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Research Article

Enhancing Student Motivation in a Flipped Classroom: an Investigation of Innovative Teaching Strategies to Improve Student Learning

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ABSTRACT

This study aims to examine the potential for enhancing student motivation by implementing a flipped classroom, a novel pedagogical approach. The primary objective is to improve the educational achievements of students. The study included a sample size of 240 participants, consisting of 164 male students and 76 female students. During four months, the participants actively interacted with course materials that were specifically tailored to facilitate the implementation of the flipped classroom pedagogical approach. A questionnaire survey was employed to collect data about participants' perspectives on the adoption of this teaching method. The findings of the study provide evidence for the beneficial impact of flipped classrooms on student learning. Although a portion of the student body experienced feelings of being overwhelmed by the course content and structure, a significant majority of students conveyed that this particular pedagogical approach effectively enhanced their learning experience and fostered a sense of motivation. The findings indicated that a significant proportion of the student population exhibited a favorable disposition towards the implementation of the flipped classroom approach, as well as the utilization of video materials and the Moodle platform.. In conclusion, the present study on flipped classrooms yields promising results for the field of teacher education. Nevertheless, it is imperative to emphasise specific factors during the implementation of this approach., the findings may partially reflect the impact of a novel pedagogical method rather than only the effects of the flipped classroom approach.

Keywords: Innovative Teaching, Questionnaire, Flipped Classrooms, Encouraging, Teacher Education.

INTRODUCTION

King (1993) describes the traditional lecture as the "sage on the stage" form of teaching, in which knowledge is passively transferred from the professor to the pupils. However, university education, including traditional lectures, has faced significant criticism over the last three decades. The primary critique has shed light on several key points: students exhibit passivity during traditional lectures as a result of insufficient mechanisms to foster intellectual engagement with the subject matter, students' attention diminishes rapidly, the pace of lectures does not accommodate the diverse needs of all learners, and traditional lectures are ill-suited for imparting higher-order skills such as application and analysis (Tomas, Doyle & Skamp, 2019). New learning environments, characterized by web-based learning opportunities and resources, have emerged as a result of the widespread use of digital technology in educational settings, allowing students to participate in different kinds of learning. The proliferation of interactive technologies has greatly facilitated the integration of novel methodologies in higher

education, thereby fostering collaborative learning, exploration, and research within online networked learning environments (Dhawan, 2020). The emergence of novel pedagogical strategies that prioritize student-centered approaches has prompted educators to reassess educational methodologies, redirecting attention from themselves to the students. This shift aims to foster greater student engagement, cultivate critical thinking abilities, and enhance proficiency in digital competencies. In recent years, technology-driven educational approaches, such as the flipped classroom (FC), have become increasingly prominent. Using the FC model, students may have access to lecture videos, slides, and other resources through digital learning management systems. The flipped classroom model is one instructional strategy that has been shown to increase student engagement (Naw, 2020).

The concept of a flipped classroom is often understood as the reversal of traditional in-class activities and homework assignments. To provide more clarification, the flipped classroom approach may be seen as an augmentation of the curriculum, rather than a simple reorganization of activities. This difference allows for a more pronounced differentiation between the standard instructional method and the flipped instructional method. The flipped classroom model consists of two components: interactive activities conducted during class time and individual learning sessions outside the classroom that use internet-based resources (Brooks, 2014).

There are notable distinctions between the standard classroom and the flipped classroom. The traditional teaching approach is characterized by a teacher-centered paradigm, whereby the instructor imparts information to pupils and assumes the role of a guide who actively interacts with the students. The flipped classroom is a pedagogical approach that prioritizes learner autonomy, with professors assuming the role of facilitators and students taking responsibility for their learning strategies. Students use problem-based podcasts, which are audio-visual digital files, including activities such as listening to lectures, viewing videos, reading e-books, and engaging in conversations with both faculty members and peers before the commencement of official classes. Teachers engage in communication with all individuals in order to provide them with focused responses to particular inquiries during valuable instructional periods. The constructivist learning theory is also referred to as this. Students engage in the active construction of knowledge rather than passively receiving information that is imposed upon them. The following table presents a visual representation of the distinctions between a standard classroom and a flipped classroom (Uzunboylu & Karagozlu, 2015).

The flipped classroom is an educational approach that employs technology to deliver instructional content outside of traditional class hours, to enhance student engagement, collaboration, and active learning during in-person sessions. The flipped classroom is a pedagogical approach characterized by the relocation of traditional classroom lectures outside of regular class time through the utilization of technology, thereby allowing for face-to-face class sessions to be dedicated to engaging in active learning activities. The pandemic has significantly affected the educational environment, including how instruction is delivered and how students progress. Its effects may be seen most clearly at institutions of higher learning, like universities and colleges, which are modifying pedagogical methods like lectures, tutorials, and workshops in light of the current international climate. The literature consistently reports a multitude of characteristics that have led to the ongoing advocacy for the implementation of the flipped classroom approach. As an illustration, students have the opportunity to engage in collaborative discussions with their peers, guided by an instructor, to actively construct their knowledge.

According to research by (M. K., Kim, S. M., Kim, Khera & Getman 2014), it has been observed that students have the opportunity to actively participate in the mastery level of learning when engaging in in-class activities. These activities serve as a platform for developing essential skills such as remembering, understanding, and application. Consequently, students can then utilize these foundational skills at home to further engage in more advanced activities that promote higher-order thinking skills. The implementation of liberating learning activities within the classroom environment allows instructors to allocate instructional time towards fostering collaboration and facilitating the application of knowledge.

The flipped classroom learning model involves initiating student engagement through lower-order cognitive activities outside of the classroom, followed by the completion of higher-order cognitive activities within the classroom setting (Olakanmi, 2017). These activities facilitate students in exerting control over their learning process, enabling them to engage in independent tasks and thereby enhancing their individualized learning experience. Moreover, the implementation of the flipped classroom approach has been found to yield favorable educational outcomes, including enhanced academic achievement, increased motivation, improved critical thinking skills, and enhanced opportunities for collaborative learning (**Figure 1**). Nevertheless, students encountered certain obstacles in acquiring knowledge within the flipped classroom setting as a result of insufficient resources to facilitate their learning. The flipped classroom model is predicated upon the concept of reversing the traditional teaching approach, whereby the activities typically conducted in the classroom are interchanged or inverted with those typically assigned to students outside of class.

