagement with learning that were measured by the previously discussed transactional distances. The responses to the 27 questions of students who indicated they would recommend the flipped class to their friends were statistically compared, using SPSS 24 statistical analysis, to those from the students who had indicated they would not recommend the flipped classroom to their friends.

3.2.2. Qualitative Research Method

The qualitative research consisted of two focus groups consisting of students enrolled in each of the two flipped sections of OMGT 3223 (Business Decision Modelling) during the spring semester of 2016. The two focus groups were conducted toward the end of the semester by an experienced facilitator and assisted by two graduate assistants. The instructor was not present during the focus groups and did not see the results until after the semester had ended. In total, thirty-five male and thirty female students participated in the collective focus group.

During the focus group, the facilitator led the discussion using an interview guide, shown in Table 2, with similar categories as used by McCallum et al. (2015): academic involvement, student involvement, and student-instructor involvement. A forth category was also added to measure how student experiences in the flipped class compared to the traditional class. As is common with all focus groups, these questions were used primarily to trigger participant discussions on a particular topic of interest. Once a discussion started, students were encouraged to freely express their thoughts and opinions, which ultimately produced a wider range of results than encompassed by the question guide alone.

IV. DATA ANALYSIS AND RESULTS

4.1. Quantitative Data Analysis and Results

The insight questions presented in Table 1 were administered to a total 157 male and 77 female students who completed the Business Decision Modelling course between the fall of 2013 and the fall of 2015. The participating

students were also asked to indicate whether they would recommend a course taught in the flipped manner to their friends. Of the participants, 67 female and 139 male students responded that they would recommend (88%), while 18 male and 10 female students responded that they would not recommend (12%). There was no significant difference between the number of females and males who would or would not recommend this style course to their friends. The principal reasons given for their responses are shown in Table 3.

TABLE 1. INSIGHT QUESTIONS FROM THE COLL-TD/F INSTRUMENT.

Q #	Question Statement
1	While working on the **take home** assignments, we communicated through (you can mark more than one answer).
2	While working on the **in-class** activities, we communicated through (you can mark more than one answer).
3	Please evaluate what was your relative part in the **take home** assignments (between 0 and 100%).
4	Do you think there are team members who contributed more than others in the **take home** assignments?
5	Are there team members who did not contribute at all?
6	How effective did you think the peer evaluation system used in this class was?
7	Describe briefly how collaboration should be attained while working as a team.
8	What are the two most important team skills required while working on the collaborative **take home** assignments?
9	What are the two most important individual skills required while working on the collaborative **take home** assignments?
10	What is the most adequate team size for the **in-class** collaboration? (Please explain your answer).
11	What is the most adequate team size for **take home** collaboration? (Please explain your answer).
12	With how many of your current team members would you want to work with in future **in-class** collaboration?
13	With how many of your current team members would you want to work with in future **take home** assignments?
14	I am satisfied with the special structure of the course.
15	I am satisfied with the special layout of the flipped classroom.
16	I am satisfied with my team's **in-class** collaborative work.
17	I am satisfied with my team's **take home** collaborative work.
18	I am satisfied with my peers.
19	I am satisfied with the course teaching methods.
20	I am satisfied with the course instructor.
21	I am satisfied with the way my learning is being evaluated in this course.
22	What do you think your grade in this course will be?
23	Would your grade be different if you had worked with different group members?
24	Would you recommend a friend to register for this course taught in a flipped classroom and taught in this collaborative format?
25	What are the most important elements of the course that contributed to your understanding of the subject matter?
26	As compared to a traditional lecture course, I had more interaction with the instructor in this course.
27	I prefer to work in a group.

TABLE 2. FOCUS GROUP INTERVIEW GUIDE.

