Flipped Classroom Learning:
A Case Study in Meragang Sixth Form College

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This study examines students' perspectives on student engagement and learning outcomes when the flipped learning approach is applied; data were collected from forty-nine students and presented in tables. Questionnaires and interviews were collected in addition to school-based assessment results. Students were generally positive about this pedagogy and were more engaged in accepting more responsibility for their learning – they asked questions, shared ideas, listened actively, thought deeply, and worked together with their peers. However, some students should show more responsiveness, interest, and initiative in their learning activities. Although the students' second assessment results improved after using the flipped learning method, the changes in their affective and cognitive development due to their learning experience should also be noticed. The quantitative and qualitative results provide insights for future research. One recommendation is to introduce the flipped learning approach early in the school year. Improved communication, such as providing clear, detailed instructions, and creating appropriate student and teacher expectations of the approach and scaffolding, will benefit both students and the teacher.

Keywords: flipped classroom learning, student engagement, learning outcomes

INTRODUCTION

The COVID-19 pandemic has significantly impacted education systems worldwide, forcing educational institutions to transition to online or remote learning. This has highlighted the importance of education systems remaining flexible and adaptable in the face of unexpected challenges to continue providing high-quality education. Learning should be active, experiential and student-centred rather than passive and memorisation-focused; educators should strive to provide students with the resources and support they require to continue learning and growing. They should also strive to create engaging and interactive learning experiences through online classes, group instruction, or other novel methods, and allow students to apply what they have experienced to real-world circumstances and problems.

While it may not be obvious to everyone, it seems clear that the discussion about using technology improves the quality of teaching and learning. During the pandemic, understanding the student experience of the rapid transitions to online curriculum delivery was critical, since the delivery has ramifications for future enhancements and adjustments to long-term online delivery. Information and Communication Technology empowers learners to put themselves at the centre of the learning process. Twenty-first-century learners embrace digital learning, which enables them to be problem-solvers and critical thinkers and apply their knowledge through multisensory lenses.

Raising questions is critical and has caused a reset of teachers' pedagogical and content knowledge (Mishra & Koehler, 2006) to necessitate continuous evaluation to guide discipline instruction and comprehend the critical role technology integration plays in this. Pedagogy must be altered to allow participation, and technology advancement in the classroom has changed how teachers inform and approach their work. The availability of technological devices has boosted many teaching approaches, which include one teaching technique called flipped classroom learning (Bergmann & Sams, 2012).

A flipped classroom is another form of blended learning where current technology provides education to meet learners' demands and needs. The teaching approach extends from a group learning environment to a unique individual learning environment, with instruction provided in audio or video format or through ready-made educational resources (Bergmann & Sams, 2012). The transformation progresses into an interactive learning environment where teachers provide information, assist students in constructing knowledge, and closely guide them while they engage with the subject matter. Students are exposed to educational resources outside of class; as a result, they will be adequately prepared to engage in active learning and find their voice before returning to class. In their class activities, they expand their creative knowledge further, critique their thinking, participate in hands-on learning activities and discuss the lesson's topic (Bergmann & Sams, 2012).

Students benefit from the flipped method in various ways, including the chance to learn independently, flexibility as regards when and where digital materials are accessed, and more effective use of class time to engage students in active conversation and collaborative learning. The flipped method allows students to practise lower-order thinking skills (LOTs) while also guiding them to commit time to learning activities that help them attain higher-order thinking skills (HOTs) during class time (Bergmann & Sams, 2012). Although there have been more positive results with the flipped learning approach than with the traditional way of teaching, students' evaluations were high for traditional ways of teaching (Butt, 2014). What is less evident with flipped learning is that students in flipped classes are given more opportunities to construct HOTs that affect deep learning than traditional teaching methods.

Recent technological advancements have made the concept of flipped learning more prevalent among instructors, and content can be made more accessible because of ubiquitous software and video sites. Every topic allows participation in more face-to-face engagement with the students during class time. Flipped classroom learning has become an ideal approach during the pandemic, with students watching tutorial videos, having group discussions, and using the Internet to learn. Concurrently, the teacher facilitates, guides, and provides feedback.

Teachers and educators who use the flipped learning approach will benefit from understanding its benefits, drawbacks, and application process. This way, precautions and planning can be taken before employing this method. To achieve the anticipated educational system transformation, teaching staff and students must first adopt educational system changes.

