



Exploring Self-Regulated Learning and Motivational Strategies in a Flipped Classroom: Implications for Academic Achievement

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ABSTRACT

In recent years, there has been a growing shift in education towards learning that extends beyond traditional classroom settings. With the rise of digital technologies and the prevalence of self-directed learning environments, teachers are increasingly interested in how students take control of their learning. As traditional classroom structures give way to more flexible, learner-centred environments, understanding how students engage in self-regulated learning (SRL) and self-motivation outside the classroom has become crucial. The flipped classroom provides a unique context for investigating SRL strategies and motivational beliefs, as it requires students to take greater responsibility for their learning both in and out of class. This study aimed to explore students' perceptions of (1) self-regulated learning strategies and (2) motivational beliefs, as well as to investigate the relationship between SRL strategies and academic achievement, based on a sample of 52 first-year EFL students. The data were collected using a Likert-scale questionnaire, semi-structured interviews, and an English achievement test. The findings highlight the importance of self-evaluation and intrinsic motivation in maintaining academic

	<p>focus. Pearson correlation analysis revealed significant relationships between English achievement scores, learning strategies, and self-evaluation, underscoring the importance of structured self-regulated learning practices in supporting language proficiency development.</p> <p>Keywords: self-regulated learning (SRL), flipped classroom, motivational strategies, EFL students</p>
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Introduction

Education is entering a new era in which in-class and out-of-class activities are more integrated than ever before. Teachers have increasingly turned to implementing a flipped classroom approach to maximise class time. At the same time, students have become accustomed to using technology in their studies. A flipped classroom was introduced as an innovative pedagogical approach in the late 2000s, particularly around 2007. It moved traditional lecture-based instruction outside the classroom, where students engage with teacher-prepared online materials before participating in interactive activities during class (Agirman & Ercoskun, 2022; Velegol et al., 2015). Previous studies have shown that the flipped classroom approach not only promotes an active learning environment and enhances students' motivation (Chen Hsieh et al., 2017; Fisher et al., 2024; Lewis et al., 2018) but also has a positive impact on students' academic achievement (Hung, 2015; Turan & Akdag-Cimen, 2020).

While the flipped classroom is an effective approach, it presents a set of challenges due to its requirement for students to engage in pre-class study. Previous studies have suggested that students' abilities to self-regulate their thoughts, emotions, and behaviour play a key role in the achievement of their academic performance (Amri, 2024; Valle et al., 2008; Xu et al., 2023); however, some students may not prepare well before class, which may stem from issues with self-regulation (Akçayır & Akçayır, 2018; Sun et al., 2017). As pointed out by Dirkx et al. (2019), students do not always use the most effective strategies when studying independently, especially in the context of a flipped classroom where more responsibility is placed on the learner to manage their learning outside of class (van Alten et al., 2020). For this reason, although the flipped classroom offers flexibility in terms of time, it requires students to take more responsibility for their learning by engaging with the material and completing tasks independently.

In light of this, understanding how students regulate themselves during the flipped classroom is crucial for its effective implementation. Despite this, there has been little investigation of self-regulated learning (SRL)

strategies within the flipped classroom (Al-Abdullatif, 2020; Hewitt et al., 2014) since the existing flipped classroom research has centred around its benefits and challenges (Akçayır & Akçayır, 2018; Baig & Yadegaridehkordi, 2023) and its overall effectiveness in enhancing student academic achievement (Al-Samarraie et al., 2020; Z. Li & Li, 2022; Zheng et al., 2020). Therefore, this study fills the gap by exploring the strategies students use to foster their self-regulated learning, aiming to better understand the processes involved in learning outside the classroom. Moreover, it examines students' motivational strategies, which in this study refer to the techniques used to sustain their effort toward achieving desired learning outcomes within the context of the flipped classroom. This study further investigates the relationship between SRL and academic achievement to offer guidelines for teachers in providing effective interventions or support for students who may struggle with self-regulation and academic success.

Building upon the identified gap and objectives, this research was conducted to address the following questions:

1. What motivational and self-regulated learning (SRL) strategies do students apply in the flipped classroom?
2. How do self-regulated learning (SRL) strategies correlate with academic achievement in the flipped classroom?

Literature Review

Flipped Classroom

Flipped classrooms (FC) have garnered significant attention due to their potential benefits for education. This approach involves shifting the lecture-based learning in the traditional class to outside the class, where students engage with online instructional activities such as watching pre-recorded lectures, reading texts, or taking quizzes. This provides students with a general understanding of the topic to be covered in class (Ng & Lo, 2022). Several recent studies have shown that students learn asynchronously at their own pace (Cho et al., 2021; Ishak et al., 2020; Rindaningsih et al., 2021), access course materials, and complete assignments from any location with internet connectivity (Gwo-Jen et al., 2015). This self-paced, independent learning approach changes their role from passive recipients to active learners, preparing them to engage in discussions and activities during class (Liu et al., 2024).

In the context of English as a Foreign Language (EFL), previous studies have explored the efficacy of the flipped classroom by comparing it to traditional instructional methods (Al-Naabi, 2020; Jafarigohar et al., 2019;

Li et al., 2025). These studies have consistently found a significant positive impact of the flipped classroom approach on teaching and learning English, particularly in the areas of grammar (Al-Naabi, 2020), speaking and listening skills (Jafarigohar et al., 2019), and written communicative competence (Li et al., 2022). Moreover, research has also demonstrated that the implementation of the flipped classroom has not only encouraged a more engaged and extensive use of metacognitive strategies in a university flipped classroom (Judy Shih & Huang, 2022) but has also led to an increase in students' self-efficacy (Namaziandost & Çakmak, 2020).

Interestingly, while empirical studies have highlighted the positive impact of the flexibility of flipped classrooms on students' motivation (Aidoo et al., 2022) and learning effectiveness (Chou et al., 2021; Tang et al., 2023), there is evidence indicating that students may struggle with maintaining their self-discipline (Chun & Sathappan, 2018; Silverajah et al., 2022). A study by Chun and Sathappan (2018) examined the effectiveness of the flipped classroom approach in enhancing students' mastery of English adjectives by comparing the learning outcomes of experimental and control groups through pre-test and post-test scores. The findings revealed that the flipped classroom approach had a significant positive impact on learners' acquisition of adjectives. However, an analysis of students' perceptions highlighted that not all learners were able to fully meet the demands of the approach. Some students faced challenges with self-discipline, often failing to complete the assigned homework and coming to class unprepared.