ACADEMIC INVOLVEMENT
Do you feel the learning objectives are fairly articulated? Could this be improved?
How would you compare this learning approach to the standard approach?
Does the flipped classroom keep your attention better than the standard lecture approach?
Do you ever feel lost in class? Does the flipped class allow you to compensate for this better than a traditional class?
How would you rate your mental focus (time on task) when compared to a traditional class?
Do you feel diversions (social media, etc.) are more limited in the flipped class? How do you feel about that?
Do you feel you have a better chance of getting a good grade in a flipped class? Why or why not?
Do you have a chance of getting to know your professor a bit better in the flipped class?
STUDENT INVOLVEMENT
How do you feel about the group nature of learning?
Do you feel the group work is shared equally by all group members?
Do you feel the group work is shared fairly by all group members?
What would you like to see more of during the in-class sessions?
How do you feel about sometimes having to be the leader in the group activities?
Do you ever feel shy about offering your inputs in the flipped classroom? What about in a traditional class?
STUDENT-INSTRUCTOR INVOLVEMENT
Do you feel the learning objectives are fairly articulated? Could this be improved?
How effective was your professor in managing the learning environment?
Do you believe him to be skilled in the learning coach/consultant teaching role?
What would you like to have seen more or less of?
How many of you would seldom seek out your professor out for an office visit, but feel that the flipped classroom gives you that experience?
What do you think of the learning coach/consultant role of the instructor in the flipped classroom versus the one lecture fits all approach of a traditional class?
FLIPPED VS. TRADITIONAL
How would you compare this learning approach to the standard approach?
Does the flipped classroom keep your attention better than the standard lecture approach?
Do you ever feel lost in class?
Does the flipped class allow you to compensate for this better than a traditional class?
How would you rate your mental focus (time on task) when compared to a traditional class?
Do you feel diversions (social media, etc.) are more limited in the flipped class? How do you feel about that?
Do you feel you have a better chance of getting a good grade in a flipped class? Why or why not?
Do you have a chance of getting to know your professor a bit better in the flipped class?

TABLE 3. REASONS FOR (OR NOT) RECOMMENDING THE FLIPPED CLASS.

Reason Given	% of those NOT recommending (n=28)	% of those recommending (n=206)
Definitely not. I would recommend a traditional lecture format in a regular classroom.	40%	0%
Yes because of the collaborative format.	0%	34%
Yes because of the instructor.	0%	13%
Yes because of the instructor and the collaborative format.	0%	53%
No because of the collaborative format.	46%	0%
No because of the instructor.	14%	0%

The data in this table indicates that of those students not recommending the course, 39% would not recommend because they preferred a traditional lecture format, while another 46% would not recommend because they did not like working in groups. It is also worth noting that a similar proportion of students would either recommend or not recommend the flipped class on the basis of the same characterizing reason. For instance, 14% of students would not recommend the flipped course because of the instructor; while 13% of students would recommend the flipped course because of the instructor. Similarly, 46% of students would not recommend the course because of the collaborative format; while 53% of students would recommend the course because of the collaborative format.

The student responses provided in response to the Table 1 insight questions were cross-tabbed according to those who would and would not recommend the flipped course using SPSS 24 statistical analysis, and the difference in responses was tested using SPSS's Pearson Chi Square test. Only five responses had a statistically significant difference (χ^2 with $p < 0.01$). Note that the responses to all questions, except those that are open-ended, were based on a five-point Likert scale ("Strongly Agree" on one end of the continuum, and "Strongly Disagree" on the opposite end). Any neutral responses of "Neither Agree or Disagree" were not counted for the statistical analysis. Thus, in the tables below, the "Agree" responses included all participants who responded with either "Strongly Agree" or "Agree." A similar convention was used with the "Disagree" responses. This explains why the number of responses included in the analysis varies from question to question.

4.1.1. Statistically Significant Results

As indicated in Table 4, a major factor that influences the student decision to recommend the flipped class to their friends is that they felt that they had significantly more interaction with the instructor in the flipped format than they would have had in a traditional course. This can potentially be attributed to the instructor being able to provide assistance to students on a Just-In-Time (JIT) basis. To the extent that students are successfully collaborating in the flipped class, the instructor does not need to intervene. However, when a student group reaches an impasse in their

interactive problem solving and realizes that they need additional support, the instructor is readily available to provide them with the exact knowledge they need at that time so their progress is not interrupted.

Table 5 indicates that the decision to recommend a flipped course to a friend is significantly greater for someone who likes to collaborate as compared to someone who does not. This is not surprising since the flipped classroom is defined as an educational technique that consists of two parts: 1) collaboration in the form of interactive group learning activities inside the classroom, and 2) direct computer-based individual instruction outside the classroom (Bishop & Verleger, 2013). This result supports earlier findings that student preference for collaboration is a statistically significant predictor of student satisfaction with the flipped classroom (Swart et al., 2015).

TABLE 4. INTERACTION WITH THE INSTRUCTOR.

As compared to a traditional lecture course, I had more interaction with the instructor in this course * Recommend Crosstabulation

			Recommend		Total
			no	yes	
As compared to a traditional lecture course, I had more interaction with the instructor in this course.	disagree	Count	10	9	19
		% within Recommend	55.6%	5.8%	10.9%
	agree	Count	8	147	155
		% within Recommend	44.4%	94.2%	89.1%
Total		Count	18	156	174
		% within Recommend	100.0%	100.0%	100.0%

$\chi^2(1)=41.12, p < 0.001$

TABLE 5. PREFERENCE FOR WORKING IN GROUPS.

