Flipping MIS Classroom by Peers:
Gateway to Student's Engagement Intention

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ABSTRACT

Flipped classroom is one approach of active learning leading to better students' learning, abilities, and academic performance. The aim of this study is to evaluate the effect of applying the flipped classroom approach to MIS course, to examine the antecedents of engagement intention after participating the flipped classroom by peers, and to guide key factors of success student presentations. The quasi-experimental retrospective pre-post design is adopted during the whole semester. Eight rounds of student presentations were conducted. Data were collected after each round. Descriptive statistics, t-test, simple linear regression, and multiple linear regression were used. The findings confirm the relationships among perceived usefulness, satisfaction, and engagement intention. There were significant differences among students' perceived usefulness and intention before and after applying the flipped activities. Audience students also suggest the proper settings for the flipped classroom by peers.

Categories and Subject Descriptors

• **Applied computing~Interactive learning environments** • *Applied computing~Collaborative learning* • Information systems~Social networking sites

Keywords

Flipped Classroom; Perceived Usefulness; Engagement Intention; Satisfaction; Adoption; Education

1. INTRODUCTION

Learning in the 21st century has focused more on active learning. Active learning is the change from lecture-based learning to given tasks or questions to help students comprehend a concept [1]. Findings from the literature support that students value active learning and peer interaction [11]. Strategies enabling the active learning are flipped classrooms, team based learning, problem based learning, and case based learning [38]. A flipped classroom, sometimes called "blended learning/ inverted classroom", is an approach which expects students to learn theoretical concepts outside classroom settings, using computer technology and the Internet, and provides active-learning activities in class for students to apply these concepts such as

group exercises to solve problems, application activities, case studies, discussions, and role playing, facilitating by lecturers or other students [1; 8; 17; 29; 33; 35; 41; 52].

In flipped classroom, lecturers have to design learning experiences to draw engagement intention of students in the collaborative classroom, whereas students are accountable for self-directing themselves to explore online materials of foundational knowledge before class [15]. Flipped classroom characteristics consist of changing in use of classroom time/ out-of-class time, conducting homework, active learning, peer learning, and problem-solving in class, doing pre-class/ post-class activities, and adopting technology, especially video [1]. Several benefits of the flipped classroom include promoting students' learning without the barriers of time and location, introducing additional materials to students, increasing students' academic achievements, facilitating productive discussion, increasing collaborative and peer learning and students' interaction during class time, enhancing students' abilities [14; 38; 45; 55]. Some study also emphasizes that the majority of students prefer watching videos over the traditional face-to-face lecture [18].

Some studies explore the flipped classroom. Missildine, Fountain, Summers, and Gosselin determine the impact of flipping lecture and homework together with innovative classroom activities on the academic achievement and satisfaction of nursing students, applying a quasi-experiment to compare three methods: traditional lecture only (LO), lecture and lecture capture back-up (LLC), and the flipped classroom approach of lecture capture with innovative learning activities (LCI). Results show that students in the LCI group gain higher examination scores than others, but are less satisfied with the flipped classroom method than others [34]. Cheng applies the quasi-experimental design to examine students' satisfaction and learning outcomes from flipping MIS class with mobile technology. The study finds that students using iPads to access the web-based tutorials (eTutor) outperform more than students using PCs. However, students in the iPads group feel less satisfied with learning than the control group [9]. Bijlani, Chatterjee, and Anand examine using concept maps to facilitate a flipped classroom, by implementing them as a pilot study with senior students. Findings indicate positive results of the visual knowledge representation [5].

Law presents an approach to flip the introduction to MIS course, applying free tools and web-based sources. Also, developing assessment tools to monitor individuals' learning outcomes better [27]. Schultz, Duffield, Rasmussen, and Wageman investigate the influence of flipping classroom on the academic

success of students enrolled in the advanced placement (AP) chemistry course. Statistical differences are found on a favorable perception and all assessments of flipped-class students, which are higher than traditional class students on average [40]. Elliott analyzes students' opinions in a flipped sophomore-level IT course, applying surveys and reflective statements. Results show that the course satisfaction with the flipped concept is significant [14]. Kong conducts pre- and post-tests to examine applying digital classrooms to increase students' information literacy competency and critical thinking skills. Findings show that students gain a statistically significant growth in their domain knowledge, information literacy competency and critical thinking skills [25]. Chen and Chen explore a holistic flipped classroom in a higher education context, using a survey, an interview, and computer system logs to validate the effectiveness of the flipped approach. It is found that students' satisfaction, attendance, and efforts are improved, showing positive results [8]. Crews and Butterfield examine students' preferences for face-to-face and online learning. Findings indicate that the class structures supporting flexibility, organization, and clear expectations, mostly affect the online learning experiences [11].

