

Animation Students' Engagement and Motivation through Peer Teaching: Online Flipped Classroom Approach

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Abstract

Background Our ways of learning are rapidly changing with technological advancement, especially in online learning platforms. Animation and media education traditionally rely on a teacher-oriented demonstration in practical hands-on and face-to-face settings. Conversely, this study investigates a brand-new learning experience using peer teaching in the flipped classroom approach. How does peer teaching affect the learning attitude of animation students? How does this approach influence the learning engagement and motivation of animation students? This study attempts to answer these questions by introducing a conceptual framework based on engagement theory and self-determination theory (SDT), including motivational barometers under the new online flipped classroom pedagogy.

Methods Thirty-three bachelor's degree students in the digital media program participated in this action research. The researchers scheduled a peer teaching with flipped classroom experience for a three-month animation course. Subsequently, they collected three qualitative data sets from observations, self-reflective journals, and individual interviews.

Results The findings show a significant difference from the traditional classroom in four dimensions: freedom of choice, variety of teaching resources, effective learning from peers, and a favorable flipped classroom. These findings also indicate that the change of learning environment affects students' learning attitudes and classmates' relationships.

Conclusions This study suggested peer teaching with a flipped-classroom in animation education leads to higher learning engagement, which eventually facilitates the all-rounded development of students. This novel pedagogy is recommended to experiment in other undergraduate subjects.

Keywords Animation Education, Flipped Classroom, Learning Engagement, Motivation, Peer Teaching

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1. Introduction

In recent years, animation students' learning experience in higher education has changed considerably. Thanks to advanced technology and various social networks, students can now explore different learning platforms for self-learning and development (Oh et al., 2020). Universities also actively adopt student-centered pedagogies to encourage an active, collaborative, and interactive learning environment (Baepler et al., 2014; Gierdowski, 2013). Hence, many courses, including animation and media courses, have designed peer- and student-oriented learning activities that are more motivating and engaging (Oh et al., 2020). In a media design program where students take animation studio subjects, there are numerous teaching and learning activities between teachers-students and students-students. The researchers have observed an increasing interaction between students when sharing their technical knowledge in and out of classroom activities, especially with a blended learning environment. Students discuss and help each other in both face-to-face and online settings.

Furthermore, as Oh et al. (2018) posit, peer influence is crucial for animation students' learning experience because their rapport with their teammates' matters to perform well, enhancing engagement and motivation (Oh et al., 2018; Wentzel et al., 2017) in their project. This setting helps students impact each other's performance and inspiration during their studies (Eisenkopf, 2010). Working and interacting with peers naturally leads to peer teaching and learning in an animation studio-based learning environment.

Peer teaching is a method in which students who are experts in an area teach other novice students. Research has shown that this approach provides an opportunity for students who play teacher roles to acquire their domain knowledge (L'Roy, 1983) with the condition of using a similar database and understanding each other well in concept (Cornwall, 1980). Students who actively share their knowledge and skillset hold a related educational background or interest in achieving polished animation projects together in the animation classroom. They share their concepts, consult their peers for technical support, and give feedback to each other (Oh et al., 2018). Both teacher's roles and student's roles play an essential part in their overall learning experience in their studio. The students who take up a teacher's position notably perform highly efficiently and effectively in their cognitive skills, such as questioning and clarifying (Cornwall, 1980; Hattie, 2009; Stigmar, 2016; Topping, 2005).

Higher education institutions have actively implemented the flipped classroom as a technologically assisted pedagogy for the student-centered approach (Steen-Utheim & Foldnes, 2018). It allows students to experience active learning, which is highly related to their autonomous learning experience (Song et al., 2017; Oh, 2017; Steen-Utheim & Foldnes, 2018) in and out of the classroom. Animation students who utilize computer programs daily can benefit from those innovations in their studio-based learning environment (Oh et al., 2020). With the flipped classroom, animation studio class time can be more actively discursive, interactive, and social, especially with hands-on practice. At the same time, knowledge transfer happens outside the school (Abeysekera & Dawson, 2014) through online

platforms. With the flipped classroom approach, students take the lead as active participants in learning, sharing, and building a novel pathway (Damsa et al., 2015) to achieve their goals together. As a paradigm shift in the flipped classroom, teachers become facilitators instead of delivering one-way lectures while students develop independent and autonomous learning patterns. It can empower students by developing their self-efficacy and self-regulative skills (Steen-Utheim & Foldnes, 2018) through highly engaging learning activities with a deeper understanding of a subject.