I prefer to work in a group * Recommend Crosstabulation

			Recommend		Total
			no	yes	
I prefer to work in a group.	disagree	Count	9	23	32
		% within Recommend	45.0%	14.3%	17.7%
	agree	Count	11	138	149
		% within Recommend	55.0%	85.7%	82.3%
Total		Count	20	161	181
		% within Recommend	100.0%	100.0%	100.0%

$\chi^2(1)=11.53, p < 0.001$

TABLE 6: Satisfaction with Course Structure

I am satisfied with the special structure of the course * Recommend Crosstabulation

			Recommend		Total
			no	yes	
I am satisfied with the special structure of the course.	disagree	Count	16	2	18
		% within Recommend	80.0%	1.2%	9.5%
	agree	Count	4	167	171
		% within Recommend	20.0%	98.8%	90.5%
Total		Count	20	169	189
		% within Recommend	100.0%	100.0%	100.0%

$\chi^2(1)=128.93, p < 0.0001$

TABLE 7. SATISFACTION WITH TEACHING METHODS.

I am satisfied with the course teaching methods * Recommend Crosstabulation

			Recommend		Total
			no	yes	
I am satisfied with the course teaching methods.	disagree	Count	12	6	18
		% within Recommend	63.2%	3.6%	9.7%
	agree	Count	7	161	168
		% within Recommend	36.8%	96.4%	90.3%
Total		Count	19	167	186
		% within Recommend	100.0%	100.0%	100.0%

$\chi^2(1)=69.24, p < 0.0001$

TABLE 8. SATISFACTION WITH PERFORMANCE EVALUATION.

I am satisfied with the way my learning is being evaluated in this course * Recommend Crosstabulation

			Recommend		Total
			no	yes	
I am satisfied with the way my learning is being evaluated in this course.	disagree	Count	11	4	15
		% within Recommend	52.4%	2.4%	7.9%
	agree	Count	10	166	176
		% within Recommend	47.6%	97.6%	92.1%
Total		Count	21	170	191
		% within Recommend	100.0%	100.0%	100.0%

$\chi^2(1)=64.64, p < 0.0001$

Since the flipped classroom is structured to require both collaboration and individual study, we wanted to know how the combination of these contrasting learning styles impacted student satisfaction with flipped learning. Table 6 indicates that there is a statistically significant difference in the responses of the students willing to recommend the flipped class to their friends and those who are not. Most notably, nearly all of those willing to recommend the course (98.8%) are satisfied with its structure. Anecdotal evidence suggests that these students enjoy the freedom of being able to sit down and learn the material at the time and place of their choosing. Anecdotal evidence also suggests that those who would not recommend the course to their friends do not like the flipped-style classroom structure because they instead prefer the more conventional discipline of having to be in a scheduled class with the instructor presenting the course materials.

The flipped classroom approach also requires a complete transformation in the mindset and role of the instructor. In the flipped-style classroom, students receive individualized computer-based instruction through modern technology and media (such as video lectures) prior to coming to class. This forward-thinking approach prepares students to engage in interactive group learning activities and frees the instructor from lecturing to providing JIT coaching and consulting as groups navigate through their interactive learning activities. Furthermore, we wanted to understand whether such a shift in teaching methods would impact student satisfaction. Table 7 indicates a statistically significant difference in the responses of students who would and would not recommend the course to their friends. As before, most students who would recommend the course to their friends were also satisfied with the flipped teaching methods (96.4%), while only 36.8% of those who would not recommend the course were likewise satisfied with the flipped teaching method.

The collaboration that was part of the interactive group learning activities was also extended to quizzes and exams. As described earlier in this paper, students were encouraged to collaborate together in the preparation of Excel spreadsheets that would be used to answer quiz and exam questions. However, all quizzes and exams were taken individually. Thus, collaboration was permitted as a means for individuals to learn the course materials; however, the onus to apply what was learned remained with the individual students. We were also interested in how this method of evaluation impacted a student's willingness to recommend the course or not. Table 8 indicates that there is a statistically significant difference in satisfaction with how a student's performance was being evaluated between those who would or would not recommend the course. Almost all students who would recommend the course to their friends were satisfied with how they were being evaluated (97.6%), while 47.6% of those who would not recommend the course were simultaneously satisfied with the method for evaluation.

4.1.2. Interesting Similarities

The above section identified factors associated with the flipped classroom in which students who would recommend it to their friends and those who would not had statistically significant disagreement. In short, whichever factor one group liked, the other did not.