RESEARCH PURPOSE

The purpose is to explore student responses related to flipped classroom learning and how this learning approach relates to student engagement and learning outcomes.

RESEARCH QUESTION

What influence does flipped classroom learning have on student engagement and learning outcomes?

LITERATURE REVIEW

Flipped Classroom Learning

Johnathan Bergmann and Aaron Sams pioneered flipped classroom learning in secondary education in 2007, allowing for self-paced independent learning, flexibility in when and where online resources are accessed, and sufficient class time to engage students in active discussion and interactive learning

(Bergmann & Sams, 2012). Classwork is completed at home prior to class in a traditional classroom, and homework is completed during class. The approach has also transformed learning experiences by shifting from teacher-centred to student-centred teaching strategies through improved educator-learner interactions. This also provides students with a more engaging learning environment that leads to higher achievement and better prepares them also for post-secondary study.

There are two forms of the flipped classroom learning method: traditional and holistic. The traditional approach involves students watching video tutorials, delving into challenging questions and answers, providing face-to-face guidance, and constructing learning activities based on a learning-centred process (Bergmann & Sams, 2012). On the other hand, the holistic learning approach requires teachers to facilitate and oversee every classroom learning activity, in which students preview video tutorials, participate in class settings, and explore subject topics with their teachers (Bergmann & Sams, 2012).

The primary benefits of using flipped classroom learning are increased interactive periods within visual tutorial settings, the ability of students to discuss with their teachers, the promotion of teamwork in the classroom setting, the ability to retrieve visual tutorials at any time, and the ability to learn at the pace of the students. Teachers who can neither prepare nor deliver the video tutorials beforehand might construct them during class hours and incorporate them into their lesson plans. When integrating the method, teachers may have difficulties providing communicative classroom tools and determining whether their students learn from the video tutorials.

Teachers monitor students' development by noting challenging questions they cannot answer. This enables teachers to uncover knowledge gaps that require more clarification to address difficulties through in-class activities, thereby reducing students' incorrect assumptions. Online teaching and learning mean teachers and students engage with learning through a learning management system. This management system enables blended learning and takes on a more demanding role as the primary determinant for supporting, contextualising and delivering learning activities. In an engaging format, time spent in class promotes collaborative and peer learning, which stimulates reflective processes since it involves discussion, feedback, and problem-solving communication, all of which are necessary competencies in today's environment. In addition, the approach allows students to practise lower-order thinking skills such as remembering, understanding and applying at their own pace, and teachers steer the students during learning activities. In addition, the in-class participatory activities enable students to be immersed in higher-order thinking abilities such as analysis, evaluation, and creation, as defined by Bloom's Taxonomy (Anderson, Krathwohl & Bloom, 2001).

Flipped classroom learning in a home-based learning environment empowers students by making them responsible for their learning, which provides an intrinsic driving force to learn rather than extrinsic enforced power introduced by their teachers. (Anderson, Krathwohl & Bloom, 2001). Their teachers become facilitators assisting students in boosting their confidence, maintaining their motivation, monitoring students' learning progress, providing feedback, and sustaining their knowledge. The learning pedagogy addresses students' differences regarding competence and learning pace (Garas-York, 2020), as learners differ in their ability to assimilate the content material and fulfil assignments.

Student Engagement and Learning Outcomes

The degree to which students interact with physical and cognitive knowledge is called engagement (Butt, 2014). Students work on assigned tasks outside class while participating in class with the content material through small group analytical discussions and assignment problem-solving. Teachers employ multimedia to deliver relevant materials, which boosts student-teacher engagement with the subject matter, and peer-peer engagement promotes the context of online learning through collaboration. The engagement encourages active and interactive learning by having students collaborate to build knowledge, solve issues, and ask and react to questions (Pacansky-Brock et al., 2020). Teachers' active support for students' use of technologies that become accessible can strengthen student engagement between teachers and students and between students. Many students believe that learning is a passive process; changing students' views towards active engagement necessitates critical thinking. However, as it is a difficult change, scaffolding is required to reduce the possibility of students becoming distant and overwhelmed (Kahu et al., 2019).