The student participants in the researchers' media design program graduated from vocational training-oriented institutes where students acquire a technical skillset alongside their major study. With their experience handling different projects and software, students can share their know-how with their classmates for the team projects. In addition, when students teach each other, they enjoy the learning process, and their focus level is higher than when passively listening to lectures (Stigmar, 2016). Students learn outside the school while experiencing dynamic interaction with hands-on practice in the class. Students design their lessons using video tutorials such as "human figure walk cycle in 2D animation" or "special effect using motion graphics" and share the videos on our customized platform. The platform mediates students' teaching material that they create and fosters active participation. Other students thereby can learn flexibly through self-paced study and have hands-on practice time in the classroom (Steen-Utheim & Foldnes, 2018).

This paper investigates animation learning student motivation when integrating peer teaching into the flipped classroom approach by putting them into the teacher's role. Very little animation education research has been conducted so far, especially with peer teaching under the flipped classroom method. However, in the art and design education field, animation education plays a significant and critical role when considering the number of animation departments or schools worldwide (Ward, 2013).

Peer teaching can set an excellent foundation for students to be more motivated, competent, interactive, and independent learners in the flipped classroom environment. While many studies have investigated the topic of peer teaching and flipped classrooms separately, this study explores the advantages for students who adopt both approaches to maximize the benefit for them. Specifically, the research aims to address the following questions:

1. What is the learning experience under peer teaching with the flipped classroom approach in animation education?
2. How does peer teaching affect the learning attitude of animation students?
3. How does peer teaching under the flipped classroom approach influence the learning engagement and motivation of animation students?

2. Literature review

2. 1. Animation classroom in the media design degree program

Animation is an artistic, cinematic, and technical-driven medium that requires much technical skillset and collaboration to complete one fine product. Media design students learn to create animation in studio-based learning, an essential teaching method for any media-related education (Oh, 2018). In the studio, they generate ideas and visualize the story, background, and character design to bring them to life (Wells, 1998). Students learn from field experts and tutors and work on projects like professionals (Brocato, 2009). They need to know how to implement their project through the entire project pipeline—pre-production, production, and post-production—with consistent feedback and tutorial sessions from peers and teachers (Oh, 2018). Students work closely with their team members for a semester or an entire year to achieve highly refined animation projects. Animation is a practice that is closely associated with craft art (Ward, 2013); hence, students hone their skills by constantly practicing (Oh, 2018). Through this activity, students learn to collaborate to practice and take the opportunities to be active and independent learners during their course of study (Oh, 2018; Oh et al., 2018). Interacting and sharing with peers allows them to have a higher level of cognitive and social skills (Hetland et al., 2007) and foster a positive learning experience (Bazillion & Braun, 1998).

2. 2. Learning pyramid

Dale (1946) introduced the first classic learning pyramid called "Cone of experience." Treichler (1967) revised the model by including the approximated percentages of what people generally remember (Table 1). Later, Sousa (2006) introduced rates of retention (Table 2).

Table 1 Cone of experience (Treichler, 1967)

Percentage of what people generally remember	Method of learning
10%	What they read
20%	What they hear
30%	What they see
50%	What they hear and see
70%	What they say
90%	What they say as they do a thing

Table 2 Rate of retention (Sousa, 2006)

Rate of retention	Method of learning
5%	Lectures
10%	Readings
20%	Audiovisual
30%	Demonstration
50%	Discussion Group
75%	Practice by Doing
90%	Teach Others/Immediate Use of Learning

