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The Use of a Flipped Classroom to Enhance Engagement and Promote Active Learning

Associate Professor Dr Rozinah Jamaludin Siti Zuraidah Md Osman*
Centre for Instructional Technology and Multimedia, Universiti Sains Malaysia, Penang, Malaysia
* E-mail of the corresponding author: ctz80@yahoo.com

Abstract

This study was based on Reeve's (2013) four-aspect conceptualization regarding student engagement to promote active learning using a flipped classroom. The flipped classroom is defined as using technology to provide lectures outside of the classroom, while assignments with concepts are provided inside the classroom through learning activities (Clark, 2013). Behavioral engagement is defined as teachers' direction of students toward activities that require them to apply initiative (Fredricks, Blumenfeld, & Paris, 2004). Emotional engagement is promoted by intentionally selecting materials that stimulate students' interaction with and feedback to the material (Taylor & Statler, 2013). Cognitive engagement is defined as the teacher's skill in questioning and the students' elaboration of an idea as an answer (Smart & Marshall, 2012). Agentic engagement is student self-learning, with a contribution from the lecturer to provide instructional support (Reeve & Tseng, 2011). A descriptive quantitative methodology was used in which 24 undergraduate TESOL students took the course QMT 212 Instructional Design. The results show that emotional engagement ($\bar{x}$ =5.79)(sd=1.02) has the highest score, followed by behavioral engagement ($\bar{x}$ =5.62)(sd=0.69), cognitive engagement ($\bar{x}$ =5.61) (sd=1.02) and agentic engagement ($\bar{x}$ =5.1)(sd=1). This study also shows that, for active learning to occur, emotional engagement is one of the important factors as compared to other types of engagement.

Keywords: engagement (behavioral, emotional, cognitive and agentic), flipped classroom, active learning

1. Introduction

"Engagement represents the range of action students take to advance from not knowing, not understanding, not having skill, and not achieving to knowing, understanding, having skill, and achieving" (Reeve, 2013, p.580). This study was based on Reeve's (2013) four-aspect conceptualization of student engagement. Students' behavioral, emotional and cognitive engagement will exist if there is a relationship with the teacher and instructional support during learning activities (Reeve & Tseng, 2011). While agentic engagement is similar to the other three types of engagement, the concept is uniquely proactive and agentically engages the student to take action before the learning activities take place and to create their own instructional cooperation with the lecturer's instruction (Reeve, 2013).

Herreid and Schiller (2013) assert that a flipped classroom engages and focuses students' learning by combining active, student-centered learning with content mastery that can be applied in the real world. According to Clark (2013), activities with real-world scenarios could be implemented by hands-on and project-based learning activities during class time to enhance students' understanding and comprehension of the content and to encourage them to verbalize their engagement with such activities. There are some challenges and problems that must be faced by the lecturer and the students using a flipped classroom to promote active learning as a means of enhancing student engagement.

1.1 Problem Statement

Davies, Dean and Ball (2013) stated that the process of changing from a traditional classroom to a flipped classroom can be challenging because of a lack of facilities, internet accessibility and effective models. However, it is important to help students learn and develop their learning skills using innovative methods of instruction (Tsai, Lee, & Shen, 2013). A lecturer can enrich lecture presentations through the incorporation of multi-media content as an innovative method of instruction, for example, the use of PowerPoint (Leicht, Zappe, Messner, & Litzinger, 2012); students still must memorize the material (i.e., notes and PowerPoint slides) that will not increase classroom engagement (Ahlfeldt, Mehta, & Sellnow, 2005). Engagement may not exist because of environmental factors, lack of understanding or satisfaction, accessibility of local education services (Kettlewell, Southcott, Stevens, & McCrone, 2012) or innovative instruction. Therefore, the implementation of the flipped classroom will increase student engagement, resulting in positive educational outcomes and improving their

performance as a result of the learning environment (Reeve, 2013; Wilson, 2013).