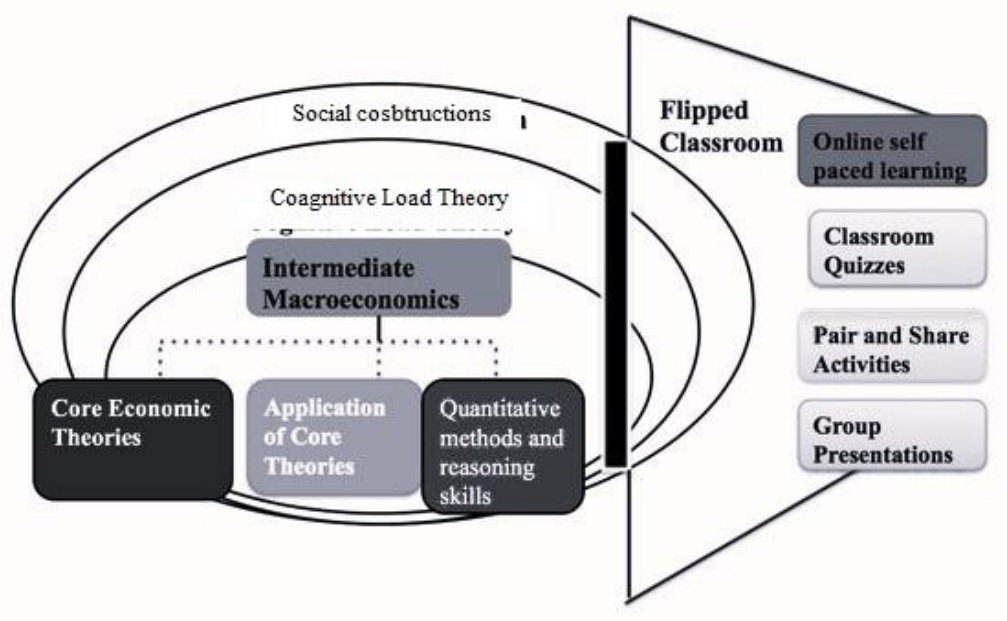

Figure 1. The Theoretical Framework Underpinning the Design and Execution of the "Flipped" Classroom Model

Therefore, rather than passively receiving lectures in the classroom and subsequently completing assigned problem sets at home, students are now expected to independently study course literature and absorb lecture content via video materials outside of class. Within the educational setting, students engage in proactive involvement in problem-solving endeavours, rigorous examination of content, and interactive discourse, all of which are facilitated by the instructor. Supporters of the flipped classroom methodology in higher education outline numerous advantages linked to the reversal of traditional teaching and learning methods, by the principles of the flipped classroom model. The utilisation of this methodology facilitates the acquisition of knowledge by students at a pace that aligns with their individual preferences, thereby promoting their active engagement with the content of the lecture. Furthermore, it enhances the efficiency of face-to-face instructional sessions, facilitating a greater degree of effectiveness, creativity, and active engagement in the learning process. Moreover, educators derive advantages from enhanced prospects for engaging with and assessing the learning progress of students. Ultimately, this approach enables students to take responsibility and be accountable for their educational endeavors. The flipped classroom is an instructional model that utilizes technology to enhance contemporary learning styles, thereby cultivating a unique classroom culture.Numerous studies have proposed that the implementation of the flipped classroom approach holds potential as a superior pedagogical model for future educational practices. The role of student motivation is of utmost importance in determining the success of the educational approach within the flipped classroom learning environment. The efficacy of this instructional approach is significantly impacted by the degree of student motivation and engagement in extracurricular activities. The allocation of in-class time towards discussions facilitates student engagement, allowing them to actively participate and satisfy their need for autonomy and competence. Advocates of the flipped classroom pedagogy endorse the incorporation of diverse personalized in-class exercises, facilitating educators in extending assistance to a larger cohort of students.

In the context of higher education, it is recommended to dedicate class time to the practical application of knowledge. This instructional approach allows instructors to provide feedback and identify any mistakes made by students. The flipped classroom model is a burgeoning educational approach that is garnering considerable interest in developing countries, particularly in China. Researching on this approach may yield valuable insights regarding its applicability in scenarios where conventional face-to-face instruction is either impractical or prohibited. The primary objective of this study is to examine the impact of the flipped classroom model on students' perceptions of their learning process and progress, as well as their levels of motivation. Hence, it is imperative to investigate the influence of student motivation in the context of a flipped classroom, a novel instructional approach designed to enhance students' academic performance.

Research Gap

Currently, due to the increasing demand in the Chinese talent market, schools and institutions have also expanded their enrollment. In the context of machine translation instruction (MTI), the instructional responsibilities placed upon instructors are progressively intensifying, resulting in bigger class sizes. Furthermore,

the presence of diverse learning approaches enhances students' educational experiences, although there is a concurrent decline in the amount of instructional hours available to instructors. Consequently, this situation poses challenges for educators in effectively delivering their lessons. Simultaneously, it is challenging for professors to attend to the individual learning needs of every student throughout the instructional process. Moreover, the absence of self-efficacy among students contributes to a prevalent occurrence of silence inside university teaching courses in the current era.

Recent studies, both domestic and international, have demonstrated that the implementation of the flipped classroom model effectively empowers students as active participants in the learning process. This approach not only fosters enhanced communication and interaction between teachers and students but also facilitates meaningful engagement among students themselves. Furthermore, the adoption of the flipped classroom method has been found to stimulate students' intrinsic motivation and contribute to notable advancements in their learning outcomes. Consequently, we conducted a study on the implementation of the flipped classroom approach within the context of university-level instruction.

LITERATURE REVIEW

The efficacy of flipped classrooms has been shown by researchers, despite the existence of divergent perspectives among students and instructors. The use of flipped classrooms has allowed students to acquire fundamental information outside of the traditional classroom setting, allowing in-class sessions to be dedicated to the application of concepts and the development of critical thinking abilities (Gough, DeJong, Grundmeyer & Baron, 2017). The flipped classroom has shown favorable effects, as well as negative consequences, contingent upon the specific conditions of achievement.

According to Flores, Del-Arco, and Silva (2016), the flipped classroom is a distinctive teaching approach that utilizes technology to foster a novel classroom culture and enhance 21st-century learning styles. Several scholarly research have posited that the flipped classroom method (Bernard, 2015; Zainuddin & Halili, 2016) may hold promise for achieving a better quality of effective teaching and learning in the future.