Schunk and Mullen (2012) identify motivation and self-efficacy as significant characteristics determining classroom engagement and performance success. According to Skinner and Belmont (1993), teacher behaviour influences students' behavioural and emotional engagement. Kahu, Picton and Nelson (2019) explore student engagement from the behavioural, holistic, psychological and sociocultural standpoints, and how these views relate to practical teaching approaches (Skinner & Belmont, 1993). In addition, empirical findings from engagement research have shown that active learning approaches such as problem- and project-based learning are efficient. The approaches emphasise cooperative learning that fosters student success by developing critical thinking, problem-solving, and reasoning skills and establishing a deep comprehension of the content material. It also strengthens group members' interdependence, influencing their learning results (Kahu et al., 2019).

While there is substantial evidence that the flipped classroom approach increases student engagement (Kahu et al., 2019), which leads to the reinforcement of lifelong learning, there is less evidence that the pedagogy leads to improved academic learning outcomes (Adams et al., 2016; Yong et al., 2015). However, researchers have found that online teaching techniques in general have boosted student engagement and satisfaction, resulting in better learning outcomes (Choe et al., 2019). Maintaining student engagement is critical to improving students' learning processes and outcomes. Thus, how students engage in educationally planned activities influences their learning outcomes. Although students are presumed to be in command of their knowledge production, learning is also seen as dependent on educational institutions and instructors providing learning environments that encourage student engagement. Student learning outcomes are an essential component of curriculum design, involving preparation, coherence, relevance, and evaluation (Seraphin et al., 2022), and favour student-centred teaching and learning processes.

What students comprehend and can do is a direct product of their formative experience; hence, subject learning outcomes represent students' attitudes, competencies and knowledge about their subject following their educational learning process (Mendoza et al., 2022). Students can improve and conform to their learning, and the outcomes are critical to the teaching and learning processes. The outcomes encourage educators to reconsider their curricular strategies and ensure they are appropriately aligned for the delivery mode and discipline level.

Curriculum design invariably looks for demands in student learning outcomes that also align with other components, such as methodology and curricular organisation (Seraphin et al., 2022). A clear feature is that continuous improvement becomes a continual effort to improve processes through differentiated adjustments. The procedures meet various needs over time, and educational institutions will be able to meet their formative objectives and the promise of value delivered to society through continuous professional development, which includes everything from curricular design to self-regulation and external evaluation. As a result, using continuous educational quality improvement as an assessment target implies that curricular design based on learning outcomes is fundamentally aligned, allowing management and stakeholders to make informed decisions about promoting continuous improvement (Mendoza et al., 2022).

METHODOLOGY

Participants
Forty-nine students – 18 male and 31 female - from an English language class, with ages ranging from 17 to 19.

Instruments and Procedure
Instruments – Questionnaire and Interview
The questionnaire gathered three types of information: the first was demographic information, and the second was results taken from a non-flipped learning classroom's assessment and a flipped learning classroom's assessment. The third was the students' responses on a five-point frequency scale, which captured students' learning approaches and preparation and included three open-ended statements.

The interview included an open-ended question in which the students shared their thoughts on each activity. Positive student comments on the pre-class, in-class, and after-class activities (6.4) were separated from negative comments on the pre-class, in-class, and after-class activities (6.5).

Procedure

The teacher taught in the standard way for a month before an assessment in June, then transitioned to a flipped approach in July before another assessment in August. Google Forms collected the students' responses to the five-point Likert-type items. Due to the nature of the items, qualitative data in the form of narrative responses were employed with caution to allow for data to be reviewed and analysed. This revealed how students saw their transformative learning.

This approach was purposefully adopted to expose the same sample set of students to both face-to-face and online contexts. Students were given instructions, materials, and a quiz to complete before class; students were also encouraged to ask the teacher questions and communicate with one another through a social networking group created for the class. The in-class and after-activities were carried out as planned.

The main topic of the learning activities was climate change; the sub-topic during the pre-class trial task was about acid rain, while the actual pre-task sub-topic was water pollution. The questions for both tasks sought to ascertain the causes and consequences of acid rain and water pollution, respectively.

Pre-Class Task

Trial Task. Two videos, seven and nine minutes long, respectively, and a PDF document were available. The students were instructed to watch the videos, pay attention to the messages or content, make notes, and formulate questions to bring to class for discussion. The students could frequently watch the videos, read the pdf document, and answer a short quiz comprising true or false and fill-in-the-blank questions. The quiz was not graded to ensure that the students recognized that the quiz was a practice quiz for the actual quiz. However, the quiz was part of the student's attendance. Students' answers were monitored, problems were found, and students who did not watch the videos nor attempt the quiz received a verbal warning to convince them to do so or they would be referred to the student disciplinary body. Video discussions were conducted on Microsoft Teams, and the teacher assisted students who struggled to grasp the subject by providing extra explanations and correcting incorrect assumptions.