In addition to challenges with self-discipline in a flipped classroom, students have also been found to lack motivation to actively engage in learning activities outside of class (Baig & Yadegaridehkordi, 2023; Nielsen, 2023). Nielsen (2023) employed both open-ended and closed-ended questions to explore engineering students' experiences with the flipped classroom, particularly to identify potential sources of frustration. The findings revealed that, while students appreciated the flexibility and freedom of self-paced learning, many struggled to adapt their study habits and stay motivated, as the approach required them to self-regulate their learning and take greater responsibility for engaging with content outside of class. These findings from previous studies suggest that while flipped classrooms have been found to offer several benefits in educational settings, some challenges cannot be ignored.

Self-Regulated Learning (SRL)

Self-regulated learning (SRL) refers to the process by which learners intentionally adapt their learning activities to meet their goals. According to Zimmerman (2002), students who manage their learning tend to be more

motivated and use effective learning strategies. This not only helps them succeed academically but also makes them feel more optimistic about their future. Throughout the self-regulation process, students employ strategies they believe will lead to success and continually refine these approaches to enhance their effectiveness. Among various learning strategies, research has shown that students who effectively monitor and regulate their emotional states are more likely to manage their study habits, thereby decreasing the likelihood of procrastination (Rasheed et al., 2020). Furthermore, the strategies students use to manage and control their learning processes have been identified as strong predictors of academic performance (Bai & Wang, 2023). Supporting this, a study by Chen et al. (2019) found that SRL ability plays a key role in academic success, particularly in the context of learning English vocabulary through mobile applications.

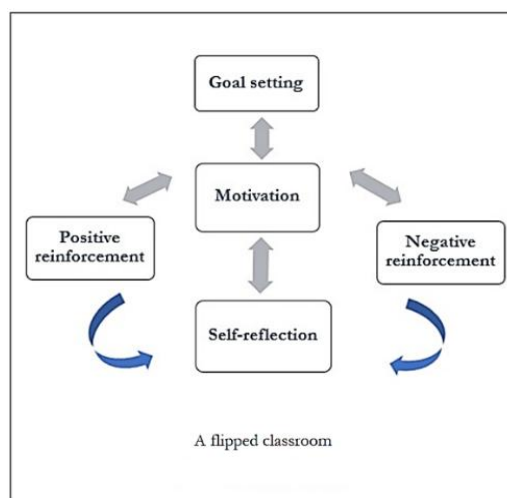
From the viewpoint of social cognitive theory, Zimmerman's cyclical model (2000) has been widely used to offer a thorough insight into how learners actively regulate their learning processes to achieve academic success. His cyclical model is useful in terms of providing a framework for research to investigate how students can be guided to become more strategic and successful in regulating their learning. In his model, self-regulation is viewed as context-specific procedures that involve three phases: forethought, performance, and self-reflection (Panadero, 2017). These procedures occur in a consistent pattern during the pursuit of personal goals.

During the forethought phase, individuals begin by analysing the task before setting goals and planning how to achieve them. They also check how confident they feel, how interested they are, how important the task is to them, and what they expect from the task. Goal setting is a vital aspect of the self-regulated learning process, as it enables students to monitor their progress and assess the effectiveness of their performance (Zimmerman, 2002). In the performance phase, individuals carry out the task, motivate themselves, and stay focused until they finish the assignment. Apart from controlling themselves to stay on track, individuals also observe their performance by experimenting with different approaches to see if they can achieve better results (Panadero, 2017). For example, learners may break larger tasks into smaller, manageable parts, choose quiet study environments to minimise distractions, and use self-reward strategies after completing tasks to maintain motivation. In the final phase, individuals reflect and assess their task performance to determine their success or failure. This self-reflection phase is regarded as critical because it is thought to influence how they tackle similar tasks in the future. In particular, when students experience failure, their negative reactions to these failures, such as discouragement or feeling incompetent, can significantly impact their motivation levels, which ultimately hinders their performance.

Based on this model, self-regulated learning (SRL) involves a range of processes—from planning academic tasks to persevering through challenges—that are among the strongest predictors of academic success. The core definition of SRL emphasises its dynamic and multifaceted nature, highlighting its central role in shaping learning outcomes. As indicated by Dent and Koenka (2016), learning is considered self-regulated when students actively engage in motivational, cognitive, and behavioural aspects of academic tasks. In essence, SRL supports lifelong learning by enabling students to set clear goals, manage their learning independently, and assess their progress toward those goals (Xiao & Yang, 2019).

To test Zimmerman’s cyclical phase model of self-regulated learning, DiBenedetto and Zimmerman (2010) studied fifty-one high school juniors with varying levels of achievement in science. Using a microanalytic methodology, they closely examined students’ thoughts, feelings, and behaviours during the forethought, performance, and self-reflection phases of learning. The goal was to see how students engaged with SRL subprocesses across these phases. Their findings revealed that high-achieving students used significantly more self-regulatory strategies than their average- and low-achieving peers. This pattern held true regardless of gender, providing strong support for the model and reinforcing the link between SRL use and academic success.

While the study focused on students’ use of self-regulated learning (SRL) strategies, it is also important to consider the role of motivation within this framework. According to Zimmerman’s cyclical phase model, motivation plays a crucial role in both the forethought and performance phases, as it drives learners to set meaningful goals and persist in achieving them. Likewise, SRL processes are essential during the performance phase, helping students stay focused and maintain effort. This close connection highlights how motivation and SRL are deeply intertwined—each reinforcing the other—and underscores the idea that they should not be considered in isolation. This perspective is supported by previous research (Gu & Lee, 2019; Zimmerman, 1990), indicating that SRL skills and motivation are interdependent and positively related.

Figure 1*The Model of Motivation and SRL Phases in a Flipped Classroom*

Building on Zimmerman's (2000) social-cognitive perspective, self-regulation is viewed as a cyclical process where feedback from previous performance is used to inform adjustments in ongoing efforts. As depicted in Figure 1, goal setting, motivation, reinforcement, and self-reflection are interconnected and influence one another in a continuous loop. The feedback students receive from their prior actions serves as a critical input for refining their goals and strategies, which in turn impact their motivation and subsequent learning behaviours. Through this ongoing cycle, students continuously adapt and regulate their learning, fostering both personal growth and academic development.

SRL and Motivation

In the field of psychology, motivation is understood as a mental state characterised by an individual's desire, drive, enthusiasm, and determination to work toward specific goals or to complete tasks (Challob, 2021). It is a key factor that encourages students to engage actively in their studies, work hard, and persist in their efforts. Within the framework of self-determination theory (SDT), developed by Deci and Ryan (1985), motivation is understood by looking at the reasons behind why people choose to act. At its core, SDT separates motivation into two main types. Intrinsic motivation is when someone does something just because they find it interesting or enjoyable.