According to the findings of O'Flaherty and Phillips (2015), the flipped classroom has been determined to be a successful method in which students are actively involved in higher-order cognitive processes, such as problem-solving and in-depth exploration of topics. Additionally, this technique facilitates collaborative efforts among students and enables the development of realistic assessment assignments.

The present study examines the student learning experiences within a flipped classroom setting.

The impact of student motivation on learning is a significant factor in the effectiveness of the flipped classroom learning environment. The success of this learning approach is heavily reliant on the level of motivation shown by students and the extent to which they engage in out-of-class activities (Abeysekera & Dawson, 2015). The allocation of in-class time for talks serves to promote active student engagement, therefore supporting their desire for autonomy and competence.

Supporters of the flipped classroom approach propose the implementation of a variety of personalized in-class exercises, aiming to enable teachers to assist a larger number of pupils. According to Hashim and Shaari (2020), it is suggested that in Higher Education, the time spent in the classroom should be dedicated to the application of knowledge. This approach enables teachers to provide feedback and identify any faults made by students.

In their study, Lai and Hwang (2016) discovered that the implementation of the flipped classroom approach led to improved student learning outcomes, heightened academic accomplishment, and higher satisfaction. These positive effects were seen when students actively participated in problem-solving activities. According to a study conducted by Köroglu and Çakir (2017), it was found that students engage in learning activities that facilitate the application of higher-order thinking abilities after obtaining information and learning skills.

Furthermore, Reyes-Lozano, MedaCampana, and Gamboa (2015) have shown that research has seen enhancements in cognitive learning outcomes and students' desire to augment learning results.

METHODOLOGY

Research Objective

This study aims to examine the potential for enhancing student motivation by implementing a flipped classroom, a novel pedagogical approach. The primary objective is to improve the educational achievements of students. The objective of this study was also to investigate the perceptions of students on the use of flipped classroom pedagogy in a university course focused on research methodologies. Three specific factors were taken into account, specifically: (a) the overall experiences and attitudes of students towards learning in a flipped classroom setting, (b) the students' experiences with utilizing video lectures as a means of learning, and (c) the students' experiences with utilizing a Learning Management System (LMS) within the context of the flipped classroom model. Additionally, this research has also taken into account variations in the experiences and attitudes shown by students with differing levels of academic achievement.

Material and Method

The investigators utilized a case study methodology to investigate the students' encounters and perspectives of the flipped classroom. The survey, which was implemented as part of a descriptive research study, was employed to collect data on participants' beliefs, attitudes, and interests by administering questionnaires. By the methodology employed in this study, participants were administered the same assessment measures both before and after their engagement with the blended learning approach. This was done to facilitate the analysis of comparative data, with a specific emphasis on identifying any noteworthy disparities in participants' perceptions of learning after the academic term.

Data about the participants' subjective experiences within the context of the flipped classroom approach were gathered through focus group sessions. The researchers utilized a quantitative methodology to investigate the perceptions of university students regarding their learning process in the context of a flipped instructional model. The primary learning objectives of this course are twofold. First and foremost, to augment students' understanding of the fundamental principles that underlie research strategies, data collection methods, and analysis methods. Additionally, the objective is to familiarize students with the practical application of both qualitative and quantitative analytical approaches.

Participation

The present study comprised four distinct groups of students enrolled in the College of Education. This study recruited a sample of 240 students for this study using convenient sampling. The age range of the participants was 19 to 39 years old, with a majority of 164 men and 76 women. Before beginning the study, all participants provided informed consent. The sample size has been assessed by the statistician.

In a similar vein, students were required to strategically devise, execute, and assess inventive propositions pertaining to the instruction of linguistics subjects in conjunction with a justification for the chosen approach, as well as a comprehensive elucidation of the methods employed to evaluate said content within the context of primary education. The flipped method's techniques originated in the use of a learning management system, which has been recognized as an effective piece of software for easing the learning process, keeping tabs on students' development, and inspiring them to keep going. This study spanned four months and covered a set of required lessons designed to work in tandem with a flipped classroom. Zoom was used for weekly live lectures held at the same time all around the world.

Students were assigned tasks including video viewing, online exploration, and study on current linguistics subjects during these sessions. To ensure the highest level of safety for their online courses, instructors provided students with a Zoom link each week that they could only access by checking in with their university credentials in advance. The video conferencing system's real-time sharing function allowed professors to do live presentations on course material or to record and save such presentations on the online learning management system (LMS), making them available to students at any time throughout the semester. The offered URL is accessible through students' smartphones and other digital devices. Every week, the instructor would start by clearly outlining the objectives, instructions, and evaluation criteria for the assigned tasks and activities. This helped ensure that students had a clear understanding of what was expected from them. Each topic was structured as a weekly lesson with a duration of 80 minutes. This session had three parts: students watched a 10-minute film outside of class, had a 30-minute discussion in-person and online, and then spent 40 minutes on tutorials and reflection tasks in class and through Zoom. Before the start of class, the students watched a 10-minute video and read additional materials to get a handle on the topic at hand. The videos were specifically created to elucidate essential aspects of the subject matter and subsequently shared as a hyperlink on the WhatsApp platform. Following the viewing of

the videos, subsequent discussions were conducted via Zoom meetings. Subsequently, the instructor commenced a 40-minute tutorial within the classroom setting, aiming to establish fundamental concepts about the subject matter addressed in the video. Following the completion of practical work, class activity, and problem-solving, a 30-minute interactive group discussion was implemented. The students were administered an assessment, which they had the option to complete either collaboratively in groups or individually. Their performance on the assessment was evaluated within the online learning platform.

Data Collection

The collection of participants' perspectives regarding the adoption of the flipped approach was conducted using a specifically designed questionnaire. The primary objective of this questionnaire was to document the implementation of the flipped approach by gathering data from a sample of university students at two different time points. Numerous benefits have been identified with regard to the utilization of this methodology about its reliability, objectivity, and representativeness. Questionnaires possess significant value in the realm of data collection due to their inherent ability to quantify responses and their convenient administration process, enabling researchers to gather information from a substantial sample size. Furthermore, these surveys are widely regarded as highly dependable due to the absence of researchers during respondent completion.

The researchers designed a 27-question survey to collect data relating to the experiences students had about learning in the flipped classroom environment. The questions were presented using a five-point Likert scale ranging from 5= strongly agree, 4= agree, 3= not sure, 2= disagree, and 1= strongly disagree and poor =1, 2= fair, 3= satisfactory, and 4 = very good. Open-ended questions were also used, which allowed the participants to explain their views on the learning materials, how the content was delivered, learning outcomes, and challenges they encountered during the implementation of the course.