We found that while the above conclusion was revealing, there also were several factors where both groups agreed. These served to provide additional insight into what drove their decision to recommend or not. Table 9 illustrates the results of an open-ended question that asked both groups to indicate what they thought it would take to be successful in this course. The top three factors in each group

were identical, and the percentage of respondents who identified each of these three factors were very similar in range. Furthermore, over 82% of the responses in each group contained at least one of these three factors. Note that the totals in each column of the table do not add to 100% simply because they do not include all responses given – rather, only the top most prevalent 3 categories have been reported.

We were also interested in seeing whether the two groups of students had a different perspective on how collaboration should be attained as a team. Table 10 lists the factors most frequently cited by each group as being important in attaining successful collaboration. While none of the differences in the responses were statistically significant, it is interesting to note that a larger percentage of students who would recommend the course considered open communication as being an important factor for achieving successful collaboration.

In addition, we found that both groups of students – those willing to recommend and those not willing to recommend the course to a friend – did not differ significantly in their lists of teaming skills that were required to achieve collaboration in take-home assignments, nor in what they listed as the top individual skills required to achieve successful collaboration on take-home assignments. Neither did the two groups differ in their experience with team members who did not do their fair share of group work.

TABLE 9. FACTORS THAT LEAD TO SUCCESS IN THE FLIPPED CLASSROOM.

Most important elements for success in this course	Mentioned by % of those NOT recommending	Mentioned by % of those recommending
Team Collaboration	46%	47%
HW Videos & Examples	21%	24%
Instructor	15%	12%

TABLE 10. FACTORS REQUIRED TO ATTAINING SUCCESSFUL COLLABORATION.

Most important factors for attaining successful collaboration	Mentioned by % of those NOT recommending	Mentioned by % of those recommending
Contribution from all members	56%	41%
Willingness to work with others	11%	11%
Open communication	6%	24%
Delegation	6%	9%

TABLE 11. EXPECTED GRADE.

Grade	Expected by % of those NOT recommending (n=20)	Expected by % of those recommending (n=206)
A	35%	43%
B	35%	50%
C	30%	6%
D	0%	1%
F	0%	0%

Grade expectancy can also be a factor in willingness to recommend a course. Table 11 shows the grade expectancy of both groups of students. The surveys from which these results were obtained were administered well toward the end of the semester, so students did have a credible basis for their grade expectation. As can be seen, 93% of the students were willing to recommend the course expected to receive a grade of either an *A* or a *B* in the class, compared to only 70% of the students who were not willing to recommend.

4.1.3. The "Bottom Line" – Some Conclusions from the Quantitative Results

In summarizing the above information, it appears that students who would not recommended the flipped class, in contrast to those who would, felt that they had less interaction with the instructor, did not like to work in a group, did not like the course structure or teaching method, did not like the way that their performance was being evaluated, and generally expected to earn lower grades. However, they surprisingly agreed with those who would recommend the course on what factors contributed to success in the course, on how to achieve successful collaboration with their teammates, and on the teaming skills required to successfully collaborate on take-home assignments. In short, students who would not recommend the flipped course appear to have understood what was needed to be successful in the course; however, they simply lacked the desire to follow through on it.

4.2. Qualitative Data Analysis and Results

Focus group sessions were conducted with two separate classes of students taking OMGT 3223 (Business Decision Modelling) as a flipped class in order to ascertain the qualitative underpinning for quantitative results that described their general level of satisfaction with their flipped learning experience reported earlier in this paper as well as in the literature. The focus group question guide shown in Table 2 was followed and the results recorded by the two graduate assistants. These responses were discussed in detail with the facilitator and their consensus results are given below.

4.2.1. Focus Group Results

The quantitative results reported by Swart et al. (2016) demonstrated that the students perceived greater satisfaction and learning in the flipped classroom compared to a

traditional class. The qualitative results of the focus groups affirmed these quantitative findings. In the flipped setting, the class was divided into smaller groups of five to six students. The focus groups felt the number of students within the groups was "about right," and while saying it could go as low as four, it should stay between four and six. The rationale was that the groups needed enough membership to advance several ideas toward solving the problem, but to not have so many members that the group would be bogged down in analyzing a cumbersome number of alternatives.

The groups all described a similar approach to solving the problem for the class. Most, but not all, would read the material, view the pre-class videos, and do other pre-class preparations prior to the actual class. If a student had not sufficiently taken time to prepare for the class, the other members of the group would serve as de-facto peer instructors to help get the unprepared student(s) into the flow of the problem solving. More than 50% of the students said they had experienced a situation where they were not prepared for the day's class, but they came to the class anyway since they felt the group activity would allow them to learn the material. Students relayed that they were accepting of certain excuses for not being prepared (for instance, the death of a family member was mentioned), but they were cautious to explain that they did not expect the unprepared student to repeat the violations.