Mikkelsen explore experiences, perceptions, and behavior of nursing students enrolled in a flipped course, adopting videos and active-learning activities in teaching. Students express high satisfaction with assigned videos. The majority of students prefer the flipped approach over traditional teaching [33]. Gilboy et al. implement the flipped classroom, using a template to guide faculty to conduct before, during, and after class activities. The majority of students positively evaluates the flipped method over the traditional ones [18]. Krueger and Storlie apply a case study to evaluate the flipped approach. The assessment of students' opinions and outcomes shows that the flipped classroom's preferences are significantly higher than un-flipped classroom. On the contrary, there are no differences of learning outcomes between flipped and un-flipped classrooms [26]. Tan, Brainard, and Larkin evaluate the acceptance of flipping classroom model compared with standard lecture-based model for in-house emergency medicine teaching. Results indicate that the most of medical staffs prefer the flipped classroom (case-based discussion, peer interaction, knowledge application, self-directed learning, and small-group learning) over the traditional classroom [49]. Stephens et al. examine the effectiveness of teaching an introductory productivity software course using blended and flipped approach. Results indicate the learning effectiveness (exam grades) is a function of class engagement such as face-to-face class activities and class videos and student experience [45].

Aşıksoy and Özdamlı examine the impact of flipping a physics course on students' achievement, motivation, and self-sufficiency, applying Keller's Attention, Relevance, Confidence and Satisfaction (ARCS) motivation model. The experimental results identify that the achievement, motivation, and self-sufficiency of students in the flipped course are increased more than the control group [4]. Zhonggen and Guifang determine the effectiveness of flipping business English writing course, combining the quantitative and qualitative research approaches. It is concluded that the flipped model brings better academic achievement and course satisfaction than the traditional classroom [55]. Sajid et al. evaluate the perception and academic performance of year three students towards blended learning.

Online lectures and asynchronous discussion boards are applied. Feedbacks of students express their satisfaction with the flipped classroom, whereas the grade comparison does not show a significant increase in the academic performance [38]. Breimer, Fryling, and Yoder compare traditional, semi-flipped, and fully-flipped classroom models by three different lecturers in teaching an Introduction to Programming course. Findings indicate that conducting in-class activities satisfy students. Semi-flipped class with activities and lectures in class and lecture videos outside class gives best overall students' experience, but not impact students' performance [6].

Although those research studies flipped approach, flipped classroom is generally under-evaluated, under-theorized and under-researched [1; 33]. Studies on more courses, the implementation of flipped classroom, students'/ educators' involvement, and attitudinal and motivational practice settings for learners, the effect of different learning activities on student performance and satisfaction are still required [8; 35; 45; 49]. The aim of this study thus to examine the influence of flipping MIS course by peers and to answer the followed research questions. 1. Does the perceived usefulness of a student lead to higher satisfaction in flipped classroom? 2. Do the changes in a student's perceived usefulness and satisfaction drive engagement intention? 3. What are the differences in a student's perceived usefulness and engagement intention between before and after attending the flipped MIS class?
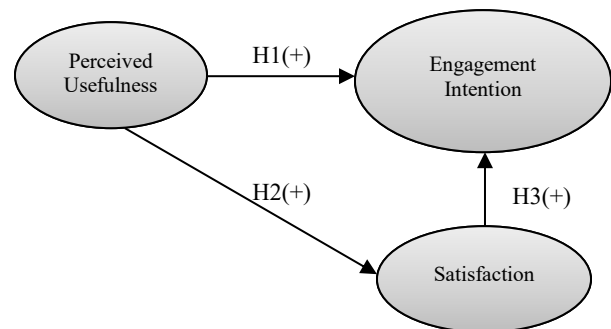
2. RESEARCH MODEL AND HYPOTHESES

Figure 1. Research Model.