Consequently, if administered by various researchers, they are expected to yield consistent outcomes. However, limitations have been identified as a result of their impersonal characteristics, which may distort respondents' responses and compromise the reliability of the information furnished due to the researcher's detachment or potential disparities in interpretation.

Statistical Analysis

The data collected during the research were analysed using Statistical Package for Social Sciences (SPSS) version 26.0. The assessment of the instrument's reliability and validity was conducted before the commencement of data analysis. The assessment of the construct's reliability was conducted using Cronbach's Alpha, which yielded an estimate of the instrument's reliability. The instrument under consideration consisted of a Likert scale comprising multiple questions. In the majority of social science research studies, a Cronbach's Alpha coefficient of .70 or above is generally regarded as satisfactory for indicating favourable internal consistency. The survey conducted yielded positive results in both the overall evaluation (α = 0.89) and within each domain, namely motivation (α = 0.86) and learning processes (α = 0.83). To evaluate the instrument's validity, a Bartlett's test of sphericity and a Principal Component Analysis (PCA) were employed for each section of the questionnaire. A p-value of 0.000 was obtained in all sections of Bartlett's test of sphericity, indicating a high level of statistical significance. After performing Principal Component Analysis (PCA), a distribution was obtained in the initial block comprising two dimensions. The aforementioned distribution was responsible for 58.47% of the overall variance. Furthermore, the Kaiser-Meyer-Olkin (KMO) measure yielded a value of 0.906. During the subsequent phase, we were able to successfully identify and extract two dimensions that collectively explained 53.24% of the total variance. This was determined by assessing the Kaiser-Meyer-Olkin (KMO) value, which yielded a score of 0.861.

RESULTS

The study encompassed a cohort of 240 students. Among a total of 240 individuals, 164 were identified as males, accounting for approximately 68.33% of the sample. Conversely, the remaining 76 individuals were classified as females, constituting approximately 31.66% of the sample. The pre-experiment cohort consisted of 49 students, accounting for 20.41% of the total, who had grades below the average. Additionally, there were 150 students, making up 62.5% of the total, who had average grades before the present study. Lastly, there were 41 students, representing 17.08% of the total, who had grades above average (**Table 1**).

Table 1. Basic Parameters of the Students

Demographics	No. of Participants	Percentage
Age	26.85±3.49	
Gender		
Male	164	68.33%
Female	76	31.66%
Students Grade		
Students with grades below average	49	20.41%
Students with an average grade	150	62.5%
Students with grades above average	41	17.08%

Student reactions to the flipped classroom approach served as the major focus of this study. The questionnaire used six dimensions to measure students' attitudes towards and contentment with the flipped format of the course. **Table 2** and **Figures 2** and **3** show the means and standard deviations, respectively. Six constructs encompass the following dimensions: satisfaction, teacher support, students' expectations, students' engagement, usefulness, and effectiveness. The dataset consists of six mean values: 5.11, 4.31, 5.02, 6.34, 6.11, and 5.62. Additionally, there are corresponding standard deviation values of 0.54, 0.68, 0.58, 0.25, 0.34, and 0.45.

Table 2. Students' Overall Impressions of the Flipped Classroom Technique

Constructs	N	Mean	SD	P Value
Satisfaction	240	5.11	0.54	0.24
Teacher Support	240	4.31	0.68	0.15
Students Expectation	240	5.02	0.58	0.11
Students Engagement	240	6.34	0.25	0.34
Usefulness	240	6.11	0.34	0.41
Effectiveness	240	5.62	0.45	0.11