On the other hand, extrinsic motivation refers to actions performed for reasons other than the enjoyment or satisfaction gained from the activity itself (Ryan & Deci, 2020). In other words, individuals are extrinsically motivated when they do something to get something in return, which could be a reward, a grade, or approval from others (Ryan & Deci, 2000). Both intrinsic and extrinsic motivation drive human behaviour. Students may be extrinsically motivated by rewards or avoidance of punishment, while intrinsic motivation arises from personal enjoyment or the satisfaction of mastering tasks.

In the context of learning, intrinsic motivation and self-efficacy (belief in one's ability) are essential components of motivation that significantly enhance students' academic achievement (Anuar et al., 2023; Çetin, 2022; Skinner et al., 2012). Recent research indicates that students are naturally motivated to manage their learning when they feel supported and confident in their ability to accomplish tasks (Cassia & Magno, 2024; Xu et al., 2023). Building on this understanding, effective self-regulation not only depends on students' motivation but also on their awareness of the value and purpose of the learning tasks. Self-regulated learning is closely related to human motivation. Research investigating the motivation aspect has revealed that students' motivational strategies play an important role in enhancing their effort and persistence with the task (Xu et al., 2023). Additionally, it has been found that the extent to which students feel motivated could be a strong determinant of their decision to engage in their learning process (Gao & Newton, 2009).

According to Eccles and Wigfield's (2002) expectancy-value theory and Deci and Ryan's (2013) self-determination theory, students' decisions about learning often depend on how likely they think they are to succeed and how much they personally value the task. In other words, when a task feels both important and doable, students are more willing to put in the effort and use strategies to manage their learning (Loh, 2019). From this perspective, students need to recognise the relevance and significance of the tasks they are assigned to effectively regulate their learning. Additionally, understanding the potential rewards or outcomes associated with task completion can serve as a critical source of motivation, encouraging sustained engagement and effort.

From a psychological standpoint, particularly within the framework of operant theory, self-regulation is seen as a behaviour shaped by environmental consequences (Newman & Newman, 2020; Skinner et al., 2012). Put simply, people are more likely to repeat a behaviour when it leads to a positive result. For students, this means that if they see a certain action helping them succeed, like getting a good grade, they're more likely to think about what they did and try to use the same strategy again to reach their goals. That is, students take control of their behaviour. They decide what they want to work on, set up cues or reminders to help them stay on track, check how

well they're doing based on their goals, and then reward themselves when they meet those goals (Reid et al., 2012; Schunk & Zimmerman, 2003). Reinforcement is consequently considered a motivator when it leads to the desired behaviour being achieved or increased in frequency (Zahid & Cheema, 2023). In this regard, if students who employ strategies to regulate their learning behaviour experience success, this could strengthen their future inclination towards learning through positive reinforcement.

While intrinsic motivation is highlighted as a main factor that drives students to accomplish tasks, the goals students have can also influence their motivation, as seen through goal orientation theory, which highlights varying levels of commitment affecting motivation. With a particular emphasis on goal orientation and motivation, Pintrich (2000) was among the first to investigate the motivational aspects of SRL through the development of the Motivated Strategies for Learning Questionnaire (MSLQ). The MSLQ has been widely cited in the research literature and has been adapted for use in various cultural contexts due to its ability to provide comprehensive insights into how students use their motivated strategies to achieve their academic results (Broadbent et al., 2023; van Alten et al., 2020; Wang, 2021). Specifically, the MSLQ was developed to examine how college students regulate their learning and what factors influence their motivation in academic contexts. The instrument consists of 81 self-report items and is grounded in a social-cognitive theory of motivation and self-regulated learning. On top of that, it has been extensively used in educational research and has demonstrated strong reliability and validity across numerous studies (Erturan Ilker et al., 2014; Fatima et al., 2025; Feiz et al., 2013).

While the MSLQ has long been regarded as one of the most comprehensive measures of self-regulated learning, Broadbent et al. (2023) noted that the instrument is increasingly outdated. As a result, it may no longer fully capture the evolving learning behaviours and challenges faced by students, particularly in online and blended learning environments. To address this limitation, Broadbent developed the Self-regulation for Learning Online (SRL-O) questionnaire, which is a more contemporary and contextually relevant tool that better reflects the self-regulatory processes crucial in digital learning contexts. The SRL-O questionnaire was designed to measure both motivational beliefs and learning strategies. It covers ten key subscales, namely online self-efficacy, intrinsic and extrinsic motivation, negative achievement emotions, planning and time management, metacognition, study environment, effort regulation, social support, and task strategies. These subscales represent the various skills and mindsets that students often rely on in online and blended learning settings. The questionnaire has demonstrated strong internal consistency, with Cronbach's alpha values ranging from 0.74 to 0.92, indicating that it is a reliable and

robust tool for studying how students regulate their learning in digital environments (Broadbent et al., 2023).

Given the importance of motivational beliefs and self-regulated learning strategies, it is crucial to understand their direct link to academic performance. Although motivational and self-regulated learning strategies are widely discussed in academic literature (Erdil-moody & Thompson, 2020; Guilloteaux & Dörnyei, 2008; Mahmoodi et al., 2014), the link between students' motivation and their academic performance has received comparatively less attention (Yarin et al., 2022). Additionally, the concept of self-regulated learning (SRL) has not been as thoroughly studied as other educational components (Zhang & Dong, 2022). Given the complexity of motivation and self-regulation, which are influenced by various factors such as goal orientation, self-efficacy (Wang et al., 2025), and classroom environment (Sungur & Güngören, 2009; Wafula, 2021), it is crucial to explore these aspects to understand how students motivate themselves and regulate their learning outside of traditional classroom settings. By investigating factors such as intrinsic and extrinsic motivation and self-regulation, this research sought to identify patterns that contribute to how students motivate themselves and regulate their learning in a flipped classroom approach.

Methodology

Aiming to explore the SRL and motivational strategies that students applied in the context of a flipped classroom and to find the correlation between SRL strategies and academic success, this study used a mixed-methods approach to gain a holistic perspective. Quantitative data were gathered through questionnaires, aiming to provide numerical insight into the prevalence of different strategies. Additionally, semi-structured interviews were conducted to delve deeper into students' perceptions and to understand why and how they employ certain strategies. Furthermore, this study involved correlational analysis to determine the relationship between SRL strategies and academic outcomes in the flipped classroom.

Sampling Methods

This research used purposive sampling to select the participants, with inclusion criteria based on both demographic characteristics and study-specific variables. The demographic characteristics required participants to be EFL students who had studied English for no less than 10 years. The study-specific variables involved technological requirements, whereby participants must have internet access throughout the research process. As for the

exclusion criteria, participants who failed to attend all flipped lessons and did not complete all exercises assigned to them in a flipped classroom were excluded from the study. From an intact group of 56 participants, 4 students met the exclusion criteria and were thus removed from the study.