Actual Task. The pre-class task began with students answering demographic questions on a digital self-completion form, which took about a minute. Two videos, eleven and thirteen minutes long, respectively, and a pdf document were made available, and the learning objectives were set according to the lesson. The students watched the videos as often as they wanted, focused on the content, made notes, and wrote questions to bring to class for discussion. They were also instructed to read the pdf document, complete a true or false quiz, and fill-in-the-blank questions. The answers were assessed, and students' attendance was recorded. Incomplete quizzes from uninterested students were referred to the student disciplinary body. Video discussions between teachers and students were held on Microsoft Teams. During the discussions, the teacher aided students who had difficulty following the subject, provided further explanations, and corrected inaccurate statements. Before the class ended and for fifteen minutes afterwards, selected students were asked to stay back for a few minutes and were interviewed about their pre-class activity. Students who had not submitted their demographic details were given a paper-based form to complete.

In-Class Task. The in-class task began with students responding to a digital self-completion questionnaire about their pre-class activity, which took 10 minutes, followed by a question-and-answer light discussion to verify that students had watched the videos, read the document, and answered the quiz. Each student had their questions and sidenotes to participate in the group discussion. Each group had three students who discussed their questions, solved them, and shared their results. The teacher supervised the students, answered questions raised, and offered support to students who had difficulties while the other groups worked on a hands-on activity, as the activity was to encourage students to collaborate and apply the content. The students were permitted to look for more web information using their mobile phones, tablets, and personal laptops to prepare for their presentations. The teacher obtained an access point to allow

students to connect to the Internet via Wi-Fi. Before class ended and for another fifteen minutes after class, selected students were asked to stay back for a few minutes and were interviewed about their pre-class and in-class activities. Students who had not completed their questionnaires were given a paper-based questionnaire at the next meet-up.

After-Class Task. The after-class task began with students answering another digital self-completion questionnaire about their in-class activity, which took 10-15 minutes. One shared experience was that the students were encouraged to share how they overcame difficulties before giving their presentation; they also posted their questions on a social networking communication platform called WhatsApp Messenger to their teacher and peers seeking clarification and assistance if they encountered difficulties in any aspect of the videos, and pdf documents or discussions. Before class ended and for another fifteen minutes after class, selected students were asked to stay for a few minutes and were interviewed about their after-class activity. A digital self-completion questionnaire about students' after-class activity was released an hour later. Students who had not completed their questionnaires were presented with a paper-based questionnaire at the next meet-up.

DATA ANALYSIS AND INTERPRETATION OF DATA

Age and Gender

The information about age and gender is given in table 1.

TABLE 1
AGE AND GENDER

Age	Gender (M/F)		Male (%)	Female (%)	Total (%)
	Male	Female			
17	8	11	42%	58%	100% (19)
18	8	17	32%	68%	100% (25)
19	2	3	40%	60%	100% (5)
	18	31			100% (49)

Table 1 shows that female students outnumber male students in each age group. The most visible distinction was at 18, when female students were more than twice the number of male students.

School-Based Assessment Results

Table 2 contains information on the assessment of a non-flipped learning classroom and a flipped learning classroom.

TABLE 2
SCHOOL-BASED ASSESSMENT RESULTS

Assessment	30% - 39% Fail	40% - 49% Pass	50% - 59% Pass	60% - 69% Pass	70% - 79% Pass	80% - 89% Pass	Overall Pass %
Non-Flipped	2% (1)	20% (10)	33% (16)	41% (20)	4% (2)	0% (0)	98% (49)
Flipped	0% (0)	13% (6)	18% (9)	61% (30)	6% (3)	2% (1)	100% (49)
Difference %	2%	7%	15%	20%	2%	2%	
Differences in student numbers	1	4	7	10	1	1	

Table 2 shows the number of students who achieved their passing percentage. The non-flipped result had one failure, while the flipped outcome had none in the 30% to 39% group. In contrast to the non-flipped learning classroom results in the 40% to 59% group, the flipped approach resulted in lower numbers in the same category by 7% and 15%, respectively, while in the 60% to 69% range, there was a 20% increase in students who fared better. The flipped learning results had a 2% improvement over non-flipped learning in the 70% to 89% group. Student participation in the flipped assessment was effective, as evidenced by significantly higher scores. It was feasible to conclude that flipped learning impacted student performance.