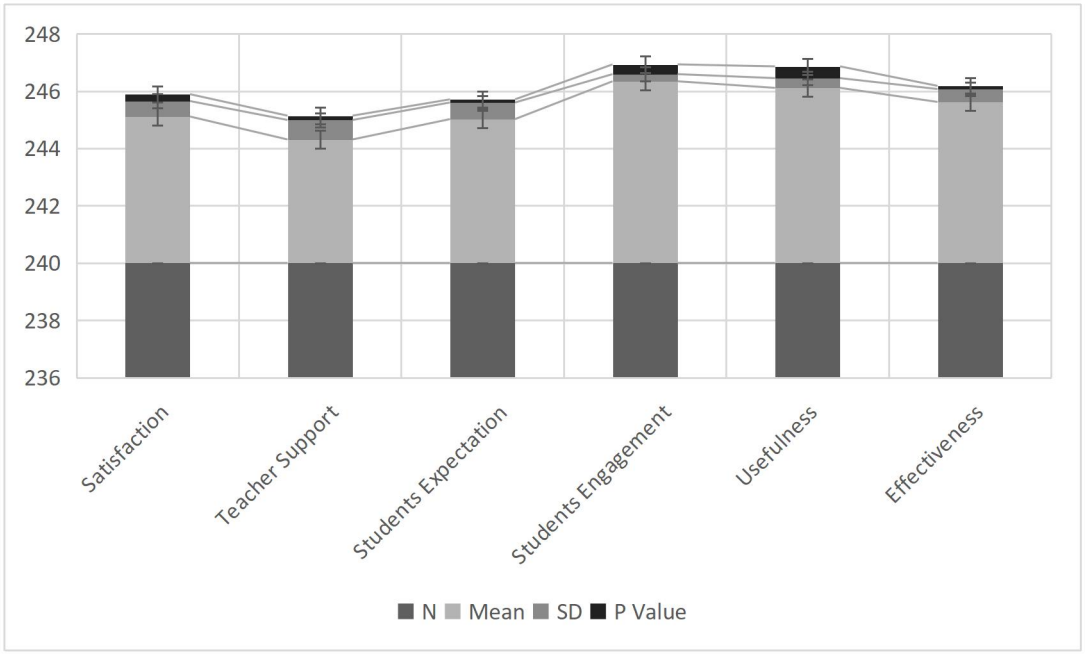

Figure 2. Flipped Classroom Approach

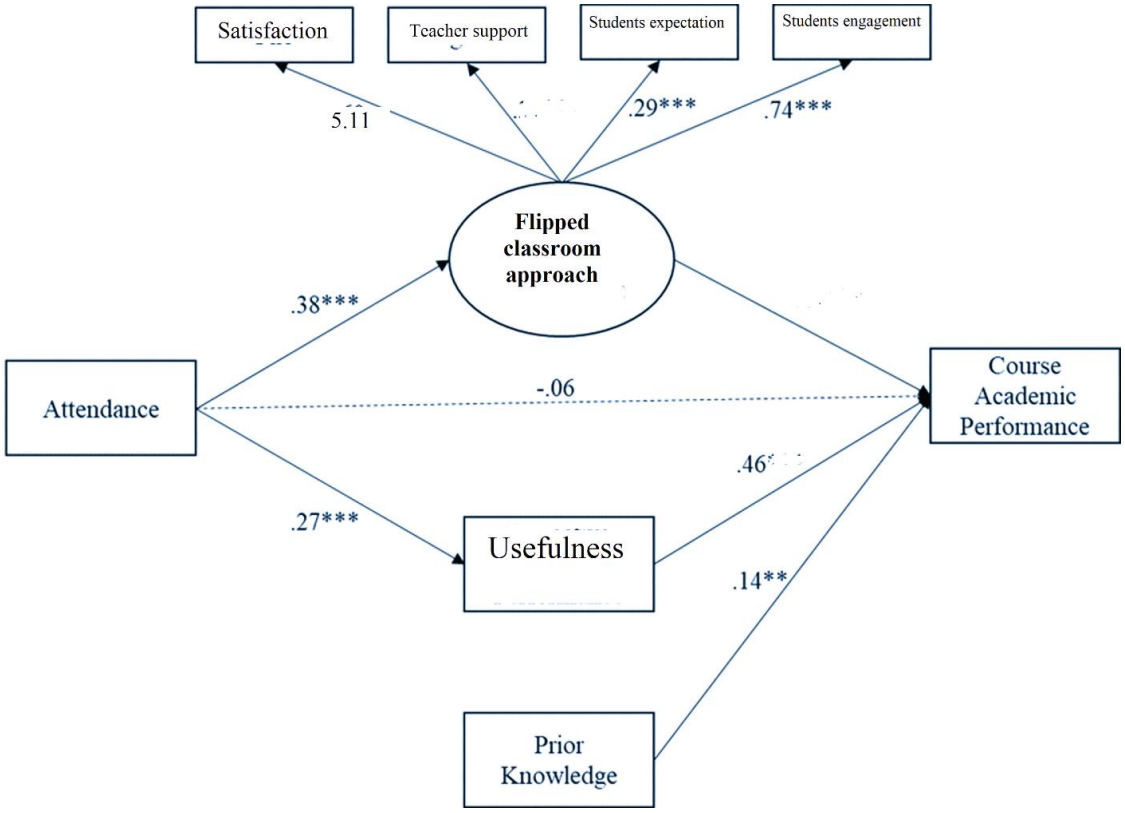

Figure 3. SEM Diagram for Flipped Classroom

Figure 3 illustrates the students' encounters with the learning management system. This phenomenon was examined across four distinct categories, encompassing the utility of observing fellow students' inquiries and corresponding teacher responses, the facilitation of learning, the value of engaging in communication with instructors, and the enhancement of motivation to acquire further knowledge. Out of a total of 240 participants, the number of individuals who expressed support for the advantages they have experienced amounts to 189, 152, 167, and 201, corresponding to percentages of 78.75%, 63.33%, 69.58%, and 83.75% respectively. Conversely, the number of participants who did not find this technique useful includes 51, 88, 73, and 39, representing percentages of 21.25%, 36.66%, 30.41%, and 16.25% respectively (**Table 3** and **Figure 4**).

Table 3. The Experiences of Students in Using the Learning Management System

	N=240		Percentage(%)		Z Value	P Value
Feedback from students on their LMS experiences	YES	NO	YES	NO		
It helped to read queries asked by other students and the instructor's responses.	189	51	78.75	21.25	2.14	0.11
Supported in learning	152	88	63.33	36.66	3.58	0.21
It was useful to communicate with teachers	167	73	69.58	30.41	3.11	0.17
Motivated to learn more	201	39	83.75	16.25	4.58	0.15

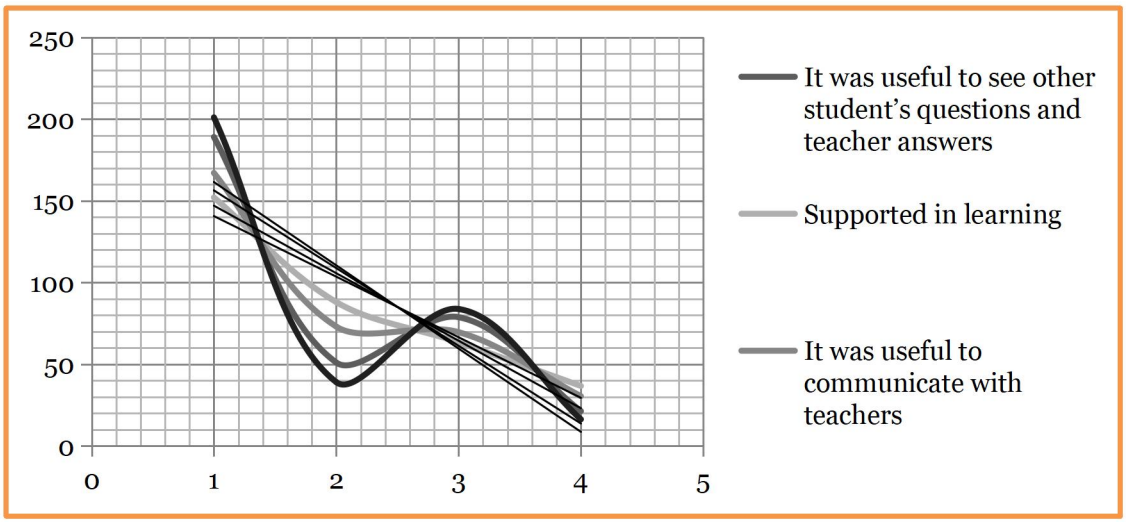

Figure 4. The Learning Management System

Table 4 illustrates the challenges that have been classified into four distinct domains: inadequate proficiency in information and communication technology (ICT) skills, restricted internet access and inadequate network connectivity, overwhelming workload, and the substantial expenses related to ICT infrastructure. The study involved a total of 83 participants, distributed across four categories. These categories consisted of 22, 16, 13, and 32 participants, representing percentages of 9.1%, 6.66%, 5.41%, and 13.33%, respectively. So, the learning management system has an impact on the flipped classroom approach.