2.1 Perceived Usefulness

Figure 1 presents the proposed model. According to the Technology Acceptance Model (TAM), perceived usefulness positively increase behavioral intention to use [12]. It is also supported by the literature that perceived usefulness positively affects intention to use in the environments, such as MOOC, augmented reality, ES classroom, web 2.0 [30; 50; 53; 54]. In addition, perceived usefulness affect satisfaction with e-learning and virtual classroom for online MBA courses contexts [3; 19; 28]. Flipped model is effective in learning and thus satisfies students [55]. The perception that learning activities created by educators are helpful could lead to student satisfaction [8]. Benefits of flipped classroom approach are improved understanding, ability to apply theoretical concepts, focused on problem solving, open lines of communication, flexible approach, and clear instructions [51].

Considering understanding, flipped classroom design and implementation could guide students through their learning stages (knowing, understanding, and applying). Applying the flipped classroom approach also enhance students' understanding and their ability to apply underlying concepts [51]. Flipped classroom with online learning, peer discussion, cognitive maps, and self-directed learning helps students reducing mental efforts and cognitive engagement, which are later beneficial for better academic performance [55]. Flipped classroom increases a student's understanding by the increase of discussion and faculty engagement [38]. Successful flipping classroom embodies in-class discussion about outside-class content studies, enabling students to gain more knowledge and deeper learning [29]. Flipped classroom assures a teacher to aware of content misunderstanding by students [29]. Many students (more than 60 percent) specify that online recorded lectures make them learn materials more effectively than the traditional lecture [18]. Flipping Excel course could increase the understanding, application, material retention, and satisfaction level of students with the course [16]. Engaging in active and peer learning in a flipped classroom leads to more concept comprehension than a traditional classroom [4]. All respondents agree that videos in the flipped classroom help them to gain better knowledge regarding kidney and urinary system anatomy and physiology [33].

Considering problem solving skills, Flipped classroom could help students to assess studied topics from a critical thinking viewpoint [56]. It also enables a student working together to solve assigned problems in the classroom rather than working on the homework alone [35]. Replacing didactic with online studies could significantly improve student performance in undergraduate medical education. Flipped classroom with student-centered learning also enhance critical thinking, application, and information retention [38]. Students in the flipped classroom present high order thinking skills. Flipped classroom is related to problem solving, inquiry learning, and active learning together with interpersonal communications [29]. In addition, junior secondary school students are confirmed the improvement of their critical thinking skills (awareness and capacity) from the designed digital classroom [25]. Increasing student-teacher interactions and employing student-centered learning environment positively impact student learning and performance [40]. Solving physics problems dimension of students is significantly increased after applying flipped classroom approach [4].

Considering other skills, revised MIS course could heighten students' technical skills such as developing a website using web building tools, operating wiki [27]. The flipped concept is an effective teaching to increase students' academic performance [4; 40]. IT aided flipped classroom could enhance learners' self-efficacy, hence improve the learners' positive attitudes towards the flipped approach [55]. Flipped method of teaching give positive results in a higher course examination [34]. Considering the increase of topic's interests, students feel more engaged in the flipped classroom. They regularly study materials, resulting in staying up-to-date with the course content [51]. Many students like to watch videos for the course topics rather than having straight lectures [18]. Students feel having deeper knowledge of all topics after the flipped classroom exercises [56]. The revised MIS course improves a student's motivation towards learning IS topics, especially due to the

dynamic course contents to match the diverse interests of non-IS students [27]. Flipping architectural engineering course contribute to more interests in the course and realizing how useful the videos and PowerPoints are [29].

Therefore, this study proposes the following hypotheses:

H1: Perceived usefulness positively affects students' engagement intention.

H2: Perceived usefulness positively affects students' satisfaction.

H4: There is a difference in the perceived usefulness of students after applying the flipped classroom by peers than before applying it.