Student Preparation During a Pre-Task Activity in a Non-Flipped Classroom and a Flipped Classroom

The following three sub-sections will explain further.

Comparison Between Student Preparation During a Pre-Task Activity in a Non-Flipped Classroom and Flipped Classroom

TABLE 3
STUDENT PREPARATION DURING A PRE-TASK ACTIVITY FOR A NON-FLIPPED CLASSROOM AND FLIPPED CLASSROOM

	Preparation – Pre-Task Activity	Approach	Strongly Agreed	Agreed	Neutral	Disagreed	Strongly Disagreed	%
1.	I work on my task activity before class.	Non-Flipped	20% (10)	33% (16)	20% (10)	16% (8)	11% (5)	100% (49)
		Flipped	43% (21)	41% (20)	10% (5)	6% (3)	0% (0)	100% (49)
2.	The task activity enables me to explore and understand further.	Non-Flipped	16% (8)	69% (34)	11% (5)	2% (1)	2% (1)	100% (49)
		Flipped	47% (23)	41% (20)	8% (4)	4% (2)	0% (0)	100% (49)
3.	The task activity obstructs my current schoolwork.	Non-Flipped	2% (1)	4% (2)	33% (16)	41% (20)	20% (10)	100% (49)
		Flipped	0% (0)	4% (2)	8% (4)	49% (24)	39% (19)	100% (49)

These items in the table are students' evaluations of their preparation in a non-flipped and flipped classroom during their pre-task activity. The descriptive analysis is explained as follows:

Statement 1: I Work on My Task Activity Before Class
Fifty-three per cent of students in the non-flipped classroom agreed with the statement, "I work on my task activity before class," and eighty-four per cent of students agreed in the flipped classroom. A thirty-one per cent increase from 53% to 84% showed that the students prepared themselves before class. This was a distinct increase because the students prepared by assessing their understanding, formulating questions and comments, researching other sources and taking notes during asynchronous and synchronous instruction. Twenty-seven per cent of non-flipped classroom students admitted to not organising their preparation, and six per cent of flipped classroom students acknowledged the same. The clear difference

demonstrated that many students realised that they needed to put more effort into their learning processes, which enhanced their ability to self-regulate and manage their learning. Students in the neutral category provided a convenient non-participation option for those who were less likely to express their opinions, which decreased from 20% in the non-flipped classroom to 10% in the flipped classroom. The ten per cent difference also demonstrated that a proportion of students had changed their minds and they either favoured or opposed early preparation.

Statement 2: The Task Activity Enables Me to Explore and Understand Further

Students' actions fulfilled their learning objectives, and their positive attitude increased their interest in their learning processes. Eighty-eight per cent of flipped classroom students agreed with the statement, "The task activity enables me to explore and understand further"; this was due to the flipped classroom students reviewing materials at home and being ready to apply what they had previously learned. In contrast, non-flipped students may have done independent self-study before this case study began. While four per cent of the non-flipped classroom and flipped classroom students disagreed with the statement. Their responses were documented in Section 6.5. The three per cent difference between 11% of the non-flipped classroom students and eight per cent of the flipped classroom students was unimportant because the neutral category was a nonparticipation option. However, it gave the impression that one student had favoured either an agreed or a disagreed option.

Statement 3: The Task Activity Obstructs My Current Schoolwork

Six per cent of non-flipped classroom students agreed with the statement, "The task activity obstructs my current schoolwork," and four per cent of flipped classroom students agreed as well. The two per cent difference indicated that one flipped classroom student had changed his or her mind and either stayed in the neutral or the agreed categories. A twenty-five per cent difference in the neutral category from 33% of non-flipped classroom students to eight per cent of flipped classroom students indicated that they had shifted their agreement to the disagreed category. Students who changed their minds demonstrated that they incorporated an authentic learning process into their classroom environment and responded to changes in the importance of peer learning, which developed interpersonal skills, improved communication skills, led to effective teamwork, and fostered growth and development. Technology devices such as smartphones have become ingrained in students' lives and suited to individual preferences; thus, a 17% difference between 61% of non-flipped classroom students and 88% of flipped classroom students indicated that students disagreed with the statement. The learning aspect provided students opportunities to develop a sense of ownership over their learning.