1.2 Research Objective

This study report is based on Reeve (2013), which identified four aspects of engagement, i.e., behavioral, emotional, cognitive and agentic, that provide the pathway to active learning. The objective of this study is as follows:

1) To investigate behavioral engagement as a pathway to promote active learning through a flipped classroom.

2) To investigate emotional engagement as a pathway to promote active learning through a flipped classroom.

3) To investigate cognitive engagement as a pathway to promote active learning through a flipped classroom.

4) To investigate agentic engagement as a pathway to promote active learning through a flipped classroom.

1.3 Theoretical Framework

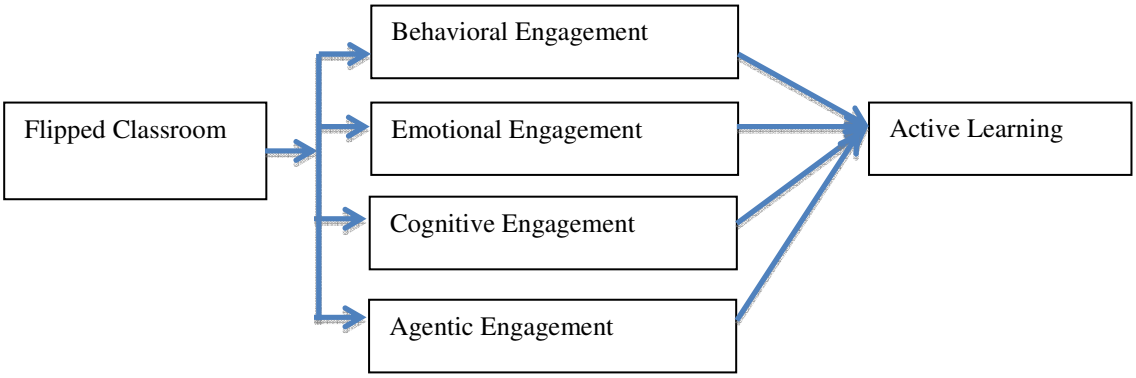

Figure 1. Theoretical Framework

Figure 1 shows the theoretical framework of this study, which is based on Reeve (2013). The learning environment of this study is a flipped classroom that had been implemented to enhance four aspects of student engagement in an effort to promote active learning.

3. Literature Review

3.1 Flipped Classroom

The flipped classroom was introduced by Jonathan Bergmann and Aaron Sams for students who had missed class; they used live video recordings and screencasting software to record lectures, demonstrations, and slide presentations with annotations and posted them for the students to watch and read (Hamdan, McKnight, McKnight, & Arfstorm, 2013). Bergmann and Sams (2012) assert that, by using a flipped classroom, the lecturer no longer must lecture for two hours while students take notes; class time no longer is used to lecture, but instead, is used for activities and problem solving (Acton & Knorr, 2013; Roach, 2013; Tucker 2012). According to Strayer (2012), students who have learned material before class will become bored in using the material compared to students in a traditional class, in which they receive the material during the class. However, according to Bishop and Verleger (2013), studies show that interactive online videos had a better effect and outperformed in-person lectures. A pilot of a flipped classroom using screencast video technology that was conducted by Flumerfelt and Green (2013) showed impressive academic achievement and behavioral improvement that could increase interaction between teachers and students; in turn, this could create opportunities for active learning (Leicht, Zappe, Messner, & Litzinger, 2012). Wilson (2013) also stated that the

use of a flipped classroom will increase student engagement and improve their performance.

3.2 Behavioral Engagement

Activity theory and trace theory, which were used by Bouvier and Sehaba (2009) to identify behavioral engagement, pinpoint traces of interaction in the performed activities. According to Cothran and Ennis (2000) and Pociask and Settles (2007) (cited in Sherab, 2013), effective communication, the exhibition of a caring attitude toward students' learning, provision of active learning opportunities and the use of cooperative learning approaches enhances behavioral engagement. In addition to students' satisfaction and achievement, time on task, social and academic integration and teaching practice are related to student behavior (Kahu, 2013). Therefore, with the support of the learning environment, high behavioral engagement will lead to active learning.