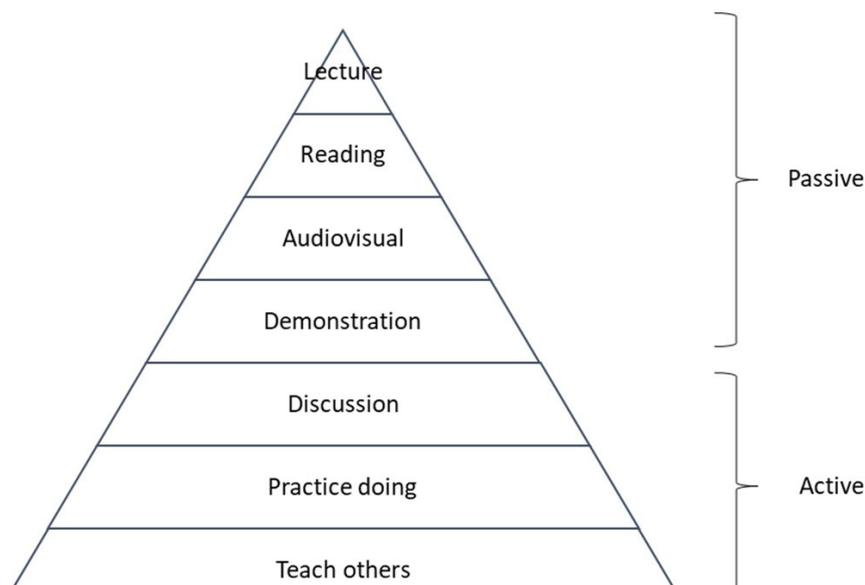


Figure 1 The active and passive learning pyramid model

The active and passive learning pyramid model (Figure 1) shows that active teaching methods, i.e., teaching others, practicing doing, and discussing, have a higher retention rate than passive learning methods, i.e., demonstration, audiovisual, reading, and lecture. Furthermore, Assadi (2018) pointed out that students retain more from what they learn using active learning methods like discussion, practicing, and teaching others. This argument corresponds with the classical model.

2. 3. Peer teaching in a flipped learning environment

Peer teaching is a concept and a teaching method that has been around for a few centuries (Briggs, 2013). Peer teaching effectively engages students with the complex idea of learning (Stigmar, 2016; Karpicke & Blunt, 2011) and their autonomous learning experience over the past decades (Benson & Danjun, 2013; Oh, 2017). In an animation classroom, students often collaborate on their projects. As Eisenkopf (2010) postulates, student's performance varies depending on their attitudes toward their groupmates and the project itself. Students are primarily motivated to perform well in teamwork because they want to maintain good relationships with their peers, mainly because they spend most of their time together in the studio (Oh et al., 2018). Cooperation encourages students to seek peer teaching and learning sessions using feedback to become more involved in achieving shared goals (Keppel et al., 2006).

When students alter their perceived role from a student to a teacher, they go through self-assessment, evaluation, monitoring, and learning (Stigmar, 2016) to allow their learners to understand well. Peer teachers keep constructing, retrieving, and reflecting on their knowledge to complement peer learners' existing knowledge, although they do not teach the new topic or materials as real teachers do. Teaching preparation helps them acquire a deeper understanding (L'Roy, 1983) about the subject, unlike learning shortcuts or memorization (Mazur, 2014).

For peer learners, the learning activity becomes more interactive and reciprocal (Boud et al., 2001) because they can easily participate in the pursuit of their learning. Peer-to-peer teaching and learning activities support all learners through a certain degree of freedom that allows them to ask questions or raise issues to the peer teacher. According to Oh et al. (2018), students' specific peer-to-peer teaching and learning culture is created and fostered in a studio-based environment by themselves. Peer learners experience the benefit of becoming more engaged and an enhanced sense of belonging in their peer group.

While the peer teaching approach transforms students' attitudes cognitively toward their learning, the flipped classroom physically supports them to be active and independent learners by providing a relaxed pace of adaptable lectures for all the students (Zarrinabadi & Ebrahimi, 2019). Students watch the video lectures on the platform created by their peers before the face-to-face tutorial time and engage with their peer teachers for the active, student-oriented, and self-regulated learning experience (Steen-Utheim & Foldnes, 2018; Oh, 2017). Conducting peer teaching in a flipped learning classroom fosters positivity in their learning and builds a dynamic and active learning environment.