Comment on the Pre-Class, In-Class, and After-Class Activities

Some student responses on their pre-class, in-class and after-class activities are in their own words below.

Positive Responses to the Pre-Class Activity
1. I watched the videos and read the notes before class. I also asked my friends which websites to find. This made me more prepared for class activities.
2. I looked for more information on the Internet after watching the videos, reading the notes and talking to my friends about what I found online.
3. I had enough time to search online, think more about the videos and watch other videos about the same topic.
4. I set my own time, and I did not have to rush my work. I called my group members and shared my notes with them.
5. I came to class with a deeper understanding of the topic and was prepared to engage in class activities. I discussed this with my teacher on camera a day before.

Students' self-efficacy and motivation were affected by their confidence; students with strong self-regulated learning skills might learn faster and outperform those with weak self-regulated skills. While

building their confidence, they set goals and prepared intelligently. Their learning analytics improved their learning habits by adapting how they supported and created effective learning behaviour. Understanding how the students exhibited their online behaviour became increasingly crucial as self-regulating learning became increasingly important. The students reported that their hands-on learning was challenging, as they sought assistance from their teacher and peers and adopted internet-based learning; they also claimed that they collaborated on their results with their peers, strengthening personal relationships. Perhaps more importantly, students were aware of and appreciative of how their learning opportunities had progressed.

Positive Responses to the In-Class Activity
1. I knew more information and confidently shared it with my friends without feeling unprepared.
2. I did not feel left out while discussing the material with my friends and knowing different viewpoints. We also searched for other information using our phones to share what we discovered.
3. I gained more experience by interacting with my classmates more frequently. The quiz did help since I asked them what their results were, and we discussed how we could improve our scores on the following quiz. I also asked my teacher for help and tips to improve my score.
4. I talked with my teacher throughout my online learning and found her knowledgeable, and I also asked my teacher and my friends more questions during class time.
5. The group discussion in class helped my learning because my friends and I went over more interpretations and connected different opinions.

Students reported teamwork effectiveness as their behaviour encouraged them to analyse their learned knowledge and use it in class during face-to-face interaction. Their participation enabled them to learn from one another, share resources, become dependent on one another, instil a sense of responsibility for their learning processes, collaborate productively, and increase productivity. Their collaborative and active learning processes were used to evaluate their learning processes, and content was discussed more qualitatively. This learning facilitated student engagement, which enhanced their learning experiences by increasing students' knowledge and facilitating problem-solving, cooperation, and mastery of learning processes. The teacher could be seen guiding students and assisting those who required assistance.

Positive Responses to the After-Class Activity
1. I could easily text the group and ask my questions, even late in the evening.
2. My friends answered my inquiries and agreed to meet online at 8 p.m. to work on our work.
3. After class ended, I discussed my issue with my group during my break. Then I continued to search online for more information.
4. My teacher was gracious enough to respond in the class group to my inquiry at 7 p.m.
5. Many friends and I experienced similar difficulties after we finished our lessons. We continued our discussion after class and stayed back in class for some minutes. We also asked questions in our chat groups. This way also inspired me to do better.

Students were observed asking and discussing additional questions and cooperating. They were seen reinforcing what they had learned and remaining preoccupied with notable work related to the subtopic. Their prior knowledge of the subject provided opportunities to broaden and deepen their understanding and encouraged students to gain positive attitudes in their learning. Students' positive attitudes and behaviours reinforced what they had learned previously and a sense of continuity about how technology enhanced their learning. The teacher was also seen guiding her student after school hours.

Negative Responses to the Pre-Class Activity
1. I had a power outage and did not discuss anything with my friends.
2. I felt unmotivated to do my work, so I played online games instead.
3. I did not do my work because I have many works in Maths and Physics.

Negative Responses to the In-Class Activity.
1. I was tired before class, so I let my friends do all the talking.

2. I did not prepare my work and asked my friends about the videos.
3. Smart friends! I could get their answers. Sharing-caring friends!

Negative Responses to the After-Class Activity
1. I did not discuss it with my friends after class because I had other assignments.
2. I had already got my answers during the discussion, so that was it.