There did seem to be a sense of respect for the expectations of the group and group members did not want to let their fellow team members down by not doing their part. While most groups did the preponderance of their work during the class period, two teams met outside class time and completed enough of the problem analysis that they did not have to spend much scheduled class time in order to complete the problems and take the tests. As was mentioned earlier, it should again be noted that the students take tests for individual grades, but they do the preparatory study in the group setting.

During class, students who have prepared will advance an idea or two toward the problem analysis. Others will agree or disagree, and no individual expressed any frustration or defeat if/when an idea was dismissed in favor of a different approach. More than 75% of the focus group members reported that they had been "lost" at one or more times during the class, but they received enough information to correctly solve the issue through the process of group activity and by the instructor serving as a "Just-In-Time" advisor.

Between 80-90% of the students in the focus group said there was good participation amongst all team members, and a similar number felt the group activity drove the results on the individual performance tests.

One strong factor in the improved satisfaction levels of the process dealt with the group managing the time available. Students reported that the instructor pace drove the class pace, regardless of the learning, in large lecture settings, while in the group sessions the achievement of the learning objective was paramount and was the goal regardless of the time it took to achieve mastery. The resulting positive results on the individual tests seemed to be a direct result of the group working together toward the common objective of making sure every student was ready for the exam before attempting it.

The quantitative results further demonstrated that there was a high level of satisfaction with group collaboration. While one of the quantitative questions suggested that 58% of the students felt their grade might have been different if they had worked with different team members, the qualitative findings did not suggest that students really wanted that option. A specific question was asked in several ways to determine if students would like to rotate tables or groups, or to be assigned to a group for a finite period of time (up to two weeks). Interestingly, not one respondent wanted that

option. Students admitted they had "bonded" with their group members and felt a sense of loyalty which manifested itself in tending to be more prepared for class, being more serious and focused during the problem work (not wasting time or playing on social media devices), not missing class and being on time. While students may have felt they could have had a different grade with a different group, they could have also been saying their grade might have been lower (rather than higher). This question likely requires further investigation, especially in light of the seeming value of creating bonded groups of learners.

Students almost universally would recommend the flipped-style of learning to other students, but cautioned that the method is more than just rearranging the classroom. If a professor were to arrange students into groups of five or six and simply lecture in this setting, the value of the peer instruction is lost. Students related that not just any professor can manage this method of learning, and all agreed that classes for professors considering this method would be beneficial.

The quantitative results reported in Swart et al. (2015) demonstrated that student satisfaction with the "flipped classroom" experience is largely determined by the student's attitude toward group collaboration, communication patterns between students and the instructor, and the understanding between the student and instructor. The qualitative results once again confirmed the quantitative findings. Group collaboration is a vital component of this process working. Students explained that on the first day of the class they were assembled into groups of five or six and generally with others they did not necessarily know or had not worked with previously. There seemed to be a "rhythm" of group collaboration that developed quickly as the groups learned how to assess the individual strengths of each team member (some more vocal, a few more prepared, etc.) and use those strengths to approach the problem solutions. In many instances, the most prepared student would lead out with a solution option and then others would comment. It was obvious that students did not seem to harbor any sense of individual ownership to the group input, and that the group was totally committed toward everyone achieving success on their individual exams. Members expressed that they were willing to invest the time to get all members adequately prepared before attempting the individual tests.

Students were appreciative of the professor being available for dedicated help if groups needed assistance, but all were critical of the "wasted time" when several groups were stuck on an issue and the professor had to go table by table to assist a team. Groups also were critical of having to wait for the professor to come and verify their solutions to the in-class problems. While a few students reported that the professor was "absolutely" essential to the flipped learning approach, some said the professor often had nothing to do after introducing the problem.

Students agreed that the professor needs to have extensive experience in the problem area, and similarly needs to be able to manage the learning environment, but as much as anything, the professor using this methodology needs to care about the approach and the student learning.

The final quantitative findings concerned the topic of grades. Findings (Swart, 2017) confirmed that students in this learning environment received higher average grades, higher median grades, and less spread in grades across the students. Students in the focus groups expressed that the flipped classroom approach gave them more incentive to get a letter grade of *A* than the traditional lecture-and-test teaching configuration. Students however, were almost in complete agreement that they did not just want to get *A*'s on quizzes without understanding the material because they realized that when the exam comes, they would not be able to pass. Almost 80% of the students in one of the focus groups expected to get an *A*,

and almost 100% expected an *A* or a *B*. This was slightly higher than the expectations in the other focus group, but higher grade expectations was the norm across both groups of students.

Between 80-90% of those in the focus groups were satisfied with the curriculum, the method of instruction, and the expectation of a good grade. Over 90% felt this method of instruction would lead to a better grade when compared with the traditional classroom approach.