3.3 Emotional Behavior

According to Taylor and Statler (2013), there is a relationship between emotions and learning: "Less emotion means less learning and more emotion means more learning" (p.9). This means that the student who receives no feedback in class or on discussion boards will not learn through that material post about that particular topic. To the contrary, Newmann, Wehlage and Lamborn (1992) (as cited in Kahu, 2013) suggest that students can still complete their work and learn well without being emotionally engaged in the topic. However, emotional engagement will help students to assume responsibility towards one another, which in turn, will motivate them to complete the task (Jones, 2012). Class material is one of the components representing student engagement that involves emotion (Handelsman, Briggs, Sullivan, & Towler, 2005). Therefore, discussion boards and problem solving in a flipped classroom could create emotional engagement, which will then lead to active learning.

3.4 Cognitive Engagement

The study conducted by Reeve (2013) shows that student willingness to engage was impacted by teacher attitudes and actions. Teachers who questioned using lower order questions in class did not allow discussion of problem-solving strategies and mental activities (Smart & Marshall, 2013). However, according to Chin (2007) (as cited in Smart & Marshall, 2013), when teachers questioned using higher order questions characterized by complexity, students had the opportunity to explain, justify and rationalize with others in the classroom. When questions were asked, students were cognitively engaged and had the confidence to answer the questions in class (Barr, 2013). Therefore, this reveals that cognitive engagement by asking questions, either on the discussion board or in class, is a pathway to achieve active learning in class.

3.5 Agentic Engagement

Agentic engagement is a new pathway for student engagement in which students try to create a more motivational and supportive learning environment for themselves and which enables educators to support students' efforts to engage themselves (Reeve, 2013). There is a need for a self-regulated learning environment for agentic learners to engage with supportive educators, who encourage students to seek feedback and help them to learn from their mistakes (Richards, Sweet, & Billett, 2013). Agentic engagement requires staff and students to have the capability to deal with new and challenging situations (Peach & Matthews, 2011) and is likewise fostered through peer collaboration that is mutually supportive (Richards et. al., 2013). Agentically engaged students will gain increased levels of learning and greater motivational support (Reeve, 2013).

3.5 Active Learning

The flipped classroom model has been recognized as promoting student-centered learning and active learning (Pierce & Fox, 2012). Active learning is one of the strategies to address the students' needs and to ensure appropriate instructional design support for critical thinking in certain contexts (Kim, Sharma, Land, & Furlong, 2012). However, according to Dixon (2010), there is no significant difference between student engagement in active and passive activities, though the content of online learning could be used to engage students by incorporating assignments, discussion forums and web pages that help to enhance students' social presence.

4. Methodology

In this research, a structured questionnaire was used that is based on Reeve (2013). Sample items from the instrument used are shown in Table 1. This instrument used a 7-point Likert scale that ranges from 1=strongly disagree, 2=disagree, 3=slightly disagree, 4=neither agree or disagree, 5=slightly agree, 6=agree, to 7=strongly agree. The respondents of this study are 24 undergraduate TESOL students in Instructional Design course QMT 212 at the Universiti Sains Malaysia, a premier public institution of higher learning. The data from the respondents were analyzed using the Statistical Package for the Social Sciences version 20.

Table 1. Sample Items From The Instrument Used

Variable	Sample Question
Behavioral Engagement	*When I'm in class, I participate in class discussion*
Agentic Engagement	*I try to make whatever we are learning as interesting as possible*
Cognitive Engagement	*I make up my own example to help me understand the important concept I am studying for this class*
Emotional Engagement	*When we work on something in class, I get involved*

The goodness of measure of the instrument used was assessed using the inter-item consistency reliability value. As shown in Table 2, all the Cronbach alpha values were above the criteria suggested by Nunnally (1978) (cited in Ogunkola & Archer-Bradshaw, 2013), who indicated that a cut off value of 0.7 is acceptable. Thus, it can be concluded that the instrument used in this survey is reliable.