As students' responses were self-reported, the nature of the comments was subjective. There was no third comment in the after-class activity because the student participated in a group discussion after his family installed a home Wi-Fi. Student perception of all three activities affected their attitudes towards the activities. Their articulated views include managing their time, being unmotivated, tired, and unprepared, relying on friends for answers, and taking risks; they also influenced their attitude by not emphasising the importance of learning new information. In short, they showed reduced initiative, interest, and responsiveness.

DISCUSSION

Students report being more engaged with the information in a flipped classroom versus a traditional model; they learn new information and regard the given information as more relevant, leading to deeper informational literacy abilities. The learning outcomes are expressions of desired student characteristics such as questioning, problem-solving, reading, communicating, working as a team, and even time management, which has helped evaluate students' ability in activities. Using learning outcomes is to optimize learning and, consequently, student achievement.

The results also show that the students perform better academically in a flipped classroom compared to their previous results in a traditional classroom; their academic results can be used to construct forecasting analytics that provides teachers with meaningful information on how to improve student learning. Additional information on an individual student's responses allows the teacher to identify and address potential causes of poor performance. The findings can also be used for self-evaluation to discover areas where the teacher might improve her pedagogy.

The results suggest that collaborative and cooperative learning not only encourage and assist students in learning deeply, independently, and from one another but also explain to a peer why specific answers are correct. The flipped learning method allows students to work independently from time and place, following the students' personal space and giving rise to self-reflection implementations. In their flipped classroom, students prepare notes, questions, and answers, and there is a high presence of student engagement, which improves students' communication, motivation, and self-direction.

Students have self-managed their initiative in diagnosing their learning needs and implementing appropriate learning strategies in the learning activities. Their self-checks have alerted them to knowledge gaps and prompted them to review their related materials again with clear objectives. They also gather and search for additional information sources after actively listening to their peers in all their activities.

Students undertake their learning activities outside of class during the pre-class task, which activates their remembering and understanding (Anderson, Krathwohl & Bloom, 2001), according to Bloom's Taxonomy. In contrast, during the in-class task, their discussion and learning activities activate their higher-order thinking abilities, such as application analysis, evaluation, and creation (Anderson, Krathwohl & Bloom, 2001). Self-directed learning, peer-assisted, problem-based approaches, and teacher assistance facilitation indicate that the flipped classroom approach encourages better student and technology self-efficacy. This positive student success in taking responsibility affects students' learning attitudes, and their learning by engaging in the pre-class task is noted and of significant consequence. An oral warning prompts students to complete activities, encouraging low-engagement students to participate; however, some students may not accept their learning responsibilities.

Although access to the Internet helps self-learning, setbacks cannot be dismissed. Students learn at varying rates; therefore, they complete their learning activities at different rates, resulting in varying student success levels. Students who demonstrate less initiative, interest, and responsiveness exhibit negative

attitudes towards their learning; these attitudes limit task performance and personal growth and development. Online learning gives students more autonomy, which presents challenges that require them to be self-regulated and motivated to learn. The shift to a more positive approach to student learning cultivates a better self, connects within themselves and others, and encourages critical thinking skills, which are essential in instilling the value of lifelong learning.

The flipped learning approach improves student thinking skills, stimulates higher-order thinking, and engages students in pre-class activities that prepare them for in-class active learning. Students have opportunities to participate in peer instruction, group discussions, and other interactive learning situations, and the approach promotes student-centred learning and collaboration.

Leadership from senior management can improve teachers' performance, maintain high teaching quality, and provide opportunities for students to learn and grow. As a result, the school administration should propose efficient governance mechanisms to encourage the use of the flipped classroom teaching approach, assist in mitigating students' learning difficulties and teacher management challenges in classroom teaching, and assume responsibility for improving teachers' information literacy.

Students gain a sense of social presence as they build a learning community in the classroom and develop a deeper appreciation for achieving their goals. This study's findings are significant for future research and approaches to student development of self-directed life-learning qualities and abilities.

LIMITATIONS

This study is limited to an analysis of a small class size delivery; consequently, individually monitoring students enables the study to discover answers which lead to improved or deteriorated assessment results. However, it restricts the findings' generalisation. A survey could be prepared and delivered to many students to identify how they view their learning; also, students might be evaluated for how they perceive their assessments on a broad scale, as the initial study did not ask the students their views about their assessments.