2.2 Satisfaction

According to Delone and McLean IS success model, user satisfaction positively impacts intention to use [13]. Learners' perceived usefulness positively affects their satisfaction of the e-learning system [19; 28; 47]. Students seem to enjoy engaging in the flipped classroom [29]. The enjoyment of the flipped classroom nature and feeling up to date with the course could increase student engagement throughout the semester [51]. New learning experiences enhance the perception of value and satisfaction of students [45]. Learners' positive attitudes towards the flipped classroom come from the increase of their satisfaction. Students' satisfaction with online learning also decreases dropout rates, increase their learning persistence, and persuade more efforts in learning, driving students' success [55]. Flipped classroom receives strong positive preferences from both lecturers and students [49]. Blended learning gains significant satisfaction from student in Saudi Arabia [38]. Flipped classroom enhances a higher level of student satisfaction and engages students more actively, compared to the conventional classroom [26]. The flipped approach increases the satisfaction level of the Excel course [16]. Many students (more than 40 percent) prefer the flipped classroom over other approaches [33]. The majority of students are quite satisfied with the flipped classroom because of its interesting. They enjoy the collaboration on group assignments and prefer the flipped classroom section [14]. The ability to adapt knowledge in class with lecturers, ability to re-listen video lectures , and ability to learn at the students' own pace make students give favorable responses to the flipped approach [40].

Therefore, this study proposes the following hypothesis:

H3: Students' satisfaction positively affects their engagement intention.

2.3 Engagement Intention

Intention to use is believed that using the system is valuable or have a tendency to use it [19]. The flipped classroom empowers students' development and engagement [32]. Assigned videos for students to watch make them well-prepared for the ensuring activities in class [33]. Flipped classroom and inverted approach actively engage learners both before class time (watching video lectures) and during class time (participating in-class activities and interacting with teachers) [33]. It also strongly motivates students to join collaborative and active learning activities [55]. Flipping teaching of ninth grade class decrease failure drop, the number of discipline cases, and parental complaints [29]. It also gives the same result for an introductory biology class,

decreasing drop rates, higher attendance and increasing positive student attitudes and exam scores [46]. Higher class attendance also leads to better academic performance, measured by college grades [10]. Flipping higher education classes in the U.S. demonstrate the improvement of students' engagement, preparation, and achievement [29]. The majority of students prefer participating in-class activities rather than listening to lectures for two class periods [18]. From the professor's perception, students engage more and have superior understanding of the theoretical concepts applied to the assigned projects [26]. Active and student-centered approach of flipping classroom generates the quality class time and also attracts students' attention [4]. Flipping physics course significantly increases students' motivation and the course attention [4]. Flipped classroom approach makes small groups of students more engaged in case studies, simulation, and other learning activities [34]. Flipped classroom motivates students to attend and learn substantial materials out of class, and thus promote students' motivation and satisfaction as the outcomes of their learning [1].

So, this study proposes the following hypothesis:

H5: There is a difference in the engagement intention of students after applying the flipped classroom by peers than before applying it.

3. RESEARCH DESIGN AND METHOD

3.1 Design and Participants

A quasi-experimental study with one-group and pre- and post-test were applied, with a convenience sample. One-group pretest posttest design is also used by various recent studies in the literature [23; 39; 43]. The study was conducted in an introductory MIS course of _____, _____ University, during the whole semester period. The introduction to MIS is the basic required course offered for all undergraduate students, not only students from the MIS major. Generally, students enroll this course when they are in the first or second year. There were 20 students enrolled in this class. All of them participated in the flipped experiments. However, one later withdrew from the course. Finally, nineteen participants evaluated the overview of flipping classroom.

There are several methods for the flipped classroom that are lecture videos, pre-reading assignments, outside-class online discussions, online quizzes, and student presentations. Flipped course normally varies the use of these methods [26]. Flipped classroom design should contain the clear structure, available class information, and explicit milestones [11]. Talbert also emphasizes that the effective flipped classroom should include highly structure pre-class assignments, means of accountability, well-design sense-making activities, and open-lines of communication during the course [48]. Table 1 shows the summarize of flipping techniques applied in the MIS classroom. Online resources given to students were e-book, separated by each chapter, and pre-recorded lecture clips, and some information from the online sources, as presented in the Figure 2.