2. 4. Student engagement and motivation

Shifting the role of students as passive recipients (Steen-Utheim & Foldnes, 2018; Stigmar, 2016) to teachers as active providers is a big challenge for students. Contrary to the traditional lecture-based classroom, animation learners in the media design course always engage in unique ways, such as peer critique and sharing sessions in their studios (Oh, 2018). This advantage of constant peer interaction keeps them feel engaged, effective, and self-authored. It also provides them with a sense of belonging (Oh et al., 2020; Ryan & Deci, 2000). Peer teachers must change their mindset in an animation classroom by preparing lectures and ensuring their peers understand them clearly through hands-on practice sessions. Engagement is an enthusiastic attitude towards learning activities and a willingness to get involved more (Christenson et al., 2012). According to Fredricks et al. (2004), students experience different dimensions of engagement in a session: 1) behavioral engagement, which focuses on participation in both academic and social activities; 2) emotional engagement, which comprises both positive and negative feelings for overall experience at school and makes students more enthusiastic with their projects; and 3) cognitive engagement, which integrates motivation and attention to master skills.

The procedure of peer teaching also equips students to lead their peers with a sense of autonomy (Benson & Danjun, 2013) and ownership. According to Ryan and Deci (2000), in their self-determination motivational theory (hereafter SDT), the sense of autonomy is one of the critical attributes for students to feel intrinsic motivation. Autonomy is a person's choice to be self-determined and to handle opportunities for self-direction (Deci & Ryan, 2002). In addition, Deci and Ryan (2002) continue to postulate other essential attributes of SDT that are competence and relatedness. Competence is the quality of a person who feels effective during interactions with others. Meanwhile, relatedness means that a person feels a sense of belonging to a community.

Changing the classroom dynamic, such as peer teaching in a flipped classroom, encourages students to have a more autonomous attitude when engaged and motivated throughout their studies. Learners are inspired to amplify their autonomous and independent learning outcomes by interacting with peers (Flink et al., 1990; Oh et al., 2018). Adopting a blended learning environment motivates students to be more interactive and supportive in and out of the classroom and facilitates a discursive learning environment by nurturing intrinsic motivation (Rasiah, 2014). Ma (2016) suggests that the benefit of peer interaction in the blended learning environment can foster a positive interpersonal relationship, which creates an engaging and motivating learning experience (Mazer et al., 2009).

3. Method

This qualitative research employed action research methodology by applying peer teaching under a flipped-classroom approach in animation education. A total of 33 students from a digital media bachelor's degree program at Hong Kong Polytechnic University comprised the participants of this research.

In this action research, the researchers observed and analyzed participants from two perspectives: teachers and students. As teachers, each group of students was required to perform peer teaching on specific animation techniques or software, such as how to animate clothing in Photoshop, Maya, After Effects, or Clip Studio. The researchers asked the participants to create and share tutorial videos using the customized platform (website). The website, therefore, featured different teaching materials from each session. Students also conducted face-to-face hands-on peer teaching sessions for discussion and practice. Peer teaching focuses on the student-centered classroom and allows students to speak freely with less pressure within a peer-led teaching environment. However, it can still be challenging for students when they take a teacher's role. As students learn to empower themselves and work together to understand teaching topics. As students usually share similar views and speak the same language, it can be more efficient when they teach and learn technical skills together.

As students, students were also learners in this flipped classroom approach. They watched a tutorial video online presented in advance by their peer groups. Then, they came back to class for a discussion and a hands-on session to learn the technical skills from their peers. Learning from their peers may create novel learning experiences and have positive effects on their learning engagement and outcomes.

Within four months in early 2021, the researchers collected three qualitative data sets from observation, self-reflective journals, and individual interviews throughout the animation studio subject. The researchers observed the teaching and learning conditions in every class. At the end of the semester, the researchers collected self-reflective journals from participants that detailed their learning in this subject. They also conducted interviews with each participant to obtain data and information for answering the research questions precisely. This study aimed to understand how flipped classrooms and peer teaching influence the learning engagement of animation students.

The researchers conducted qualitative data analysis through coding and finding a familiar pattern. This process allows the researcher to identify the critical affecter of learning engagement of the animation students. Three data sets provide rich information for achieving the research objective; simultaneously, another researcher conducted interviews and data analysis. This process employed triangulation to reduce bias and ensure the credibility of the research.