A significant number of students stated they would not have taken the class had it been offered in the traditional setting, and many acknowledged they would not have learned as much or expected as good a grade. This was attributed to the group activity and how everyone pulled together to ensure collective group achievement.

The students did have some suggestions for improvement. Their suggestions primarily dealt with the videos used for out-of-class instruction. Students were universal in their dislike of lectures, and said that the videos used for this class made them feel as if they were essentially sitting in a traditional class. They felt that the videos were taped lectures and those videos included whatever made up the class that was taped to include question and answer sessions. Many of these sessions were difficult to hear and were perceived as often irrelevant to the assignment. All agreed that the videos were the best way to learn the course materials, but also felt they could be shortened, categorized, and made more pertinent to a specific issue. When asked how they would rate the videos on a Likert scale of 1-10 (with 10 being best), the videos were rated between 6-8. Other than the videos, the students were pleased with all other aspects of the course content, facilities, and presentation methods.

4.2.2. The "Bottom Line" – Some Conclusions from the Qualitative Results

As with all surveys, the COLL-TD/F instrument assumes that respondents know how they feel. But unfortunately, the surveys do not reveal why students feel a particular way. The focus groups were conducted to develop a deeper understanding of how students feel about the flipped class and why.

Participation in focus groups was voluntary, and respondents were not segregated according to whether they would or would not recommend the flipped class to their friends. This may account for the positive responses that were obtained about all aspects of the flipped class. Of particular surprise was the remarkable esprit de corps that was developed by groups during the flipped class. Clearly, with 12% of flipped students indicating that they would not recommend the course to a friend, not all students shared the sense of unity, common interests and responsibilities evidenced during the focus groups. Thus, the results of the focus groups indicate what can be achieved. But, the results of the quantitative results indicate why it is not achieved by all students.

V. DISCUSSION OF RESULTS

To recap, this research was motivated by findings indicating that approximately 12% of students who experienced flipped learning in our course would not recommend the course to their friends, circuitously indicating that they were not satisfied with the learning experience. Our objective was to identify the factors that created this lack of satisfaction in anticipation that our results could lead to overall guidelines to improve flipped classroom learning.

The quantitative results of this research found that a large majority of students would recommend the flipped class to a friend because they perceived flipped learning as producing greater satisfaction and results than they would have obtained in a traditional class. The minority of students who would not recommend the flipped class to a friend did so

because they understood what it took to be successful in such a class and simply did not want to do it – meaning that they preferred a passive approach to learning as opposed to an active approach.

The results of the qualitative research revealed that students have an even greater positive feeling toward flipped learning than revealed by the quantitative results. Students expressed that through the group collaboration that is an integral part of flipped learning, they developed a strong sense of group loyalty that led to their mutual support of each other's learning and success. They also revealed that students felt that the instructor must be enthusiastic about and well versed in this method of instruction.

Flipped class focus group results reported in the recent literature have been mixed. McCallum et al. (2015) reports results that resonate with ours, namely that students felt that the flipped classroom encourages student academic involvement through the out-of-class preparation that is required as well as the in-class collaborative activities. Karabulut-Ilgu et al. (2016) report that 52% of students would recommend the flipped class to their friends – a substantially lower percentage than in our study (88%). However, they also reported a number of challenges that were encountered that appeared to be largely due to a lack of experience by faculty and students with this type of learning.

In an international context, Birbal and Hewitt-Bradshaw (2016) uncovered through their use of focus groups "fairly strong resistance" to the flipped classroom due to cultural factors (psychological and social) from first year students at a Caribbean university. Taylor (2015) found as a result of his focus groups that a number of students taking flipped classes at a British university doubted the value of flipped classes in enhancing academic standards.

In a medical education context, Walling et al. (2017) used focus groups to obtain medical student perspectives on active learning (a key component of flipped classes). Many of their subjects had considerable experience in several formats of active learning, but perceived it as an inefficient means of acquiring the required knowledge to achieve the high grades required to achieve a desirable residency and for passing the U. S. Medical Licensing Examinations. Similar results were obtained by Kenwright et al. (2017) with fourth year medical students in a flipped pathology course at a university in New Zealand. Students simply did not engage with the flipped learning activities. They instead preferred the structured approach to learning offered by traditional lecture courses in which required knowledge to pass the exams is being passed directly to them. Students felt that the time invested in active learning activities was an inefficient use of time. They considered the knowledge construction process associated with active learning as application of knowledge which was inconsistent with their immediate goal of passing the knowledge-based medical exams.