Participants

Participants were 52 Thai first-year nursing students aged 18-20, who had been studying English as a foreign language for at least 12 years. They were recruited through purposive sampling from an intact group of 56 first-year students enrolled in a required course at the Institute of Nursing, Thailand. The researcher utilised in-person recruitment to find potential participants who were interested in taking part in this study. They were assured that the choice to participate was voluntary and their identities would be kept confidential.

Research Instruments

An Attitude Questionnaire (part 1: motivational beliefs and part 2: self-regulated learning)

The questionnaire aimed to explore students' perceptions of motivation and self-regulated learning in a flipped classroom context. It was structured on a 5-point Likert scale and consisted of two parts. Part one focused on students' motivational beliefs, while part two addressed their self-regulated learning strategies. Students responded to each item using the following scale: 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree. This research instrument was adapted from the self-regulation for learning online (SRL-O) questionnaire (Broadbent et al., 2023), which has been validated and shown to be a reliable tool for assessing online self-regulated learning in both online and blended learning environments.

In the flipped classroom, students were required to study online outside of the classroom, so this questionnaire was appropriate for measuring their self-regulated learning (SRL) and motivational beliefs in the context where students engaged in online study outside of traditional class time. The questionnaire was reviewed by experts, and wording modifications were made to enhance clarity and ensure alignment with the specific objectives and context of the study. The first part of the questionnaire consisted of twenty items designed to assess the extent to which students agreed or disagreed with statements related to their motivational beliefs. This section covered four dimensions: (1) self-efficacy, (2) intrinsic motivation, (3) extrinsic motivation,

and (4) negative achievement emotion. Each dimension included five items, making a total of 20 items focused on students' motivational beliefs.

The second part of the questionnaire explored students' self-regulated learning (SRL) strategies in the flipped classroom. This part consisted of twenty-four items that explored students' perspectives across five dimensions: (1) learning strategies, (2) self-evaluation, (3) social support, (4) study environment, and (5) regulation of out-of-class effort. The first four dimensions contained five items each, while the final dimension included four items.

Semi-structured Interview

Semi-structured interviews were conducted to deepen the understanding of students' motivational strategies and experiences in self-regulated flipped learning. Students were recruited from varying proficiency levels based on their midterm exam scores. By including a diverse group, the researcher could examine how students with varying levels of academic ability experienced challenges and opportunities in the flipped learning environment, as well as how they utilised their strategies to regulate their learning while maintaining their motivation.

A group of five first-year EFL students enrolled in the nursing program voluntarily participated in individual interviews. The participants, selected through convenience sampling, included three high-proficiency female students (all aged 18) and two low-proficiency students (two females aged 18, one male aged 19), as classified by their midterm exam scores. All students were non-native English speakers studying English as a Foreign Language (EFL). Each interview lasted approximately 40 minutes and was designed to explore their motivational beliefs and self-regulated learning strategies in a flipped classroom context.

The interviews were conducted in Thai and focused on two main areas: motivational beliefs and self-regulated learning strategies. The interview comprised 10 questions, with 5 questions dedicated to each area. For example, participants were asked about the techniques they use to maintain focus during flipped instruction, how they sustain their motivation, their persistence in achieving academic goals, and the skills they deem essential for effectively managing and regulating their learning. The qualitative data gathered from the semi-structured interviews were transcribed and analysed using the thematic analysis method described by Nowell et al. (2017). This process was used to identify key themes, concepts, and patterns within the data. The interviews were recorded and subsequently transcribed by the researcher. Selected quotations that reflected the perspectives of multiple participants were included in the results section as illustrative examples.

English Achievement Test

The English Achievement Test used in this study was adapted from the Oxford English for Careers Nursing 1 Student Book (Grice, 2007). The researcher opted to construct the test based on Grice's (2007) book because it was the primary textbook for the course and closely aligned with the curriculum objectives. The test consisted of 30 questions designed to assess students' proficiency in reading comprehension, grammatical structures, and vocabulary relevant to the study unit. Initially, the test included 32 items; however, following expert validation, two redundant items were removed, resulting in a final version with 30 items. The questions were adapted from the course textbook by three English language teachers, and the content was subsequently reviewed and validated by three experts in the field to ensure clarity, relevance, and alignment with the study objectives.

Validity and Reliability of Research Instruments

The instruments underwent validation by three experts in the field to ensure their accuracy in measuring intended constructs. Items scoring below 0.5 were removed, and those below 1 were revised for clarity. The resulting high level of item objective congruence (IOC) demonstrated strong alignment between test items and learning objectives. Specifically, the English achievement test achieved an IOC of 0.86. The motivational beliefs questionnaire, the self-regulated learning questionnaire, and interview questions achieved an IOC of 0.96, 0.87, and 0.96, respectively.

To identify issues with the instruments before their full implementation, 10 nursing students from different sections were asked to review the items in the questionnaire, interview questions, and English Achievement Test. As a result, several modifications were made to the first part of the questionnaire regarding motivational strategies, and two redundant items were removed from the English Achievement Test to improve clarity, reducing the total number of test items from 32 to 30.

The internal consistency of the questionnaire was assessed using Cronbach's alpha. The reliability of the questionnaire regarding students' motivational beliefs and SRL strategies was confirmed with a Cronbach's alpha coefficient of 0.81 and 0.86, respectively. The reliability of the test items was assessed using the Kuder-Richardson Formula 20 (KR-20), indicating a coefficient of 0.74. These values indicated a high level of internal consistency of the research instruments.

Data Collection and Analysis

Steps to Call for Participants

After obtaining Institutional Review Board (IRB) approval to conduct research, the researcher provided participants with an overview of the research objectives, explaining to them the data collection process. Consent forms were subsequently distributed to obtain their permission for data collection. In terms of privacy and confidentiality, participants were assured that their information would be treated confidentially, and that all data would be stored securely on password-protected computers and would be deleted one year after the completion of the research.

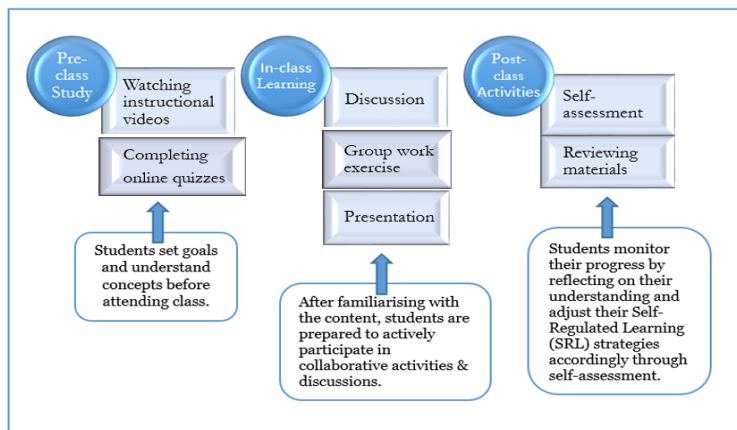
Flipped Classroom: English for Communication

First-year nursing students were required to enrol in an English for Communication course as part of their curriculum. This 14-week course aimed to develop their English proficiency in spoken and written English for effective communication in real-life situations. The research collected data from only the last two units of the course, despite it comprising four units. This approach was aimed at familiarising students with the course structure before data collection. The last two units of the course required them to use basic grammar structures and sentences to describe body measurements and to practise giving advice.