Table 4. Pre Services Teacher Identified Challenges

	N=240	Percentage(%)	Z Value	P Value
Lack of ICT Skills	22	9.1	2.22	0.13
Access to the Internet and Poor Network Connectivity	16	6.66	4.74	0.22
Heavy Workload	13	5.41	3.85	0.14
Too Expensive Cost of ICT Infrastructure	32	13.33	4.77	0.47

Table 5 and **Figure 5** display the descriptive statistics for the variables related to the evaluation of the strategies utilized to improve students' motivation in this specific approach, classified according to the participants' gender. The variables under investigation encompass motivational strategies, FC videos, practical classroom activities, point and prize systems, small group activities, and quizzes. The male population exhibits mean values of 5.2, 2.5, 3.2, 1.5, 3.84, and 3.1. The data-set consists of the following values: 0.54, 0.68, 0.58, 3.94±0.25, 0.34, and 0.45, where the standard deviation is calculated. The mean values for the female participants are 3.33, 2.11, 2.03, 1.01, 2.94, and 2.16. The observed standard deviation values in the dataset are 0.64, 0.78, 0.48, 0.22, 0.31, and 0.15.

Table 5. Students Motivation Approach

	Male(n=164)		Female(76)		Z Value	P Value
	Mean	SD	Mean	SD		
Strategies Used for Motivation	5.2	0.54	3.33	0.64	-2.11	0.36
FC Videos	2.5	0.68	2.11	0.78	-3.15	0.47
Practical Classroom Activities	3.2	0.58	2.03	0.48	-1.98	0.19
Points and Prizes	1.5	30.25	1.01	0.22	-1.85	0.54
Small Group Activities	3.84	0.34	2.94	0.31	-2.67	0.44
Quizzes	3.1	0.45	2.16	0.15	2.77	0.15

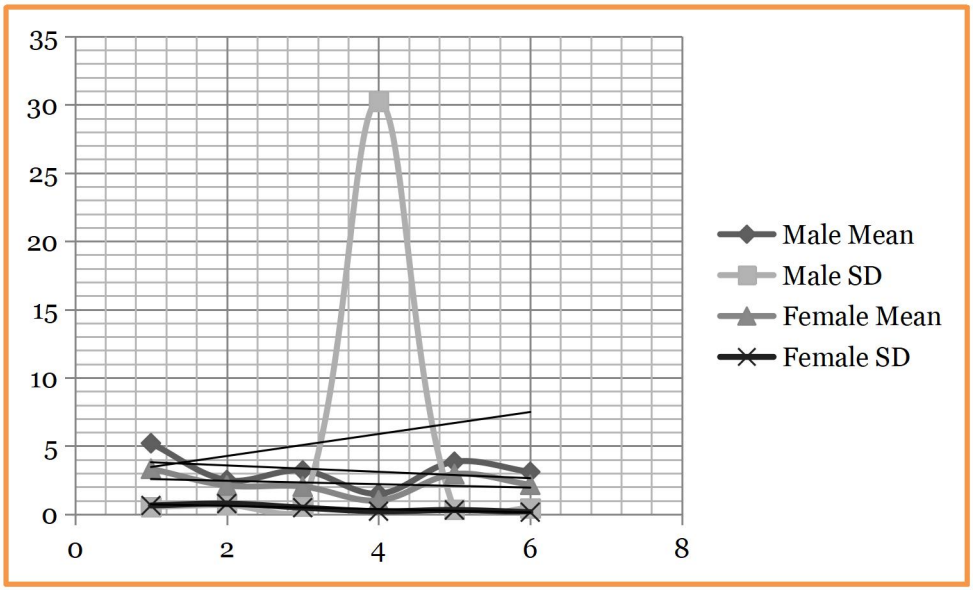

Figure 5. Students' Motivation Approach

Table 6 displays the non-parametric results related to the variables linked to the evaluation of the strategies utilized to improve students' motivation in this specific approach (**Figure 6**). Each category has been subdivided into two sections: pre-and-post. The observed p-values are 0.544, 0.658, 0.231, 0.123, and 0.320. The mean values for the pre-test and post-test are as follows: 2.14±0.54, 2.33±0.14, 1.11±0.14, 1.34±0.24, 1.14±0.14, 1.36±0.14, 1.02±0.14, 2.37±0.31, and 1.12±0.54, 1.34±0.64, respectively. This shows that after the technique there is an enhancement in the motivation of the students.

Table 6. The Non-Parametric Findings on the Variables Associated with the Assessment of the Techniques Employed to Enhance Students' Motivation within This Framework

	Mean±Sd	Z Value	Mann-Whitney U	P Value
		FC Videos		
Pre	2.14±0.54	-0.14	1589	0.544
Post	2.33±0.14			
		Practical Classroom Activities		
Pre	1.11±0.14	-0.56	1755	0.658
Post	1.34±0.24			
		Small Group Activities		
Pre	1.14±0.14	-0.74	1638	0.231
Post	1.36±0.14			
		Points and Prizes		
Pre	1.02±0.14	-0.58	1897	0.123
Post	2.37±0.31			
		Quizzes		
Pre	1.12±0.54	-0.69	2135	0.320
Post	1.34±0.64			