Figure 2 Action research process

3. 1. Conceptual framework

Learning engagement is a popular topic in education research. This study investigates the effects of peer teaching under flipped classroom practices on classroom learning engagement and motivation. This study adopted the engagement framework of Fredricks et al. (2004) and the self-determination theory of Deci and Ryan (1985, 2002).

Under the engagement theory, scholars investigated learning engagement from three dimensions: behavioral engagement, emotional engagement, and cognitive engagement (Fredricks et al., 2004). First, behavioral engagement has three different definitions: positive conduct, involvement in learning and academic tasks, and participation. Students are said to have good behavior (Finn, 1993) if they make an effort, pay attention, contribute to classroom discussions (Finn et al., 1995; Skinner & Belmont, 1993), and participate in school activities (Finn, 1993).

Second, emotional engagement refers to students' reactions in the classroom, including feelings of interest, boredom, joy, unhappiness, and anxiety (Skinner & Belmont, 1993) toward their learning experience with teachers. Fredricks et al. (2004) also postulate that emotional engagement is associated with motivation, as this paradigm focuses on interest, value, and rapport between teachers and students.

Third, cognitive engagement denotes an investment in learning that involves self-regulation, strategy, ambition, and a challenging mindset related to psychological investment (Newmann et al., 1992). Students are willing to learn, master their knowledge and skills to accomplish a task (Zimmerman, 1990), and invest psychologically. By showing effort, students become more cognitively engaged and motivated at the same time. Students would choose to work harder independently while trying to be flexible in finding better solutions to their problems. Hence, they can cope better when they experience failures.

Another essential theory the researchers adopted for this study is self-determination theory (SDT hereafter). Deci and Ryan (1985) developed SDT for students' psychological needs,

and it has been one of the most critical theories in educational research (Liu et al., 2009; Oh et al., 2020). SDT concerns of intrinsic motivation signify an individual student's pure interest and satisfaction (Oh et al., 2020). In this study, researchers employ the SDT model created by Deci and Ryan (1985) and initially modified by Oh et al. (2020) in their previous study. Ryan and Deci (2000) postulate that if an individual's three psychological needs, namely competence, relatedness, and autonomy, can be satisfied, their intrinsic motivation is heightened regardless of the situation. The first need, competence, motivate learners to interact effectively in their environment. Subsequently, learners feel optimal and effective when interacting with their social environment, experiencing opportunities, and expressing their capacities (Deci & Ryan, 2002; Shapira, 1976). The second need, relatedness, involves having warm and caring interactions and a sense of belonging in a community (Deci & Ryan, 2002; Furrer & Skinner, 2003). The last need, autonomy, refers to acknowledging choice provisions made by learners (Patall et al., 2013) and recognizing their self-determined and self-authored actions (Deci & Ryan, 2002).

The researchers developed the conceptual framework for this research using the primary motivators within the classroom engagement attributes in Fredricks et al. (2004) and SDT (competence, autonomy, and relatedness). In Table 1, critical engagement theories and SDT were adopted to propose the right-hand column, "Motivational barometers of peer teaching in the flipped classroom." The column presents the expected outcomes when applying these two theories' attributes to our specific research situation.