Table 1. Summary of flipped classroom techniques for MIS classroom

| Effective Flipped Classroom Elements [48]	Techniques Employed in MIS Course
Highly structured pre-class assignments	Reading slides, e-sheets, and information from online sources and listening lecture clips (1 hours 15 minutes length approximately)
Means of accountability	Flipped classroom assignment with firm deadlines for each group
Well-designed sense-making activities	Group presentation in free formats such as role playing, giving lectures, game playing, slide presentations
Open-lines of communication	Open communications with students via Facebook group
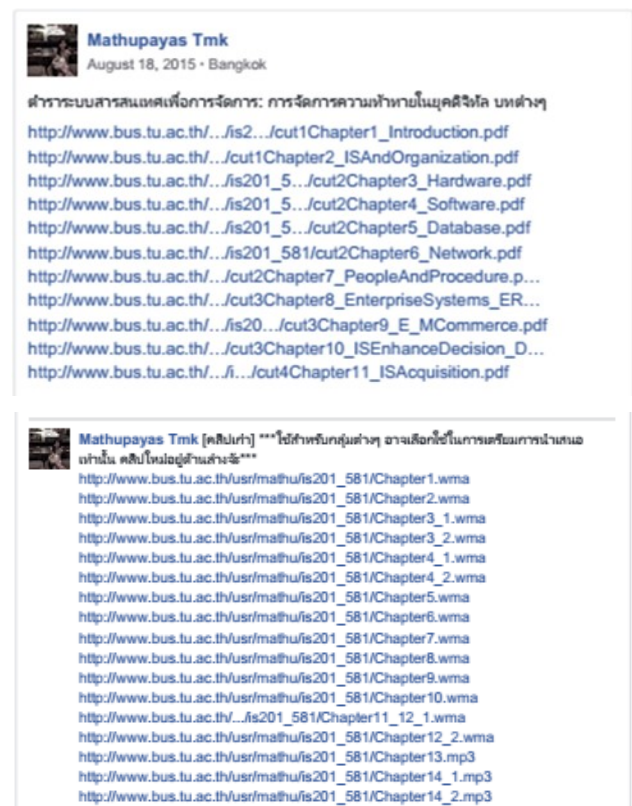
Figure 2. E-documents and sound clips regarding to the assigned topics, posted on the classroom's Facebook group

Although the flipped classroom approach presents various benefits, the pre-class assigned work for students may lead to the perennial problems of student preparation [1]. In addition, some students in the literature studies were less satisfied with the flipped experiences. They felt frustration, disconnect and depersonalization [33]. Janson, Ernst, Lehmann, and Leimeister also specify that the peer assessment is a useful mean for a flipped classroom [22]. Therefore, to decrease assigned loads and burdens for university newbies, this study applies the flipped approach partially, by introducing the flipped classroom

concept to students in advance, separating students into 4 groups (each group containing 4-5 students), assigning each group to study both online materials (e-sheets, lecture clips, information from online sources) and offline materials (PowerPoint slides) and to lead in-class activities (group presentation in free formats), and requiring their peers to evaluate perceived usefulness, satisfaction, and engagement intention received from the flipped classroom.

Group presentations were opened to be free formats, but collaborative and active styles. Eight topics assigned to each group consist of *introduction/ information systems in organizations* (Group 1: 1st round), *hardware* (Group 2: 1st round), *software* (Group 3: 1st round), *telecommunications and networks/ the Internet, intranets, and extranets* (Group 4: 1st round), *electronic and mobile commerce* (Group 1: 2nd round), enterprise systems/ information and decision support systems/ knowledge management and specialized information systems (Group 2: 2nd round), software development (Group 3: 2nd round), and the personal and social impacts of computers (Group 4: 2nd round). Some class points were given to the group conducting a flipped classroom presentation to encourage other students to participate. Each group presentation was facilitated by teachers, for instance, correcting some misunderstood concepts. After each group presentation completed in each week, an instructor would give full lectures regarding to the presented topic next week.

3.2 Data Collection and Procedure

Data were collected using a self-reported online questionnaire. The quasi-experimental retrospective pre-post methodology were applied to control the response-shift bias occurring in the classic pre-post tests and to decrease over- or under-estimation of pre-test [39]. The first section of a questionnaire is about students' information (id, name, and his/ her group id). The second section relates to the audience's satisfaction in terms of his/ her perceived enjoyment, perceived content coverage, perceived content credibility, perceived harmony of the presented group, and overall satisfaction, ranging from 0 to 5 marks. This mark was later combined to be the presentation scores for each group. The last section of pre- and post-test is about change in perceived usefulness (improving audiences' understanding, problem solving skills, creativity skills, and increasing audiences' interests regarding to the presented topic), change in students' engagement intention (intention to engage the next flipped presentation, intention to attend the class, and intention to participate in the classroom), and open-ended questions for additional comments about the student presentation. The second and third section apply 6-point Likert scale consistent with the scale of satisfaction, labeling 1 = lowest and 5 = highest.