The learning transition cannot be attributed solely to changes in the flipped learning environment because other factors, such as preferred learning style and student and teacher competency, influence students' learning approaches and challenges. These variables are not controlled for or reviewed objectively.

When lessons are moved online, flipped learning becomes more resilient in impacting student engagement and learning outcomes, and it may have been beneficial to determine student self-efficacy before and after the flipped delivery approach as separate groups - internals versus externals; some students experienced disruption due to unfamiliarity with online technology and non-contextual cues.

A size of 49 students may be too small to detect an effect, and the size becomes a possible cause of statistical insignificance. The initial design does not include a significance test because the author is looking for a practical significance of online delivery using a flipped learning approach between pre- and post-numeric variables in assessments and student views of their learning activities. It is well to quantify the non-significance in data analysis and interpretation because, in the real world, there are multiple plausible explanations for what happens in the data.

IMPICATIONS AND RECOMMENDATIONS

Collaborative efforts are necessary to ensure the interconnection of learning and teaching between learners and teachers. Other learner-related characteristics, such as access to technological facilities and attitudes towards online learning by utilising a flipped learning approach, should be examined to lessen impediments to technology integration.

All teachers should also be potentially taught online in subjects they currently teach face-to-face, albeit in different academic terms and participate in continuous professional development programmes on integrating information, communication, and technology into pedagogical practices. More research on teacher attributes and efficacy in students' learning processes is needed on the flipped classroom approach.

Teachers' continual commitment to the teaching method, as well as their expectations and behaviour towards technology, have a significant impact on the flipped learning approach's success.

An early introduction to the approach will benefit students and the teacher through improved communication, such as providing detailed instructions, creating student-teacher expectations of the learning approach, and instructional scaffolding where the teacher facilitates student learning.

Using statistical methods could help to improve the quality, efficiency, and ability to conduct proper research. A statistical significance test can indicate how likely a relationship occurs purely by chance, but it does not always indicate practical significance. The occurrence could result from using statistical indicators to compare groups or variables to demonstrate a statistically significant difference.

CONCLUSION

The pandemic has brought about a widespread shift to online learning, and many educators have turned to flipped learning to continue providing students with quality instruction. Educators can provide students with information and skills they need to learn independently using online resources and then use class time to reinforce what they have learned. Flipped learning is an effective method for adapting to challenges, but it is not without its drawbacks.

A flipped classroom pedagogy assists professionals and students in developing a commitment to lifelong learning. However, the effectiveness of a flipped classroom is reduced if students do not come prepared to class. Students are encouraged to use a self-directed and autonomous approach in their task activities and to collaborate on their work in online, hybrid and physical settings. The results of this study suggest that flipped teaching has the potential to engage students in deeper learning strategies more effectively than traditional non-flipped classes, as well as to favour enriched knowledge, improve student engagement, increase student learning experiences, support meaningful active knowledge construction, and enhance problem-solving skills and cognitive strategies. The current study has also found improvements in the number of passes in student learning outcomes with flipped learning. The results do not simply indicate that the assessment used in the flipped classroom is effective; further research is needed to explain the effectiveness.

With the expansion of information and technology, it is natural for educational institutions to adopt modern technology in a continuing process. However, following the application, the teaching tool's efficiency must be tested regularly to ensure overall satisfaction and quality assurance. Furthermore, there needs to be more information on student behaviour and comprehension surrounding pre-class preparation. Not all students complete their activities due to student attitudes (as well as other external barriers). Some barriers include self-awareness, self-regulation, intrinsic motivation, competing interests, and metacognition abilities.

The author suggests that more research studies on the flipped classroom approach should be emphasised, focussing on teacher characteristics and efficacy in student learning because flipped classroom learning is integral to developing autonomous learning and advocating active learning. It is critical to underline a continual professional development framework for academic staff to effectively teach in partially online environments and participate in learning and development activities to improve teaching practice and activities related to curriculum implementation, both for their development and for students to have transformative learning experiences.

Teaching and teacher competence are two areas that should be investigated. This is because teaching competence is the role of the teacher that is directly related to pedagogical content knowledge, whereas teacher competence is a systemic view of teacher professionalism that includes the teacher's role and responsibility as an individual within the school, community, and participant in professional networks. The goal of a flipped learning approach is learning effectiveness, actively engaging, and creating a virtuous learning cascading circle.

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