Table 3 Conceptual framework

Classroom engagement (Fredricks et al., 2004)	Self Determination Theory (Deci & Ryan, 1985, 2002; Oh et al., 2020)	Motivational barometers of peer teaching in the flipped classroom
Behavioral engagement: <ul style="list-style-type: none"> • Positive conduct, involvement in learning and academic tasks with effort, persistence, concentration, attention, and asking questions. • Positive academic achievement-related outcomes that prevent one from dropping out. 	Competence: <ul style="list-style-type: none"> • Learners feel effective in their interactions with the academic and social environment. • Learners experience opportunities to exercise and express their capabilities. 	Confidence and belief in their learning: <ul style="list-style-type: none"> • Peer-teacher students feel confident with their domain-specific knowledge by preparing the teaching materials for their peers. • Peer-learner students feel more attentive and comfortable asking questions to their peer-teachers. • Both peer teachers and learners communicate freely, and they experience more opportunities in expressing their needs and capabilities. • Students believe that they have positive academic progress.
Emotional engagement: <ul style="list-style-type: none"> • Affective positive and negative reactions in the classroom, such as interest, happiness, boredom, sadness, and anxiety. • Absence of negative emotion. 	Relatedness: <ul style="list-style-type: none"> • Learners become caring and are cared for by others. • A sense of belonging, both with other individuals and within the community of learners. 	Collaboration and reciprocation: <ul style="list-style-type: none"> • Students feel much easier and more comfortable collaborating than in teacher-led classrooms. • Students interact with each other, become more engaged, and have an enhanced sense of belonging. • Students take the lead as active participants in learning and sharing to pursue their academic goals together.
Cognitive engagement: <ul style="list-style-type: none"> • Investment in learning, e.g., self-regulation, being strategic, desire to go beyond the requirement, and preference for challenge. • Prevent students from dropping out of classes or schools. 	Autonomy: <ul style="list-style-type: none"> • Choice • Acknowledgment of personal feelings • Opportunities for self-direction • A sense that learners' actions are self-determined or self-authored. 	Active and independent learners: <ul style="list-style-type: none"> • Students know how to elaborate their learning instead of just passively listening to teachers. • All learners experience a certain degree of freedom when asking questions in a peer-led classroom. • Classroom becomes more active, discursive, and curious. • Learners set up their own learning time and pace; hence, autonomous learning happens, and they desire to do more than what they learn in a classroom.

4. Results and findings

The collected data and analysis revealed a set of valuable findings that answered the research questions. In general, most students gave positive feedback after experiencing peer teaching with flipped classrooms in animation course. Most of them stated that it was a brand-new and meaningful experience to become teachers, although students were quite shocked to do peer teaching initially. Compared with the traditional teacher-led learning approach, students found that this peer teaching approach satisfies the fundamental criteria of the animation studio subject, as it brought students lots of benefits and is more effective in learning. They said that they would welcome more subjects taught through a similar approach. Below are the three significant results from the data analysis.

4. 1. The learning experiences under peer teaching with a flipped classroom

From the data analysis, combining peer teaching and a flipped classroom with online resources is an innovative pedagogy in animation education. Teaching by peers and learning from peers brought students a distinctive learning experience. The four most mentioned experiences in the data are:

Freedom of choice. Students were empowered to choose the curriculums to teach in their sessions. They selected topics according to the expertise within the group or the topics they thought were interesting and essential in animation study.

Variety of teaching resources. When students prepared their teaching materials, they collected information from various sources such as previous education, experience, the internet, or books. The procedure of finding resources broadens their perspectives and inspires them to think further.

Effective learning from peers. As teachers, students worked very hard to understand the curriculums they were going to teach, as they needed to use the knowledge to teach their classmates thoroughly. As learners, they claimed that they felt comfortable learning from group mates and classmates, which reduces the hesitation of asking questions.

Favorable result of the flipped classroom. Students created tutorial videos and put them online for classmates to view and revise. Most of the students agreed that the online tutorial videos helped them prepare for the hands-on session and change after lessons.

This learning experience and environment reduced the learning barriers. Students engaged more in teaching and learning, which enhanced their learning motivation.

4. 2. The change in student's attitudes

In traditional animation education, interaction is not very often, and students are primarily passive learners. For instance, they usually passively observe the teacher's demonstration and attempt in their projects. However, the observation and interview results of this study show that students who participated in peer teaching have a significant change in learning

attitude, as in the following:

More effort was involved. When students have the responsibility to teach, they are more willing to put effort into it. For example, they might learn from groupmates or research to make sure they know the topic very well. Students also became more considerate, as they cared about how many classmates could learn from their teaching. They tried their best to help in the hands-on sessions and answer questions.

Self-regulation enhanced. To deliver a good teaching session, students put determination into planning, time management, and getting learners engaged. Students who were less interested in animation were self-initiated to learn more when they became teachers.

Active participation. From the learners' point of view, students paid serious attention during peer teaching sessions. They enjoyed learning from classmates, as they thought the curriculum was helpful and exciting. Students also stated that when their classmates were teaching, they felt very casual when raising their hands and did not hesitate to ask questions. These changes in learning attitudes show that the peer teaching approach allows students to learn more effectively, which may improve future learning.