During the first half of the semester, students studied two units in class and took a midterm exam. In the second half of the semester, they were assigned to study instructional materials, including pre-recorded videos, reading texts, and online quizzes related to the course content, before coming to the next class. During weeks 12-13, following the final out-of-class activities, an online attitude questionnaire was administered using Google Forms to explore students' opinions on their self-regulated learning (SRL) strategies and motivational beliefs. During the same period, a group of five students, selected from a pool of 52, voluntarily participated in a semi-structured interview that lasted approximately 40 minutes. It is important to note that the English Achievement Test was administered the week before the final examination.

Table 1*Weekly Activities in the Flipped Classroom*

Weeks	Activities
1	Introduction to Google Classroom for updates on instructional materials and video content In-class study for Unit 1
2-3	In-class study for Unit 1
4-6	In-class study for Unit 2
7	Mid-term examination
8	In-class study for Unit 3
8-9	Out-of-class instructional materials for Unit 3: - Reading articles on body measurement - Completing an online quiz using Google Forms
9	In-class study for Unit 3
9-10	Out-of-class instructional materials for Unit 3: Watching a pre-recorded video on giving advice to patients
10	In-class study for Unit 3 with group discussion
10-11	Out-of-class instructional materials for Unit 4: - Reading articles on elderly care - Completing an online quiz using Google Forms
11	In-class study for Unit 4
12	In-class study for Unit 4 with group discussion Out-of-class instructional materials for Unit 4: Watching a pre-recorded video on describing problems of the elderly
12-13	Out-of-class instructional materials for Unit 4: - Listening practices - Completing an online quiz using Google Forms Data collection: online attitude questionnaire semi-structured interviews

Figure 2*The Instructional Model of Flipped Classroom and Self-regulated Learning*

To explore the students' motivational beliefs and SRL strategies, an attitude questionnaire was administered. The responses were gathered and analysed via Google Forms. The instrument was adapted to suit the study context and was validated by field experts to ensure content clarity and relevance. All responses were collected and analysed using Google Forms. To ensure the accuracy and reliability of the analysis, the data were double-checked for consistency and completeness before interpretation. Furthermore, transcripts of interviews were carefully analysed to identify themes and variations in participants' attitudes. To ensure the accuracy and validity of the analysis, a summary of the identified themes was provided to the participants for feedback and confirmation. Moreover, to understand the relationship between students' self-regulated learning strategies and their academic achievement within the flipped classroom setting, data derived from students' scores on the English Achievement test and their responses from the attitude questionnaire were analysed using Pearson's correlation coefficient (r). This provided an understanding of the strength and direction of the relationship between these two variables (SRL and academic achievement).

Findings

Research Question 1: What Motivational and Self-Regulated Learning (SRL) Strategies Do Students Apply in the Flipped Classroom?

Motivational Beliefs

The analysis of questionnaire responses regarding students' motivational beliefs revealed several notable trends in how students perceived and engaged with motivation within the various motivational constructs. (see Tables 2 and 3).

Table 2

Questionnaire Response Summary: Motivational Beliefs in a Flipped Classroom

Construct	Self-efficacy	Intrinsic Motivation	Extrinsic Motivation	Negative Emotions
N	52	52	52	52
Mean	19.50	21.31	13.54	12.17
Std. Deviation	2.60	2.70	4.43	4.89

The data presented in Table 2 indicate that, among the four subscales of motivational constructs, intrinsic motivation had the highest mean score ($M = 21.31$, $SD = 2.70$), suggesting that students rated their internal drive for learning relatively strongly. Self-efficacy also showed a relatively high mean score ($M = 19.50$, $SD = 2.60$), indicating that students generally reported confidence in their ability to complete academic tasks and overcome challenges in the flipped classroom setting. In contrast, extrinsic motivation had a lower average score ($M = 13.54$, $SD = 4.43$), reflecting that motivations driven by external rewards or recognition were less commonly endorsed. Finally, negative achievement emotions recorded the lowest mean score among the four constructs ($M = 12.17$, $SD = 4.89$). The larger standard deviation for this subscale suggests a wider range of emotional responses among students, with some reporting minimal negative emotions and others indicating higher levels of academic-related stress or discomfort.

Table 3*Descriptive Statistics for Subscales of Motivational Beliefs in a Flipped Classroom*

Items	Mean	Std. Deviation	N
1. I am confident that I can master the content from the instructional materials before coming to class.	3.64	.89	52
2. I am confident that I can finish the assignments before coming to class.	4.60	.66	52
3. I am confident that I can persist with the task even though I find it difficult.	4.31	.73	52
4. I am confident that I can overcome distractions during the flipped classroom method.	3.56	.80	52
5. I am confident that I can come to class fully prepared.	3.40	.93	52
6. I find it satisfying when I learn new material outside of class.	4.33	.79	52
7. I get a sense of achievement when I learn new content prior to coming to class.	4.14	.74	52
8. I like learning content from out-of-class material in this flipped instruction because I can learn at my own pace.	4.21	.82	52
9. I think the out-of-class material in this flipped instruction is useful for my learning.	4.44	.67	52
10. I think the out-of-class material in this flipped instruction equips me with the necessary information for group discussion in class.	4.19	.72	52
11. I want to finish all my assignments so that I can show off to my friends and family.	2.77	1.33	52
12. I want to get a high grade because of others' expectations of me.	2.92	1.38	52
13. I study material before coming to class because I want to get a better grade than others.	2.44	1.20	52
14. When I study the content before the next class, my instructor or friends will be satisfied with my preparation.	3.23	.94	52
15. If I cannot get a good grade, my family will be disappointed.	2.17	1.43	52
16. When I have to study the contents before coming to discuss in class, I feel bad.	2.20	1.18	52
17. I feel stressed because I have to come to the class prepared.	2.50	1.28	52

Items	Std.		N
	Mean	Deviation	
18. While studying instructional materials, I want to distract myself to lower my anxiety level.	2.83	1.26	52
19. I feel pressured when I have to preview materials before coming to a flipped class.	2.40	1.24	52
20. I have an uneasy, upset feeling when I have to discuss in a flipped class.	2.21	1.30	52