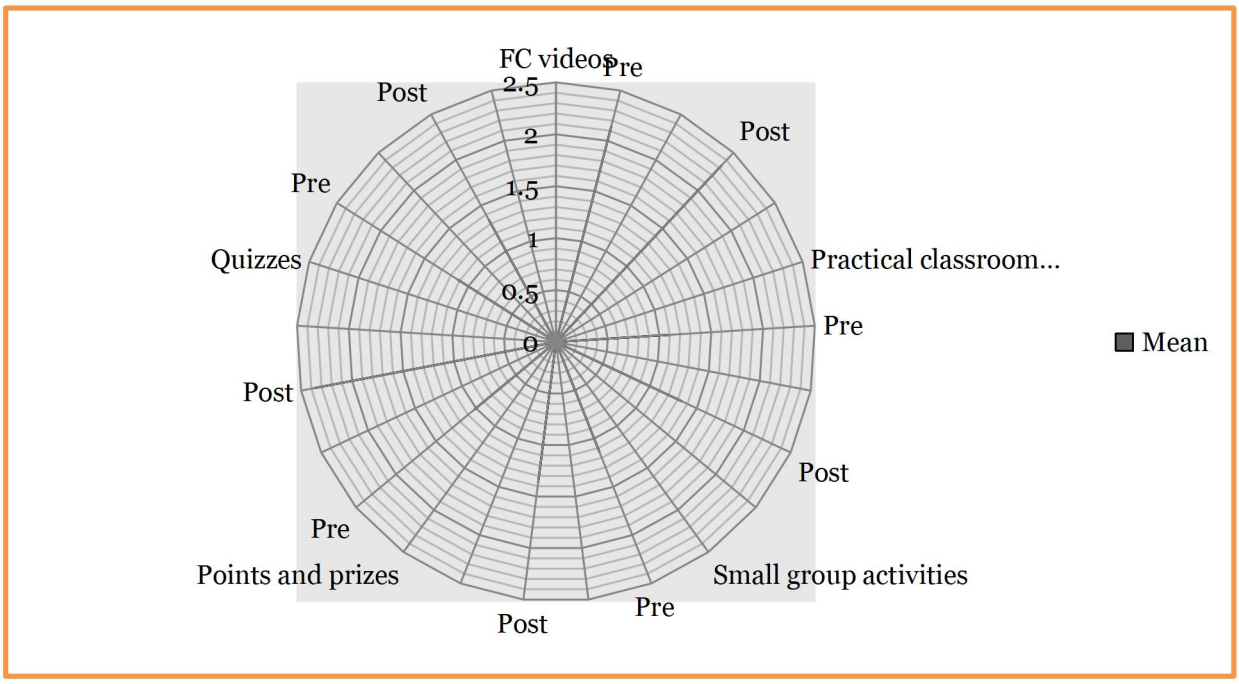

Figure 6. The Approaches Employed to Cultivate Students' Motivation

DISCUSSION

The primary aim of this research was to examine the impact of adopting the flipped classroom approach on student academic achievements. The findings indicate that the adoption of flipped classrooms leads to positive outcomes in terms of student learning. Although the students acknowledged that the course's content and structure were overwhelming, a majority of them expressed that this approach facilitated their learning and also served as a source of motivation. The students exhibited a notable degree of satisfaction in regard to their participation in the course utilizing the flipped classroom methodology and demonstrated favorable dispositions towards this instructional approach. The individuals expressed that the methodology employed was successful, as it aligned with their anticipated outcomes and resulted in noticeable improvements in their learning. Furthermore, the findings of the study indicate that the implementation of the flipped classroom approach yields positive outcomes for students. This is primarily attributed to the fact that the instructional materials employed in this pedagogical model serve as a source of motivation and enable students to engage in self-paced learning.

The students exhibited varying levels of satisfaction, encompassing both positive and negative sentiments, concerning their learning experiences within the flipped classroom setting. The majority of participants surveyed expressed a positive general perspective. (Betihavas, Bridgman, Kornhaber & Cross, 2015) The individuals employed vocabulary such as "happy," "good," and "quite good" to express their sentiments. Only a small percentage of students reported enjoying their experience studying in flipped classes. Several students expressed satisfaction with the learning environment created by the flipped classroom model, praising it as an original strategy that fits nicely with today's rapidly developing technology environment. They emphasized that integrating online learning into their education at present would equip them with valuable skills and knowledge for the future. The survey results revealed a high level of agreement among participants regarding the positive impact of blended learning on their inclination to seek additional information beyond what is presented by the teacher during class. According to student perspectives, the act of seeking supplementary information has been found to augment the process of knowledge construction, thereby fostering increased self-assurance in achieving favorable academic outcomes (Flores et al., 2016).

The students exhibited a notable degree of satisfaction with their experience of participating in the course via the implementation of the flipped classroom approach and had favorable views towards this instructional method.

The individuals said that the methodology proved to be efficacious, as it aligned with their anticipated outcomes and yielded positive educational advancements. The results of this study align with the findings of prior research conducted by Zainuddin and Attaran (2016) as well as Jensen, Holt, Sowards, Ogden, and West (2018). Furthermore, the findings of this study indicate that the implementation of the flipped classroom approach yields positive outcomes for students. This is attributed to the fact that the learning materials used in this instructional

method serve as a source of motivation and enable students to engage in self-paced learning. These findings align with the research conducted by Olakanmi (2017).

The efficacy of the learning experience in FCA is significantly influenced by the level of preparedness shown by students in the pre-class exercises.

According to the accounts of students, the practice of viewing video lectures before attending class was found to be beneficial in sufficiently preparing for subsequent activities. This observation is consistent with previous research conducted by Grypp and Luebeck (2015) as well as Wang (2016). Additionally, the inclusion of video lectures and supplementary learning exercises catalyzed students' inclination to engage in independent research and seek out additional knowledge. This phenomenon was also seen in previous scholarly investigations, whereby students indicated that their comprehension was enhanced via the practice of stopping, rewinding, and transcribing notes from video lectures (Abeysekera & Dawson, 2015; Ramnanan & Pound, 2017). The FCA method was seen by students as a means to augment their level of involvement and satisfaction, both of which are vital components of the teaching and learning process. Previous research has shown that the quality of the video lectures and learning materials in a flipped course is a significant factor.

In relation to overall perceptions, students exhibited favorable attitudes towards the implementation of the flipped classroom approach. This observation is corroborated by the findings of prior research. The provided text consists of two numerical values, specifically (Hashim & Shaari, 2020). The positive attitudes exhibited by students participating in FCA activities align with findings from previous research on students engaging in extracurricular practices to enhance their comprehension of concepts, construct knowledge, and develop proficiency in scientific inquiry skills. In line with earlier studies that have shown its efficacy in encouraging peer cooperation and engagement within a supportive group setting, the current study found that the layout of the flipped classroom course was beneficial to building motivation among students (Chen, Chao & Hung, 2018).

Moreover, as shown in other studies, participants' feedback on the efficacy of various methods and approaches on their own perceived motivation was overwhelmingly positive, with the Kahoot! quizzes appearing as an especially useful resource (Xiu, Moore, Thompson & French 2019) (Soult, 2016). Gamification, combined with ludic aspects like points, levels, or awards, has been shown to increase students' motivation and participation because of the increased interest and pleasure they experience. Moreover, as highlighted by Fontana (2020), and Park and Kim (2021), the implementation of gamification has the potential to augment social connections among students. This is achieved by facilitating the exchange of information, fostering mutual learning, and providing entertainment through online platforms. In light of the present epidemic, when isolation and the need to protect oneself and others have taken centre stage, these advantages stand out in particular (Aşıksoy & Özdamlı,2016) (Wanner & Palmer, 2015) (Fontana, 2020).