4. 3. Relationship between classmates

During this action research, students experienced intense interaction with peers. They must collaborate in groups to complete the teaching tasks, and they learned from other classmates. The practice is like the project-based learning they used when creating animation. But this time, it included a brand-new area for them, which is teaching. Therefore, students learned skills from each other, and, at the same time, they worked closely to communicate and collaborate. After all, most of the participants said that they gained the following from their peer teaching approach:

Knowing their classmates better. Students were happy to get the chance to know more about their classmates with the online profiles created in the flipped classroom platform and the time they worked together. They knew more about their classmates' personalities, abilities, and strengths. Some of them stated that they can now easily find the corresponding classmates if they have questions in a particular skill. They also think they can now easily find groupmates for future projects.

Motivation from peers. Students claimed that they are motivated when they see the brilliant teaching materials done by other groups. It gave them a benchmark to pursue and a feeling of competition. Students wanted to prepare for their teaching sessions and do better in their projects and future work.

These findings indicated that peer teaching with flipped classroom pedagogy significantly influenced students' learning experiences, their attitude toward learning in animation classrooms, and their relationship and collaboration with their peers.

5. Discussion

By looking at the research findings with the conceptual framework, peer teaching has a favorable effect on animation student's engagement. It also propels students to have higher motivation in their studies. The findings indicate that peer teaching with a flipped-classroom approach affects classroom engagement and motivation in animation education.

5. 1. The facilitation of animation skills learning

This study indicated that peer teaching built a favorable environment for students to learn animation skills. Through the active participation of teaching peers and learning from peers, students obtained solid skill sets and knowledge about producing an animation. Compared with the teacher-led learning, students showed a more positive attitude and effort. They paid more attention in class and were more persistent in their learning. This performance perfectly matches the idea of behavioral engagement, which is essential for students to achieve academic outcomes and avoid dropping out (Fredricks et al., 2004). For a practical subject like animation, when students are behaviorally engaged and become active learners, they demonstrate a very positive phenomenon about learning by doing. Meanwhile, the flipped classroom online material acted as a strong reinforcement for students. Even if some of them cannot follow in class, they can always go back to review.

Furthermore, students can exercise and express their capabilities in the related curriculum more when digging into animation knowledge and preparing teaching materials. They became more confident with their skills, and this enhanced their sense of competence. In self-determination theory, a sense of competence is one of the core elements of motivation. Someone with a higher sense of competence would be intrinsically motivated on a specific task (Ryan & Deci, 2000). Teaching could be much more effective when students have higher motivation in learning.

From the school perspective, peer teaching supported by a flipped classroom pedagogy successfully facilitated the learning of animation skills. Students gained a better skill set in creating animation after the three months of classes. It significantly leveled the imbalance of students' knowledge and ability, bringing an overall higher standard of animation skills level.

5. 2. Peer teaching promoted communication

When our students learn drawing or animation in their previous education experience, there are very few opportunities to collaborate with others. Most of the students in the class show relatively introverted personalities and have a certain level of hesitation in interaction with people. In experiencing this action research, students were assigned a heavy workload on teamwork. They were no longer working on their own. They need to communicate with classmates as they share the same goal closely. Students' feedback indicated that the outcome of peer teaching practice surprised them. The passion for creating animation they shared made them willing to open their minds and communicate. They felt satisfied when successfully conveying their idea to others. Their classmates inspired them, and they enjoyed solving problems together. Communication and collaboration result in higher relatedness in

the classroom. The research results in the motivation field have indicated that when people think they have a closer relationship or higher feeling of belongingness in a group, they are more motivated to put effort into the task. (Ryan & Deci, 2000).

Moreover, students learned to care about classmates during peer teaching. They tried to step closer to see how classmates are doing and try to answer their questions. After all, they gain the feeling of being important (belongingness) and being appreciated (value), which enhances their emotional engagement (Finn, 1989). Communication and collaboration skills are one type of tacit knowledge that students can only obtain through experience (Leonard & Sensiper, 1998). This peer teaching try-out engaged students in the opportunity of communication. This approach would become one of the most effective tools in nurturing well-rounded students.