The above findings underline that different students have different learning objectives, different learning styles, and different attitudes toward collaboration. If the learning objective is to acquire facts so that they can be regurgitated on an exam, as apparently is the case in some courses in medical school, then the active learning component of the flipped class may not contribute to that goal. However, the out-of-class component is specifically designed to provide information without requiring the inconvenience of attending a face-to-face lecture. A colleague who is the head of an academic department at our university's medical school remarked that the attendance rate at his lectures was about 20%. Those who did not attend the lectures obtained the knowledge online.

Prior research has shown that the flipped classroom has provided greater satisfaction and learning than the traditional classroom for about 88% of students for courses

where students need to learn the higher order skills associated with analyzing, integrating, applying and evaluating knowledge, as is the case in most businesses, engineering and technical fields, This research has contributed to our understanding of why the other 12% of students are not satisfied with the flipped classroom. The results of our quantitative analysis show clearly that these students did not like to work in groups, did not like the special structure of the course, were not satisfied with the teaching method, and felt that they did not have enough interaction with the instructor. The sum total of these findings all points to an earlier finding that a student's attitude toward collaboration upon embarking in a flipped course is a statistically significant predictor of their satisfaction with the course.

The focus group results indicated that students acquire/develop at least some of the teaming skills that will serve them well throughout their personal and professional lives. But the caveat is that both teachers and students alike must develop their flipped classroom skills.

VI. CONCLUSION

The flipped classroom requires a heavy reliance on group collaboration, and effective collaboration requires knowledge of how to work in teams. As authors from Bolton (1999) to Swart (2017) have observed, most business faculty assign group projects in their classes and are satisfied with the results. Unfortunately, far fewer students are satisfied with the results, and many develop negative attitudes toward collaboration.

These negative attitudes are created because students do not know how to effectively collaborate in groups. To address this issue, teamwork instruction throughout the curricula has increased (Raferty, 2013; Sashittal et al., 2011). However, according to Hobson et al. (2014), these efforts have been widely criticized as misguided and ineffective because, in part, the primary emphasis is to provide students with teamwork knowledge as opposed to the development of teamwork skills.

The flipped classroom is an ideal place for students to develop teamwork skill. But it cannot be left to happen by chance. It should happen by design. We have begun to develop teamwork and subject matter skills concurrently in our flipped classes. This process begins with an "up-front" teamwork skills module. The module consists of three elements: a basic review of teaming skills, a data based team formation process modelled loosely after a fantasy football draft, and the drafting and signing of a team charter. Forearmed with this information, students begin to practice these skills as they engage in the interactive group learning activities that take place every day, receiving assistance as needed from the instructor. Each day, the teamwork skills are further developed as students learn the subject matter through the group activities. By the timing of the first exam, those teams that have succeeded in developing their teamwork skills tend to outperform the groups that have not been as successful. This sends a clear message about the importance of teamwork and serves as a motivator to all groups to further develop their teamwork skills in order to obtain better exam results.

Incorporating teamwork development into our flipped courses is a direct consequence of what was learned in this research. Preliminary indications are that the up-front teamwork skills module can be completed in less than two weeks. We are also finding that students can learn the materials faster and better as a result of successful teamwork. Most importantly, preliminary results show an increase in the percentage of students who would recommend the flipped course to their friends.

REFERENCES

Asef-Vaziri, A. (2015). The flipped classroom of Operations Management: A not-for cost reduction platform. *Decision Sciences Journal of Innovative Education, 13*(1), 71-99.

Bishop, J., & Verleger, M. (2013). The flipped classroom: A survey of the research. *Proceedings of the 120 ASEE Annual Conference and Exposition*, Atlanta, GA, paper ID #6219.

Bolton, M. (1999). The role of coaching in student teams: a 'just-in-time' approach to learning. *Journal of Management Education*, Vol. 23, No. 3, pp.233–250.

Creswell, J. W. (2011). *Educational research: Planning, conducting and evaluating quantitative and qualitative research.* Boston, MA: Pearson Education, Inc.

Hamdan, N., McKnight, P., McKnight, K., & Arfstrom, K. (2013). A White Paper Based on the Literature Review Titled *A Review of Flipped Learning*, Flipped Learning Network. 1–15 (www.flippedlearning.org/review).

Hamza, E., Tanta, A., & Hagstrom, F. (2011). Math anxiety in college students across majors. *International Journal of Arts and Sciences*, *4*(11), 211–221.

Hobson, C., Strupeck, D., Griffin, A., Szostek, J. & Rominger, A. (2014). Teaching MBA Students Teamwork and Team Leadership Skills: An Empirical Evaluation of a Classroom Educational Program. *American Journal of Business Education,* 7(3), 191-212.