Online questionnaires were collected from the audience students immediately via facebook group posts before giving lectures on that topic, to prevent the effects of traditional settings on related factors such as student comprehension. Students were encouraged to evaluate their peers' presentations by giving them 1 marks for each evaluation. Heckler recommends that, for factor analysis, the number of observations should be greater than 5 times of the number of variables [20]. For the regression analyses, the desired level should be 15 to 20 observations for each predictor variable [44]. After 8 repeated rounds of group presentations, 95 questionnaires were collected, which were passed the general rule of thumb for the data analysis phase.

4. DATA ANALYSIS AND RESULTS

4.1 Factor Analysis and Reliability Assessment

The research instrument was assessed its validity and reliability. Construct validity was explored using an exploratory factor analysis. Cronbach's alpha was applied to test the internal consistency of the constructs. Considering the construct validity, all Kaiser-Meyer-Olkin (KMO) metrics for evaluating sampling adequacy were greater than the rule of thumb 0.5 [2; 31; 36; 42], as shown in Table 2, indicating the homogeneity of the variables. The Bartlett's Test of Sphericity is significant at probability level 0.00, determining that the correlation matrix is not an identity matrix [2; 31]. Both metrics indicate the suitability of variables for conducting factor analysis. The principal component analysis with the varimax rotation was applied under the criteria: 1) all eigenvalues were greater than 1, 2) factor loadings of each construct were greater than 0.5, loading in only one construct, and 3) the interpretation of the variables in the constructs did make sense. Finally, three factors were extracted, as described in Table 2. The perceived usefulness (PU), satisfaction (SF), and engagement intention (EI) could explain 66.573, 56.350, 74.873 percent of the total variance. Every construct gained Cronbach's alpha values (> 0.8), indicating high reliability.

Table 2. Factor analysis results

Variables/ Subscales	Factor Loadings			%Cumulative Variance	Cronbach's alpha
	PU[1]	SF[2]	EI[3]		
Understanding	.852			66.573	.826
Problem solving Skill	.838				
Creativity	.818				
Increasing Topic's Interests	.753				
Enjoyment		.845		56.350	.803
Topic Coverage		.748			
Content Credibility		.743			
Teamwork		.733			
Overall Satisfaction		.675			
Student Engagement Intention			.880	74.873	.830
Class Attendance Intention			.865		
Class Participation Intention			.850		

[1]*Kaiser-Meyer-Olkin (KMO) = .792 Bartlett's Test of Sphericity: Chi-Square = 139.604 df = 6 p = .000*

[2]*Kaiser-Meyer-Olkin (KMO) = .810 Bartlett's Test of Sphericity: Chi-Square = 139.535 df = 10 p = .000*

[3]*Kaiser-Meyer-Olkin (KMO) = .720 Bartlett's Test of Sphericity: Chi-Square = 106.204 df = 3 p = .000*

4.2 Descriptive Statistics

Of 19 students participating in the overall flipped assessment, 7 students (36.84%) are males, 12 students (63.16%) are females. Most of them (7 students, 36.84%) generally went back to study the content (in every course) around 2-3 times per month. Seven students (36.84%) also reviewed the materials around 4 times per month. Four of them (21.05%) often reviewed the content 2-3 times per week, whereas one student (5.26%) went through the content less than once per month. Regarding the presentations, twelve students (63.16%) had experienced in giving class presentations, approximately 2-3 times per month. Five of them (26.32%) rarely gave presentations less than once per month, two students (10.53%) presented the assigned topics by teachers approximately 4 times per month.

According to the definition of student characteristics [7], five of them (26.32%) were dependent learners who preferred to mainly have classroom lectures, setting topics with clear assigned details by teachers. Four of them (21.05%) were independent learners that liked to participate in constructing the course content and structure, also the assigned topics. Most of them (10 students, 52.63%) were collaborative learners who preferred classroom discussions and interactions, group projects, and learning from case studies.

After receiving full lectures after flipping the assigned topics by peers, six students (31.58%) had more knowledge about the course content (Knowledge). Six of them (31.58%) had more understanding about the content (Comprehension). Three of them (15.79%) thought that they could apply the course content with their daily lives (Application). Three of them (15.79%) believed that they could synthesize the topics with other content they learnt (Synthesis). One of them (5.26%) thought that he could analyze or separate the content to deeply understand it (Analysis). None of them believed that they could evaluate the correctness of the course content (Evaluation).