Peer teaching with a flipped classroom pedagogy creates favorable learning momentum in the learning cycle (Figure 3) for animation education. First, the engagement enriches students' knowledge. The enriched knowledge then enhances their sense of competence. Together with autonomy and relatedness, this led to higher motivation in learning. Then students would actively participate in learning and request more knowledge, which they can use to improve their peer teaching.

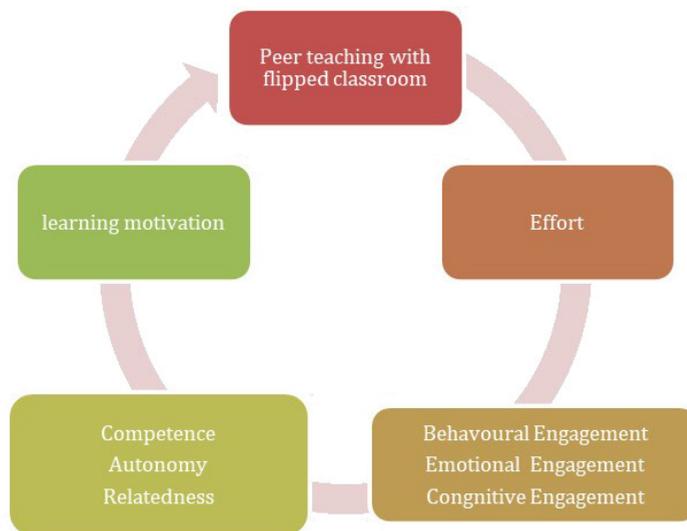


Figure 3 Peer teaching with a flipped classroom model

5. 3. Flipped classroom from passive to active learning

The study found that passive educational methods, e.g., lecture, reading, audiovisual, and demonstrations, were transformed into active learning. Because of peer teaching needs, students are motivated to learn independently and prepare for their lessons, which generates more intrinsic motivations to learn. Therefore, the whole learning process changes from passive to active in peer teaching with a flipped classroom model (Zheng et al., 2020).

5. 4. Additional benefits of peer teaching

Students were given complete freedom on the entire operation of peer teaching. They were empowered to pick the curriculum they wanted to teach, create teaching material, lead in the way they thought was good, and learn at their own pace. Although some of the students claimed that this was very challenging for them, they still wanted to complete it beyond the requirement. During this practice, they gained a strong feeling of autonomy. Again, autonomy acts as one of the core elements in intrinsic motivation (Ryan & Deci, 2000). Because of the empowerment, students thought that they had more responsibility to teach well. Therefore, they performed self-regulation in the preparation process. They designed various strategies to make their teaching more exciting and engaging. Students demonstrated cognitive engagement in class.

Along with enhancing classroom engagement and intrinsic motivation, this pedagogy creates a favorable environment to nurture creativity. Much research has indicated that intrinsic motivation positively affects creativity (Amabile, 1985; Stenmark, 2000; Casakin & Kreitler, 2010). Additionally, being confident and having freedom of choice in their learning largely benefitted students' idea-expression in animation, as they have sufficient skills and confidence to realize their ideas. Since creativity is one of the core elements that animation students need, peer teaching with flipped classrooms would influence animation education's overall learning outcome.

6. Conclusion

Animation studies is a practice-based subject. Teachers usually teach animation skills face-to-face and step-by-step, especially when learning fundamental skills. This study suggested a novel pedagogy for animation classrooms; although it does not cover the broader range of media education, the findings prove that students' learning engagement significantly increased when incorporating peer teaching and online technology into a traditional hands-on subject. High engagement leads to higher learning motivation, which eventually results in better learning outcomes and facilitates the all-rounded development of students. Based on the results of this study, peer teaching with a flipped-classroom approach is strongly suggested in animation classrooms and is recommended to experiment in other undergraduate subjects. Due to time limitations, researchers only conducted this study in one semester. However, the research team plans to continue the study to explore further the impact of this novel pedagogy in animation education. Future studies will attempt to validate further with these findings in the longitudinal study period. It is always the key to motivate students and creates an engaging learning environment as educators; this study hopes to share the insights with the community.

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