The data presented in Table 3 indicate high levels of intrinsic motivation among students in the flipped classroom. Students reported strong satisfaction with the learning material provided in class ($M = 4.44$) and with learning new material independently outside of class ($M = 4.33$). They also expressed satisfaction with the opportunity to learn at their own pace ($M = 4.21$), suggesting a positive perception of the flexibility inherent in the flipped learning approach. Within the self-efficacy domain, students demonstrated confidence in their ability to complete assignments before class sessions ($M = 4.60$) and reported persistence when facing difficult tasks ($M = 4.31$), indicating a strong sense of academic self-belief. In contrast, motivation driven by external rewards, such as recognition or grades based on others' expectations, appeared to have limited influence on the students. Scores related to extrinsic motivation were comparatively lower, with the mean score for studying to obtain external rewards particularly low ($M = 2.44$). As for negative emotions, some students experienced discomfort or stress related to the expectation of preparing in advance. However, the item measuring discomfort associated with pre-class preparation had a relatively low mean score ($M = 2.20$), implying that while certain students felt negatively about preparation requirements, this feeling was not pervasive across all participants.

Motivational Strategies

To gain deeper insight into participants' perceptions of their motivational strategies in a flipped classroom, data from semi-structured interviews with 5 students were thematically analysed:

H refers to high proficiency

L refers to low proficiency

S1, S2, S3, S4, and S5 refer to student 1, 2, 3, 4, and 5, respectively.

The analysis revealed four key subcategories related to motivational strategies in the flipped classroom: (1) setting clear goals, (2) maintaining preparedness, (3) avoiding distractions, and (4) finding an appropriate study environment. These interview findings align closely with the questionnaire

data, which indicated that students were predominantly driven by intrinsic rather than extrinsic motivation.

Intrinsic motivation emerged strongly across all dimensions, and interview responses reinforced this pattern. Students described engaging with study materials and completing assignments not out of obligation or a desire to outperform peers, but out of genuine interest and personal relevance. While some acknowledged the temptation to engage in other activities, they chose to prioritise studying, recognising its importance for their academic progress. Importantly, students emphasised that effective time management was possible because they clearly understood both the purpose and the requirements of their tasks. Central to this was the role of goal setting: students reported that setting clear, achievable goals helped them stay focused and motivated, providing a roadmap that made their efforts feel purposeful and manageable.

“I set my goals for why I needed to study. I tried to find benefits in controlling myself, avoiding distractions by putting away my phone, and finding a quiet environment that supported my studying so I could concentrate better.” (S3, H)

On the other hand, students who reported feeling less motivated explained that they already felt tired after studying in class and wanted to relax by doing other activities. They expressed that additional study outside of class could interfere with their leisure time and overall well-being. Moreover, they indicated that it was easy to get distracted by social media because there was nobody to control them. Overall, the reasons students felt less motivated and failed to regulate their learning were the desire for free time to relax and the ease of getting distracted due to the lack of control outside of class. These findings revealed that while intrinsic motivation was high, the need for relaxation and the distractions from social media impacted students' willingness to engage in additional study outside of class.

“I want to do other things like going to a movie, going on a trip, or having time to exercise, so I don't want to have extra study outside of class.” (S5, L)

Regarding self-efficacy, students expressed persistence and confidence in their ability to complete assignments before class. This belief in their capabilities aligns with their reported use of self-regulated learning strategies, as reflected in the questionnaire findings discussed in the following section.

“Even when things got tough, I could stay committed and find ways to overcome obstacles to succeed. I usually completed my

assignments before class, which helped me feel more confident and prepared when discussing the topics with my peers and instructors.” (S2, H)

Interview responses revealed that students felt confident in managing their academic responsibilities, particularly in meeting deadlines and handling challenges independently. Many participants highlighted that being well-prepared before class contributed significantly to their sense of confidence during flipped instruction.

Self-Regulated Learning Strategies

The analysis of self-regulated learning strategies was conducted across five constructs: learning strategies, self-evaluation, study environment, effort regulation, and social support. Tables 4 and 5 summarise the key statistical measures.

Table 4

Questionnaire Response Summary: SRL Strategies

Construct	Learning Strategies	Self-Evaluation	Study Environment	Effort Regulation	Social Support
N	52	52	52	52	52
Mean	20.29	20.44	20.29	19.17	15.81
Std. Deviation	3.07	3.48	2.61	3.11	2.43

The results presented in Table 4 reveal differences in how students engage with various self-regulated learning strategies. Students demonstrated self-regulatory behaviours by monitoring and reflecting on their learning progress. As shown among the five constructs, self-evaluation had the highest average score ($M = 20.44$, $SD = 3.48$). This was closely followed by study environment and learning strategies, both with mean scores of 20.29. This revealed that students paid careful attention to their study environments and actively planned their study activities. Interestingly, social support scored the lowest ($M = 15.81$, $SD = 2.43$), suggesting that students were less likely to seek help from peers or instructors. Overall, these findings suggest a strong preference among students for independent, self-regulated learning strategies rather than assistance-oriented ones.

Table 5*Descriptive Statistics for Subscales of SRL Strategies in a Flipped Classroom*

Items	Mean	Std.	N
		Deviation	
1. I set realistic deadlines for learning.	3.87	.79	52
2. I break larger goals into smaller actionable goals.	4.15	.85	52
3. I always follow my plan strictly.	4.29	.92	52
4. I make good use of my study time for this course.	3.90	.82	52
5. I plan out my schedule each week, so I have time available for studying materials before class.	4.33	.83	52
6. I usually self-assess my performance once I finish each task.	3.54	1.20	52
7. I look over my past scores I have received and check that I have made improvements in my current learning.	4.31	.90	52
8. I spend time interpreting the task to ensure I understand what I need to do.	4.31	.90	52
9. I think about what strategies have worked for me in the past when doing similar assignments.	4.29	.89	52
10. I examine my understanding of what I have learned.	4.00	.79	52
11. I can study the out-of-class materials without distraction.	3.10	.89	52
12. I usually study in a place where I can concentrate on my assignments.	4.60	.53	52
13. I have access to a quiet and distraction-free place to study.	4.58	.72	52
14. I know where I can study most efficiently for this flipped class method.	4.31	.70	52
15. I find it difficult to focus on the content when studying at home because it is too noisy.	3.71	1.32	52
16. I work hard in my out-of-class study, even when there are more interesting things to do.	4.31	.88	52
17. When my out-of-class study gets difficult, I remain committed to reaching my study goals.	3.75	.91	52
18. When my mind begins to wander during a learning session for this flipped class, I make a special effort to keep concentrating.	3.56	1.04	52
19. No matter how I am feeling, I continue with my out-of-class study because I know that I have to discuss the content when coming to the next class.	3.62	.91	52
20. I usually use effective strategies to regulate my learning during a flipped class method.	3.94	.78	52
21. I ask the teacher and/or my peers to clarify information in the flipped class.	3.77	1.04	52