4.3 Testing Hypotheses

The proposed model was evaluated using simple and multiple linear regression. Perceived usefulness significantly predicted the engagement intention of students, $B = .460$, $t(93) = 5.167$, $p = .000$. Students' satisfaction significantly impacted students' engagement intention, $B = .387$, $t(93) = 4.347$, $p = .000$. Perceived usefulness and students' satisfaction also explained a significant proportion of variance in students' engagement intention, $R^2 = .602$, $F(1, 93) = 69.629$, $p < .001$. Perceived usefulness positively impacts students' satisfaction, $B = .675$, $t(93) = 8.812$, $p < .001$. It also explained a significant proportion of variance in students' satisfaction, $R^2 = .455$, $F(1, 93) = 77.646$, $p = .000$. Therefore, *H1 - H3* were accepted.

Table 3 shows the means, standard deviations, and paired t-test of the pre- and post-test variables of all students during 8 rounds of presentations. Results show the significant increase of perceived usefulness in terms of audiences' understanding, problem solving, creativity, and their interests in the presented topics and engagement intention in terms of flipped classroom engagement, class attendance, and class participation between the pre-test and post-test. So, *H4 - H5* were supported.

Table 3. Changes in the perceived usefulness and engagement intention

Variables/ Subscales	Pretest		Posttest		
	Mean	**SD**	**Mean**	**SD**	**T-Value**
Perceived Usefulness					
Understanding	3.42	1.10	4.49	0.82	-10.438***
Problem solving Skill	3.58	0.94	4.36	0.82	-8.653***
Creativity	3.72	1.04	4.54	0.81	-8.468***
Increasing Topic's Interests	3.42	1.13	4.52	0.99	-9.683***
Engagement Intention					
Student Engagement Intention	3.75	1.12	4.48	0.94	-6.242***
Class Attendance Intention	3.89	1.05	4.63	0.96	-6.193***
Class Participation Intention	3.91	1.19	4.71	1.08	-6.811***

*** $p < 0.01$ (two-tailed)

4.4 Comments from Students

In the last section of the questionnaire, students were asked to give comments, feedback, or guidance to make the flipped presentation satisfying themselves more. Comments from audiences in each round were extracted and coded using conventional content analysis. Conventional content analysis is normally applied with a study design proposed to describe a phenomenon [21]. In this case, the phenomenon is the reactions of audience students. The coded comments are shown in Table 4. Considering positive comments, the most mentioned comments were related to the flipped activities or presentations by peers which are entertaining, creative, game plays, or enhancing audience's satisfaction more, such that 31 comments were made about this topic. Twenty-seven comments were emphasized about the presentation which is good and has expert and well-prepared presenters, and tricks to draw the attention from audiences. There were fourteen comments focus on the presentation that is easy to understand, nine comments were related to the refined content, good quizzes, and beneficial knowledge received from the presentation. Five comments were in regard to the conciseness of content and presentation.

Considering negative comments, main comments were about miscellaneous aspects of presentation, such as playing and presenting too fast, utilizing too much time, running confused game, needing conciseness, etc., showing by 20 comments. Fourteen comments focused on the comprehension and completeness of presentation and content (asking for more explanations, examples, and refined content). Twelve comments mentioned unwell-prepared presenters. In addition, twelve comments were related to uninteresting and unentertaining presentation, which fail to draw attention. Three comments include incorrect or unclear content, while two comments were about quiz dislikes.

Table 4. Categorical summary of audience students' comments

N (comments per student per round)	Done Well	Example Comments
31	Entertaining/ Liking game/ Creativity/ Feeling satisfied	"I like the flipped classroom with a game because jokes in the game make me easily remember the difficult names/ vocabularies." [#13] "I think the overall of the presentation is good, quite OK." [#11]
27	Good presentation/ Presenters having good knowledge / well-prepared presenters/ Having special tricks to draw attention	"My friends perform very well, very professional, and have professional looks, showing that they are well-prepared." [#6] "I like some snacks and candies given by the group, good to draw more attention from friends." [#6] "The presenter speaks so well, with impressed voice." [#11]
14	Easy to understand	"Presenters explain the concept and give good, easy to understand, and clear examples." [#3] "It is easy to comprehend, with the case study." [#7]
9	Giving beneficial knowledge/ refined content/ having good quizzes	"Many clips with beneficial knowledge presented are good." [#11] "I like that there are many quizzes to answer." [#16]
5	Conciseness	"Concise content is good." [#19]. "I like the conciseness. It's good." [#2]