In relation to the perceptions of student teachers regarding their learning, the collected data reveals a prevailing inclination towards positive impressions. These findings align with previous studies conducted on the implementation of this particular approach. The participants demonstrated a noticeable inclination towards understanding the effective changes in methodology that promote greater flexibility and active learning during the current pandemic situation. Based on the extant data, it is evident that students demonstrated a favourable response to the adoption of flipped education. This pedagogical approach entails a departure from conventional lecture-oriented instruction towards a greater emphasis on student-centered and self-directed learning methodologies, supported by technology-driven active learning strategies. Students highly valued the incorporation of a wider range of online resources, the promotion of more frequent interactions among students, including both teacher-student and peer-to-peer dynamics, and the introduction of innovative approaches to knowledge and content management. Numerous additional research studies have similarly reached consensus regarding the appropriateness of these alternative methodologies within the framework of the corona-virus disease, owing to their notable degree of flexibility, accessibility of freely accessible scholarly materials online, and the interactive characteristics of their educational settings, among other considerations. In this context, the utilization of a comprehensive array of information technology (IT) tools, including a contemporary Learning Management System (LMS) equipped with an intuitive interface and efficient collaboration features, would facilitate adaptable resource allocation. This approach would promote the exploration, dissemination, and practical application of knowledge among students (Park & Kim, 2021) (Clark-Wilson, Robutti & Thomas, 2020) (Basilaia & Kvavadze, 2020).

The dimensions of the study, specifically the variables of previous experience and e-competence, exhibit statistically significant differences that warrant attention. In the given context, it was observed that students with prior experience placed a higher level of importance on the potential impact of this approach in improving their future teaching practise, as compared to their peers who did not possess such experience. This finding suggests that individuals with prior experience perceived this innovation as a tool for engaging in exploration, expanding

their knowledge, and enhancing their potential as future educators to a significantly greater degree compared to those without prior experience. Therefore, these findings offer empirical evidence that reinforces the ongoing implementation of action-oriented, task-based pedagogical approaches within the realm of higher education. This would allow students to attain a more profound comprehension of the FC model, thereby augmenting their motivation and proficiency in the realm of cognitive knowledge management (Blau & Shamir-Inbal, 2017) (Gómez-Carrasco, Monteagudo-Fernández, Moreno-Vera & Sainz-Gómez, 2020).

Regarding the variable of e-competence, the results obtained from non-parametric tests revealed that students possessing a higher level of e-competence exhibited a greater perception of intrinsic motivation towards active in-class tasks, as compared to their counterparts with lower e-competence. On the other hand, students who possessed lower levels of e-competence discovered that implementing a forward-looking, formative assessment approach proved to be a more stimulating strategy for improving their teaching practise. The diverse interpretations of this phenomenon may provide learners with a more immediate understanding of their progress if they have sufficient e-competence within this framework or in the future as they improve their acquisition of digital skills. The FC model is effective in helping students understand their progress in learning and improving new methodological approaches. However, despite the positive opinions expressed by the students, their perceptions demonstrate a more pessimistic outlook compared to similar studies conducted in the same context before the pandemic. The results obtained from a prior investigation conducted twelve months ago demonstrate that students displayed an elevated degree of positive self-perceived motivation, with a mean increment of one unit. The findings of this study may indicate that the measures implemented as a result of the pandemic are causing a certain degree of anxiety among college students. Furthermore, it is important to acknowledge that the results of this study may not accurately represent the current teaching and learning methodologies that impact student motivation. This limitation is a consequence of the reliance on data from a single instance. Therefore, it is advisable to compare the analysis with real-time learning outcomes encompassing a wider array of subjects. This approach would result in a more thorough understanding of the current ramifications and impacts of this pedagogical framework (Sinha &Bagarukayo, 2019).

However, students also had negative views of the FCA because of the course's structure and a lack of information and communication technology (ICT) resources and infrastructure. Students' negative views towards the flipped classroom are related to factors such as the high cost of Internet data and a lack of available resources, both of which were highlighted by the participants. The study findings align with previous research that has identified a range of viewpoints and perspectives. According to the findings of Anderson and Brennan's study, a minority of students expressed dissatisfaction with the effectiveness of the flipped classroom approach, which contrasts with the results of our investigation. However, this divergence in student perspectives could potentially be ascribed to the difficulties that students faced while undertaking the course (Anderson & Brennan, 2015).

The results indicate that the participants demonstrated a satisfactory level of motivation, encompassing both intrinsic and extrinsic factors, throughout the core unit. The motivation was focused on the acquisition of innovative teaching methodologies and the improvement of their teaching practise in the future. As a result, the unanticipated events had minimal effect on their level of involvement with the FC model. They demonstrated a willingness to actively participate and collaborate to improve their performance in subsequent endeavors. According to the findings of comparative research, it was observed that participants displayed a greater inclination towards active engagement in the FC model, as opposed to adopting a passive role as mere recipients of information.

CONCLUSION

In conclusion, the implementation of the flipped classroom approach has been observed across various educational levels, such as secondary, college, and university, with a particular emphasis on its advantages. However, there has been a relative lack of scholarly attention directed towards the experiences and perspectives of students within this pedagogical framework. The primary focus of the aforementioned studies has been on analyzing learning outcomes, with limited attention given to the crucial matter of equipping teachers with the necessary skills to effectively incorporate technology into their instructional practices as part of their professional development upon entering the classroom following the completion of their education. The findings of this study regarding flipped classrooms indicate favourable outcomes for teacher education, highlighting the need to prioritize certain factors when implementing this instructional approach. The pivotal factors for achieving success in the flipped classroom model are the instructor's role and the nature of interactions with students.

LIMITATIONS AND FUTURE IMPLICATIONS

Nevertheless, it is important to consider the limitations of this research when interpreting the findings. A notable constraint is the absence of a control group, hence restricting the external validity of the findings. Another limitation arises from the fact that the majority of the questioned students lack prior experience with the flipped classroom model. Consequently, the findings may partially reflect the impact of a novel pedagogical method rather than only the effects of the flipped classroom approach. It is important to acknowledge that all findings of enhanced learning and the efficacy of learning are reliant on students' self-reported judgments rather than objective assessments. Subsequent investigations pertaining to the ramifications of the flipped classroom should endeavor to rectify these constraints and, more specifically, delve into the degree to which the tangible academic achievements of students are influenced by the implementation of the flipped classroom model, beyond just student perspectives.

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