Items	Mean	Std.		N
		Deviation		
22. When I have difficulties with my out-of-class study, I seek assistance from others through online means (social media, email, instant message).	3.92	1.01		52
23. I share my problems with my classmates and help one another to solve problems.	3.73	1.21		52
24. I seek clarification by asking others about what I need to do before each assignment.	4.39	.75		52

Students appeared to engage meaningfully with different aspects of self-regulated learning (SRL) while participating in flipped instruction. They demonstrated strong use of strategies related to goal setting and study environment, with high mean scores for actions such as planning weekly schedules ($M = 4.33$), breaking down tasks ($M = 4.15$), and studying in quiet, distraction-free spaces ($M = 4.60$). Self-evaluation was also a key strategy, with students regularly assessing their progress ($M = 3.54$) and reflecting on past performance ($M = 4.31$). Despite the common challenge of maintaining focus, students reported sustained effort, working hard while facing distractions ($M = 4.31$) and remaining committed when tasks became difficult ($M = 3.75$). Although maintaining focus throughout the tasks was a common challenge for them, students reported working hard despite distractions ($M = 4.31$) and staying committed when tasks became difficult ($M = 3.75$). In terms of social support, students frequently sought clarification before assignments ($M = 4.39$) while general peer collaboration and emotional support for sharing problems were reported at more moderate levels.

The findings from the interviews with five students indicate that they showed varying preferences for specific learning strategies within the flipped classroom; however, time management, planning, and concentration emerged as consistent themes across interviews (S1, H & S3, H). This suggests a strong reliance on setting specific and realistic goals for students' learning plans.

“Time management, for me, was about sticking to my plans. I needed to prioritise what truly mattered and maintain the discipline to follow through. With a heavy load of assignments, I began organising my time by breaking down larger tasks into smaller, more manageable chunks and scheduling specific time slots for each one.” (S1, H)

Furthermore, the data indicate a need for improved time management skills among students. Students (S4, L & S5, L) reported finding it difficult to manage their time when it came to handling assignments and studying, although they recognised that mastering time management skills is essential

for balancing academic tasks and other responsibilities. They also identified challenges in completing assigned tasks before class sessions.

“I procrastinated when faced with too many assignments. I needed to remind myself to tackle them promptly or else I'd pay for it later. Initially, I needed to shift my focus to prioritising what I should do first.” (S4, L)

Moreover, students agreed that setting clear goals helped manage their time and regulate their learning. Several participants mentioned that having defined objectives allowed them to refer to their schedule whenever they felt overwhelmed or scattered, helping them stay on track.

“Setting goals showed me exactly what I needed to do. Sometimes, I found myself getting distracted, but then I realised I hadn't completed my goal. It helped me stay on track.” (S2, H)

Apart from managing time effectively and setting realistic goals, distractions were a significant problem that hindered students' goal achievement. When they were distracted, they failed to focus on their studies. Keeping their smartphones away when working on assignments or studying would help them maintain focus.

“I found it hard to concentrate, especially when there were many distractions around me. I couldn't stop checking my iPhone; sometimes I would get so absorbed that time would fly by, and before I knew it, I'd lost track of what I was supposed to be doing. What I could have done to avoid this situation was to put away my phone and try to concentrate on my goal. Having a clear goal helped me stay focused.” (S5, L)

Overall, the findings from the interviews reveal that students rely heavily on self-regulated learning strategies such as goal setting, time management, and pre-class preparation. While students expressed confidence in their ability to manage academic demands, they also consistently sought clarification and support when needed. These themes reflect a balanced approach to independent and collaborative learning within the flipped classroom context.

Table 6*Motivational Strategies Reported in Student Interviews*

SRL Strategies	Motivational Strategies
Setting both short-term and long-term goals	Realising the importance of pre-class study
Creating a consistent daily study routine, specifying tasks and deadlines	Adjusting goals to reduce pressure and increase motivation
Breaking down study sessions into manageable chunks with short breaks	Taking a break to relax and refresh before refocusing on goals
Seeking social support by asking friends or instructors when faced with difficult content	Finding out reasons for failing to study or lacking motivation through self-talk or discussing with family members
Utilising technological tools like note-taking apps and time management apps to aid in studying	Maintain good health by eating healthily, exercising regularly, and ensuring to get enough sleep
Choosing a quiet and supportive environment to enhance concentration	Selecting a study place based on individual personality traits (libraries for introverts and cafes for extroverts)

Research Question 2: How do self-regulated learning (SRL) strategies correlate with academic achievement in the flipped classroom?

This study explored the relationship between several self-regulated learning variables—learning strategies, self-evaluation, study environment, effort regulation, and social support—and students' English test scores using Pearson correlation analysis. The sample included 52 students.

Table 7*Correlation Between Self-Regulated Learning and English Language Scores.*

Variables	Correlation Statistics	English Test Scores
Learning strategies	Pearson Correlation	.25*
	Sig. (1-tailed)	.04
	N	52
Self-evaluation	Pearson Correlation	.24*
	Sig. (1-tailed)	.04
	N	52
Study environment	Pearson Correlation	-.07
	Sig. (1-tailed)	.32
	N	52
Effort regulation	Pearson Correlation	.09
	Sig. (1-tailed)	.26
	N	52
Social support	Pearson Correlation	.02
	Sig. (1-tailed)	.45
	N	52

* Correlation is significant at the .05 level (1-tailed).

** Correlation is significant at the .01 level (1-tailed).

A Pearson correlation was conducted to examine how students' use of self-regulated learning (SRL) strategies related to their English test scores, specifically within the flipped classroom environment. Among the five categories of SRL strategies assessed in the attitude questionnaire—learning strategies, self-evaluation, study environment, effort-regulation, and social support—Pearson correlation coefficients revealed statistically significant positive relationships between English test scores and learning strategies ($r = .25, p = .04$) as well as self-evaluation ($r = .24, p = .04$). This suggests that students who utilised effective learning strategies and engaged in self-evaluation tended to achieve higher scores in English. On the other hand, study environment ($r = -.07, p = .32$), effort regulation ($r = .09, p = .26$), and social support ($r = .02, p = .45$) didn't show any meaningful connection to English test scores. This suggests that, at least in this group of students, these factors might not have had a strong or direct impact on how well they performed on the test.