Table 2. Reliability Values

Variable	Number of Items	Cronbach's alpha
Behavioral Engagement	5	0.957
Agentic Engagement	7	0.956
Cognitive Engagement	4	0.955
Emotional Engagement	5	0.955

5. Results

A descriptive quantitative analysis was used to compare the mean and the standard deviation. The results are presented in Table 3 and Table 4.

Table 3. Results of The Mean and Standard Deviation

	Mean ($\bar{x}$)	Std. Deviation (sd)
Behavioral Engagement		
Q1 [When I'm in this class, I listen very carefully.]	5.4783	.89796
Q2 [I pay attention in this class.]	5.6522	.71406
Q3 [I try hard to do well in this class]	5.7826	.85048
Q4[In this class, I work as hard as I can.]	5.6087	.94094
Q5 [When I'm in this class, I participate in class discussions.]	5.6087	.72232
Agentic Engagement		
Q6 [I let my teacher know what I need and want.]	5.0435	1.02151
Q7 [I let my teacher know what I am interested in.]	5.1739	.77765
Q8 [During this class, I express my preferences and opinions.]	5.0870	1.16436
Q9 [During class, I ask questions to help me learn.]	5.0000	1.20605
Q10 [When I need something in this class, I'll ask the teacher for it.]	4.8261	1.64184
Q11 [I adjust whatever we are learning so I can learn as much as possible.]	5.0435	1.58051
Q12 [I try to make whatever we are learning as interesting as possible.]	5.5217	.89796
Cognitive Engagement		
Q13 [When I study for this class, I try to connect what I am learning with my own experiences.]	5.5652	1.30823
Q14 [I try to make all the different ideas fit together and make sense when I study for this class.]	5.5652	1.16096
Q15 [When doing work for this class, I try to relate what I'm learning to what I already know]	5.8696	.86887
Q16 [I make up my own examples to help me understand the important concept I am studying for this class.]	5.4348	1.23679
Emotional Engagement		
Q17 [When we work on something in this class, I feel interested.]	5.4348	1.16096
Q18 [This class is fun.]	5.8696	1.21746
Q19 [I enjoy learning new things in this class.]	5.8696	1.14035
Q20 [When I'm in this class, I feel good.]	5.9130	1.16436
Q21 [When we work on something in this class, I get involved.]	5.8696	.81488

Table 4. Results of The Cumulative Mean and Standard Deviation

	Behavioral	Agentic	Cognitive	Emotional
Mean	5.6261	5.0994	5.6087	5.7913
Std. Deviation	0.68571	0.99669	1.01642	1.01709

In a flipped classroom, most of the respondents feel good in class as shown in item 20, which had the highest mean ($\bar{x}$ =5.91) among the 21 items (Table 3). However, in the flipped classroom, the item addressing whether students ask questions to help them learn had the lowest mean ($\bar{x}$ =5); nevertheless, the students still engage agentically in the flipped classroom.

The use of a flipped classroom to introduce four aspects of engagement promoted active learning. Table 4 shows that the mean of emotional engagement is the highest ($\bar{x}$ =5.79), followed by behavioral engagement ($\bar{x}$ =5.63)

and cognitive engagement ($\bar{x}$ =5.61), and agentic engagement ($\bar{x}$ = 5.1) is the lowest. The four aspects of student engagement are an average of slightly agree and agree. Therefore, behavioral, emotional, cognitive and agentic engagement promote active learning. Students are most engaged emotionally and less engaged agentically. The degree of consistency between the highest and lowest means shows nearly the same response among the means for emotional engagement (sd=1.02) and agentic engagement (sd=1), although emotional engagement had the highest mean compared to agentic engagement.