N (comments per student per round)	Improvements	Example Comments
20	Miscellaneous things about running presentation, such as playing and presenting too fast, utilizing too much time, confusing game, needing conciseness, etc.	"I cannot catch up some clips." [#2] "Presenters use too many videos." [#20] "Presenters should better manage times to match the activities." [#11]
14	Giving less comprehension/ Too few examples/ Requiring more refined and detailed content	"I don't understand some technical terms. Presenters should explain more about those words." [#5] "I want presenters to add more examples." [#8]
12	Unwell-prepared presentation	"Some presenters strictly read from notes." [#10] "Some presenters are not ready to present. They seem unsure with the content they speak." [#6]
12	Uninteresting and entertaining presentation/ Failure to draw attention/ Needing more games	"They cannot draw attention from peers, worse than my expectations." [#10] "I want them to add more tricks to make the presentation more interesting." [#11]
3	Incorrect or unclear content	"There is some incorrect content." [#6] "Some content is unclear, make me confused." [#16]
2	Disliking quizzes	"The questions and answers are not interesting and quite not diverse." [#1] "The questions should be open-ended questions, asking about opinions rather than the correct answers." [#13]

5. DISCUSSION

Considering theoretical implications, only a few research quantitatively explores the study regarding flipped classroom. This study combines two theories: Technology Acceptance Model and Delone and McLean IS success model, and extends the theories with specific measures and the flipped classroom context. Researchers could later extend the proposed model with other antecedents of model constructs (perceived usefulness, satisfaction, and engagement).

Considering practical implications, making participants to foresee the received benefits of flipped classroom by peers (enhancing comprehension in the studied topics, problem solving skills, creativity, and topics' interests) could increase their satisfaction and engagement intention. Satisfaction could be enjoyable, topic coverage, the credibility of content,

teamwork, and overall satisfaction of peers' presentations. Both perceived benefits and satisfaction of students, especially the benefits, are later driven the intention to engage flipped activities, classroom, and classroom activities.

Flipped approach significantly increase both students' perceived usefulness and engagement intention. Flipped classroom by peers could decrease too many workloads assigned to newcomer students and support student-centered approach since the workloads about reading materials are distributed to their peers and the knowledge about the assigned topics are retrieved back by peers' presentations. Good flipped classroom using student presentations should promote enjoy, create, and satisfied feelings to audiences. Presenters should be well-prepared, have clear understanding about the presented topics, and have some techniques to draw attention from audiences, to make a good presentation. The slides and content should be refined, concise, easy to understand, and correct. Quizzes should not be too difficult, but challenging. Adding some game plays could also help the classroom environments more jolly.

6. CONCLUSION

The aim of this work is to explore the students' perceived usefulness, satisfaction, and engagement intention during the MIS course, designed by adapting the flipped approach. Only a few studies on the application of the flipping approach in MIS education have been published. In flipped-classroom settings, a group of students prepared to conduct in-class activities by reading online and offline materials provided by the instructor, freeing up time in class. Student-centered and active-learning activities in class were led by that group. After completing each presentation, audience students were asked to participate in a survey. The quasi-experimental retrospective pre-post design were applied in this study. Results show that students expressed moderate level of perceived usefulness and engagement intention (mean score between 2.81 – 4.40, adapted from the [24; 37]). However, flipping MIS course by peers helped them increase their perceived usefulness and intention to engage the class. The proposed model was also confirmed the relationship among perceived usefulness, satisfaction, and engagement intention. Comments from students also guide the proper implementation of flipping MIS class by peers to maximize students' pleasure.

There are some limitations of this study about the small and specific sample size. So, future works should replicate the study with wider samples, conduct the experiment with different classroom settings, extend the research model with more flipped-classroom drivers, compare the flipped approach with other approaches such as gamification concept, and compare the effectiveness of flipping classroom by peers and full flipped classroom approach.

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