The Pearson correlation results are consistent with the qualitative data, which indicate that students place considerable importance on assessing their progress. Although the correlation coefficients are modest, these findings suggest that students who employ effective learning strategies and engage in reflective self-evaluation are more likely to perform better. This is consistent with the results of Valle et al. (2008), indicating that a higher level of self-regulated learning is associated with greater academic success. This can be explained through Zimmerman (2002)'s cyclical model of self-regulated learning, which emphasises the importance of goal setting, self-control during task performance, and self-evaluation after completion. The model suggests that students who consistently apply these strategies are more likely to experience improved academic outcomes, as they take active responsibility for their learning behaviours.

Discussion

This current study provides insight into how the flipped classroom supports the development of nursing students' motivational aspects and self-regulated learning strategies. Concerning the motivational beliefs, the findings highlight the importance of intrinsic motivation and self-efficacy in promoting academic engagement within a flipped classroom. This research suggests that students were highly engaged in their learning when they experienced the core psychological needs of autonomy, competence, and relatedness, as described in self-determination theory (Deci & Ryan, 1985). This analysis supports the theory that when these psychological needs are met, students are more likely to engage willingly in learning activities driven by intrinsic satisfaction. In other words, students feel empowered when they experience a sense of choice, believe in their ability to make progress, and feel supported by their learning environment.

In alignment with Ryan and Deci (2020), students in this study valued the ability to study at their own pace (autonomy), complete tasks that demonstrated progress (competence), and engage in peer discussions (relatedness). These findings reinforce the claims made by Avakyan and Taylor (2024) that a student-centred approach is more effective in meeting these psychological needs when compared to traditional teaching methods. Overall, the findings reveal that the flipped classroom provided a distinctive environment that empowered students to take ownership of their learning and fostered sustained intrinsic motivation. These results closely align with previous research (Botella et al., 2021; Oraif, 2018; Ryan & Deci, 2020), which highlights the motivational benefits of this instructional approach.

Conversely, the minimal influence of extrinsic motivators such as external rewards or social pressure observed in this current research supports

Gao and Newton's (2009) proposition that internal motivation is a stronger predictor of engagement. These findings contribute to a clearer understanding of Gómez-Miñambres (2012)'s study on motivation through goal setting by highlighting how students remain engaged even when outcomes are uncertain. In educational settings, where learning gains are not always immediately measurable or guaranteed, students may still experience a sense of satisfaction from the effort they invest, even in the absence of full goal attainment. This illustrates a form of intrinsic motivation, where the process of flipped classroom learning itself is perceived as rewarding, independent of external validation or results. This study further extends these insights by demonstrating that students actively employed goal setting as a motivational strategy, which not only structured their learning efforts but also sustained their persistence despite uncertainties or challenges.

Regarding self-efficacy, students reported a strong sense of academic confidence. Such evidence suggests that students feel confident in their ability to manage academic responsibilities and overcome the challenges they encounter during the learning process. Consistent with Cassia and Magno (2024) and Xu et al. (2023), the findings show that students who perceive themselves as capable and supported are naturally inclined to take ownership of their learning. These results concerning self-efficacy build on existing evidence from previous studies (Algarni, 2025; Fan, 2022; Samiee Zafarghandi, 2018; Sun et al., 2023), which suggest that the flipped classroom approach can enhance students' confidence by creating a supportive, student-centred learning environment that strengthens belief in their academic abilities. This strong sense of self-efficacy appears to be closely tied to students' use of self-regulated learning strategies, particularly self-evaluation, which, in turn, is closely linked to effective goal setting as students monitor their academic progress.

The importance of goal setting, as highlighted earlier, provides a foundation for understanding the self-regulated learning strategies evident in the data. In particular, students reported higher levels of self-evaluation compared to perceived social support, suggesting a strong reliance on personal reflection to monitor their academic progress. This emphasis on self-evaluation is supported by Xiao and Yang (2019), who emphasise that students are proactive in their learning when moving their learning forward through self-evaluation. Similarly, Shih and Huang (2020) observe that students engage in self-evaluation to assess their strategic approach and overall progress in English language learning, which encompasses not only classroom activities but also learning experiences beyond the classroom, such as those in a flipped classroom environment. This internal focus also aligns with Sergent et al. (2024), who argue that effective learners tend to use internal standards rather than depend on external feedback, and resonates

with the framework proposed by Zimmerman (2002), which identifies self-evaluation as a key driver of adaptive learning strategies. These findings suggest that, in this context, students are not only motivated but also demonstrate the reflective capacities associated with self-regulated learning strategies.

In addition, the findings of this current study revealed that students continued to seek clarification from peers, indicating that social support remains an essential complement, particularly in fields like nursing, where accuracy and adherence to guidelines are critical. This reinforces Martínez-López et al. (2023), who emphasise that guidance from others enhances students' confidence in handling academic tasks. Such a balance between self-evaluation and social interaction fosters deeper understanding and more effective task completion. Thus, while self-evaluation emerges as a powerful tool to foster metacognitive growth and academic independence, it also coexists with strategic help-seeking behaviour, both of which are essential elements of effective self-regulated learning. Consequently, future instructional designs should aim to cultivate both strong self-evaluation skills and accessible social support systems to optimise learning outcomes.

When it comes to the relationship between self-regulated learning strategies and English language achievement within a flipped classroom context, the findings of this study revealed statistically significant but modest positive correlations between English test scores and two SRL components: (1) learning strategies and (2) self-evaluation. The importance of self-evaluation is further supported by Zimmerman's (2002) cyclical model of SRL, which underscores self-evaluation as a key mechanism for learning strategies and performance improvement. In this context, students who regularly evaluate their learning progress are more capable of making strategic changes, which can lead to enhanced academic performance over time. The correlation between SRL and academic outcomes is also supported by Sahranavard et al. (2018) and Valle et al. (2008) who found that higher levels of self-regulated learning (SRL) were associated with greater academic achievement, whereas lower levels of SRL tended to correspond with reduced academic performance.

Overall, this current study offers important implications for educational practice. Creating environments that support students' self-efficacy and encourage goal setting could be more effective in promoting sustained academic engagement than relying heavily on external incentives. The findings also highlight the value of cognitive and metacognitive strategies, such as learning strategies and self-evaluation, in promoting academic success. Although the correlation coefficients were statistically significant, they were relatively modest, suggesting that other factors beyond SRL strategies may also have played a role in influencing students' test

performance. As a result, it is not entirely clear whether SRL strategies alone accounted for the observed improvements in test scores. More research is needed to fully understand the dynamic interplay between SRL, flipped classroom environments, and academic performance. Future research could also explore the extent to which the flipped classroom environment itself facilitates the use of SRL strategies, potentially using longitudinal designs to track how students develop and apply these strategies over time. Additionally, a limitation of this study lies in the relatively small number of participants. Future research should consider increasing the sample size to enhance the generalisability of the findings.

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