Karabulut-Ilgu, A., Yao, S., Savolainen, P. & Jahren, C. (2016). A Flipped Classroom Approach to Teaching Transportation Engineering. *Proceedings of the 123rd ASEE Annual Conference and Exposition,* New Orleans, LA. Paper ID #16034.

Kenwright, D., Dai, W., Osborne, E., Gladman, T., Gallagher, P. & Grainger, R. (2017). "Just tell me what I need to know to pass the exam!" Can active flipped learning overcome passivity? *The Asia Pacific Scholar, 2*(1), 1- 6.

Lorenzo, G., & Moore, J. (2002). Five pillars of quality online education. *The Sloan Consortium Report to the Nation*, 9–15. Retrieved from http://www.edtechpolicy.orgwww.edtechpolicy.org/ArchivedWebsites/Articles/FivePillars OnlineEducation.pdf.

McCallum, S., Schultz, J., Sellke, K., and Spatz, J. (2015), An Examination of the Flipped Classroom Approach on College Student Academic Involvement. *International Journal of Teaching and Learning in Higher Education, 27*(1), 42-55.

Moore, M. G. (1993). Theory of transactional distance. In D. Keegan (Ed.), *Theoretical principles of distance education* (1st ed.). New York: Routledge, 22–38. Retrieved from http://www.c3l.unioldenburg.de/cde/support/readings/moore93.pdf.

Rafferty, P. D. (2013). The evaluation of MBA group work: A case study of graduate student experiences and perceptions of positive group work outcomes. *Journal of Education for Business, 88*, 43-50.

Ramirez, G., Gunderson, E., Levine, S., & Beilock, S. (2013). Math anxiety, working memory, and math achievement in early elementary school. *Journal of Cognition and Development*, *14*(2), 187–202.

Sashittal, H. C., Jassawalla, A. R., & Markulis, P. (2011). Teaching students to work in classroom teams: A preliminary investigation of instructors' motivations, attitudes, and actions. *Academy of Educational Leadership Journal, 15*(4), 93-106.

Stevens, F., Lawrenz, F. & Sharp, L. (1993). *User-friendly handbook for project evaluation*. Washington, DC: National Science Foundation. Retrieved from http://files.eric.ed.gov/fulltext/ED366511.pdf.

Swart, W., MacLeod, K., Paul, R., Zhang, A. & Gagulic, M. (2014). Relative Proximity Theory: Measuring the Gap Between Actual and Ideal Online Course Delivery, *American Journal of Distance Education*, 28:4, 222-240, DOI: 10.1080/08923647.2014.924721.

Swart, W., Wengrowicz, N. & Wuensch, K. (2015). Using transactional distances to explore student satisfaction with group collaboration in the flipped classroom, *International Journal of Information and Operations Management Education, 6*(1), 24-48.

Swart, W. & Wuensch, K. (2016). Flipping Quantitative Classes: A Triple Win. *Decision Sciences Journal of Innovative Education, 14*(1), 67-89.

Swart, W. & MacLeod, K. (2016). Searching for Socrates: How to Engage Online Students, *Journal of Systemics, Cybernetics and Informatics, 14*(4).

Swart, W. (2017). *Extending the principles of flipped learning to achieve measurable results: Emerging research and opportunities.* IGI Global, Hershey, PA.

Tarasi, C., Wilson, J., & Puri, C. (2013). MBA students' quantitative attitude: Confident or anxious? *Journal of Higher Education and Practice*, *13*(1), 38–44.

Taylor, A. (2015). Flipping Great or Flipping Useless? A review of the flipped classroom experiment at Coventry University London Campus. *Journal of Pedagogic Development, 5*(3), 57-65.

Walling, A., Istas, K., Bonaminio, G., Paolo, A., Fontes, J., Nancy Davis, N. & Berardo, B. (2017). Medical Student Perspectives of Active Learning: A Focus Group Study, *Teaching and Learning in Medicine, 29*(2), 173-180, DOI: 10.1080/10401334.2016.1247708.

Wengrowicz, N., Dori, Y.J. and Dori, D. (2014) 'Transactional distance in an undergraduate project-based systems modeling course', *Knowledge-Based Systems*, Vol. 71, No. 6, pp.41–51, doi:10.1016/j.knosys.2014.05.022.

Zanakis, S., & Valenzi, E. (1997). Student anxiety and attitudes in business statistics, *Journal of Education for Business*, *73*(1), 10–16 (published online 31March, 2010).

Zhang, A. (2003). *Transactional Distance in Web-based College Learning Environments: Toward Measurement and Theory Construction* (Doctoral Dissertation. Virginia Commonwealth University, 2003). Dissertation Abstracts International, A 64/02, 477. (UMI Pub No. AAT 3082019) (http://wwwlib.umi.com/dissertations/fullcit/3082019).