Table 5. Results of Correlation Between Means

	Mean A and B	Mean A and C	Mean A and E	Mean B and C	Mean B and E	Mean C and E
Pearson Correlation (r)	0.462*	0.851**	0.653**	0.563**	0.720**	0.689**
Sig. (2-tailed) (p)	0.270	0.000	0.001	0.005	0.000	0.000
N	23	23	23	23	23	23

**. Correlation is significant at the 0.05 level (2-tailed)*

***. Correlation is significant at the 0.01 level (2-tailed)*

Mean A = Agentic Engagement, Mean B = Behavioral Engagement, Mean C = Cognitive Engagement and Mean E = Emotional Engagement

A Pearson's engagement correlation coefficient was computed to assess the relationship between behavioral engagement, emotional engagement, cognitive engagement and agentic engagement (Table 5). There was a positive correlation between the four variables, mean A and B (r=0.462, n=23, p=0.270), mean A and C (r=0.851, n=23, p=0.000), mean A and E (r=0.653, n=23, p=0.001), mean B and C (r=0.563, n=23, p=0.005), mean B and E (r=0.720, n=23, p=0.000) and mean C and E (r=0.462, n=23, p=0.270). Overall, there was a strong, positive correlation between the four variables, behavioral engagement, emotional engagement, cognitive engagement and agentic engagement. For example, increases in emotional engagement were correlated with increases in agentic engagement.

5. Discussion

Past research has confirmed that students' behavioral, emotional, cognitive and agentic engagement helps them to make academic progress and to have a more motivationally supportive learning environment (Reeve, 2013). The findings of this study confirm that, by using a flipped classroom, students' behavioral, emotional, cognitive and agentic engagement did enhance active learning in the flipped classroom. This suggests that students were more emotionally engaged with the material provided in the flipped classroom when students feel interested in the class, enjoy learning new things, get involved, feel good in class and have fun. This is followed by their behavioral engagement when the lecturer directed them to the activities in class and the students listened carefully, paid attention, tried hard to do well and participated in the class activities.

In the flipped classroom, when the lecturer posts questions on the discussion board or asks a question in class, students are cognitively engaged by trying to make connections with their own experiences, relate the ideas to what they already know, trying to fit different ideas together and make sense of them, and generating their own examples to understand the concepts. Asking questions results in communication between the lecturer and the students, which, as reported by Dixon (2010), will result in a higher level of engagement and will produce active learning. Students engage agentically, but not at a higher level. Because it is their first experience in a flipped classroom, students do not yet fully contribute their own learning material during class. However, there is agentic engagement when students let the lecturer know what they need and want, communicate their interests, ask the lecturer if they need something in class, make adjustments and attempt to make whatever they are learning as interesting as possible.

Ramsden (2003) (as cited in Barr, 2013) asserted that active learning should affect the student's level of engagement. Sherab (2013) also stated that students' behavioral engagement and cognitive engagement were enhanced through the promotion of active learning. Therefore, using a flipped classroom, active learning was

promoted by student engagement in the discussion forum on Edmodo, active student participation in class and the sharing of their own learning processes with others to solve problems in the presence of the lecturer and their peers.

6. Conclusion

This study process has been a great experience for lecturers and students in a new environment designed to implement active learning to enhance students' behavioral, emotional, cognitive and agentic engagement as discussed by Reeve (2013). It was challenging to learn about new teaching environments and to implement them. The theoretical framework that was used created a caring environment designed to enhance student engagement by providing active learning opportunities. This environment could be implemented in other courses or followed by other lecturers at the Universiti Sains Malaysia or other tertiary institutions. It has helped lecturers to achieve their learning outcomes and to make teaching and learning more engaging, active and student-centered. Therefore, by changing the learning environment, this study contributes to a new culture of pedagogy and an overall improvement in teaching styles to support student engagement. This study has shown that using a flipped classroom to enhance student engagement promoted active learning during activities both inside and outside of class; according to Fredricks, Blumenfeld and Paris (2004), such engagement is associated with positive academic outcomes.

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