# Quantitative Analysis of Students and Teachers Readiness for Flipped Classroom in Matriculation

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**Abstract**
This study aims to examine the readiness of matriculation students and teachers towards the integration of flipped classroom pedagogy. The study is quantitative methodology using two sets of survey questionnaire to get feedback from respondents. The questionnaire for students consists of five dimensions of readiness: learner's control and self-directed learning, technology self-efficacy, in-class communication self-efficacy, motivation for learning and doing previews. Teachers' readiness is categorized into four dimensions: institutional support, technology self-efficacy, teacher beliefs and teaching strategy. The study sample consisted of 380 students and 128 teachers of Selangor Matriculation College. Descriptive statistics were employed to analyze the collected data and presented in the form of mean and standard deviation. The findings of the study shows that the readiness of students and teachers for all dimensions are at high level. The findings shed light on the level of readiness within the matriculation education context and offer implications for educational policy and practice.
**Keywords:** Flipped Classroom, Readiness, Matriculation, Students, Teachers

**Introduction**
The field of education is witnessing a shift in traditional teaching and learning methods due to the creative approaches that have emerged from the convergence of pedagogy and educational technology. The rapid evolution of educational technology, paired with the shift of learners to generation Z in the digital age, necessitates pedagogical adjustments and advancement. The concept of the flipped classroom has revolutionized education and is thought to have many advantages, most notably for increasing student involvement and accomplishment. This strategy involves students using technology to learn outside of class and using class time for face-to-face or online discussion and collaboration.

In Malaysia, the matriculation programme is a pre-university education programme designed to develop excellent individuals who would pursue undergraduate degrees, particularly in science and technology, and careers in higher education establishments. Matriculation

students are those aged 18 to 19 who have finished Sijil Pelajaran Malaysia (SPM). The current matriculation cohort is made up of generation Z students who want teaching methods to move beyond traditional ways, embracing digital technology and prioritizing student-centered learning (Cilliers, 2017). Thus, technology and innovative teaching methods are imperative, and the flipped classroom model could transform matriculation education to prepare students for the Fourth Industrial Revolution (IR 4.0) (Bishnoi, 2020; Jowaty, 2009). The flipped classroom can help students develop a variety of critical skills needed for success in both academic and professional domains, including problem-solving skills Techanamurthy et al (2020), critical thinking skills Shaari et al (2021), communication skills, and collaborative skills (Mojtahedi et al., 2020). As a result, exploring the flipped classroom in matriculation or pre-university is critical since the quality of education at this level influences students' ability to adapt and excel at university, where individuals must be more independent and capable of self-directed learning.

While the flipped classroom approach is widely regarded as an efficacious student-centered strategy, there are a few considerations that must be made to guarantee successful adoption. One serious issue in the educational system is teachers and students' unwillingness to accept change because they are ill-prepared and fearful of the uncertainties that come with it. In addition to the lack of adequate training and support, there is a perception that the new approach could lead to an increase in workload. The readiness of both teachers and students is crucial for the flipped classroom to be implemented successfully (Durak, 2020). Students' readiness determines how motivated, competent of self-directed learning, and comfortable they are participating in collaborative activities in the flipped classroom. Meanwhile, teachers who are more ready will find it easier to switch from the traditional role of lecturer to facilitator in the flipped classroom. Neglecting this issue can reduce the effectiveness of the flipped classroom, preventing students from fully benefiting from its active and collaborative learning features. Therefore, this paper aims to investigate the readiness for flipped classrooms within the Malaysian matriculation context.

## Literature Review
### Flipped Classroom Model
The flipped classroom concept gained popularity after 2007 when two chemistry teachers, Jonathan Bergmann and Aaron Sams, started filming and uploading educational videos online for students to watch outside of class (Agirman & Erkoskun, 2022). According to Divjak et al (2022) this model flips the typical learning structure so that students interact with the materials before class. It replaces lectures with in-class activities. This makes teachers facilitators rather than sole knowledge providers and students as active learners (Deng, 2019). The flipped classroom consists of three phases: pre-class, in-class, and post-class. Students build their own comprehension by reviewing lecture videos and digital resources on their own prior to class (Mojtahedi et al., 2020; Shaari et al., 2021). In class, students work together to solve problems and practice critical thinking (Røe et al., 2019).

The flipped classroom has the potential to signal a trend towards hybrid, blended, and flexible learning approaches. In a previous study, students preferred the flipped classroom, which combined self-directed learning with synchronous classes, whether online or in a hybrid mode (Fructuoso et al., 2022). This model can support students' valuable learning experiences by fostering active learning Narihan et al (2023); Parati et al (2023), promoting increased

motivation Afzali & Izadpanah (2021); Botella et al (2021); Bawaneh & Moumene (2020); Darmawan (2020); Li Zhao et al (2021); Zhao & Yang (2023), and improving academic performance (Ahmad & Arifin, 2020; Atwa et al., 2021; Basriyah et al., 2020; Nantha, 2022). Nonetheless, students continue to struggle to adjust to the new responsibilities that students and teachers play in the classroom (Sosa Diaz et al., 2021). Flipped classroom implementation challenges include inadequate student preparation, pressure to understand preparatory materials, and motivating high-achieving students to prepare adequately (Ölmefors & Scheffel, 2023). Furthermore, teachers must give extensive materials for at-home study, while students must practise self-discipline to avoid distractions when utilising technology for self-directed learning before class (Meliani et al., 2022; Ali et al., 2022).

*Flipped Classroom in Malaysia*
Most school teachers in northern Peninsular Malaysia believe the flipped classroom approach improves teachers' knowledge and teaching skills for Alpha generation students despite implementation challenges (Hashim & Shaari, 2020). Teachers that used the flipped classroom agreed that it fosters self-directed, active, and student-centered learning (Kiang & Yunus, 2021). The advantages of a flipped classroom also become evident when students comprehend the material before class, and the conversation that follows helps students reinforce what they have learned and develop higher-order thinking skills (Ruslan et al., 2022). Students in the flipped classroom also had a more positive attitude towards learning Halili et al (2021); Zakaria & Yunus (2020), better academic performance Parati (2023) and better problem-solving skills. Although flipped classrooms have numerous benefits, there are implementation challenges that need to be taken into consideration. A study conducted by Chan et al. (2020) on 256 undergraduate students found that the approach was not well-liked and that acceptance of it was poor.

A GamyFlip-Pro module built for a pre-university Programming course that mixes flipped classroom with gamification significantly improved students' views towards the course, particularly in terms of achievement, motivation, and active involvement (Sulong et al., 2020). According to Kamarzaman et al (2021), students in the Accounting Management course in a flipped classroom environment performed much better than students in traditional class. In conclusion, studies on flipped classrooms in matriculation show mixed results for students. Existing research on flipped classrooms at the matriculation level, particularly in Malaysia, is sparse Tan et al (2022), with studies primarily focusing on module development Malek et al (2022) or applications Lim et al (2023) designed for use within the flipped classroom framework. Therefore, there is an urgent need for additional research into the flipped classroom approach in matriculation. Is this country's matriculation system ready for flipped classrooms?

*Readiness for Flipped Classroom*
Implementing the flipped classroom concept can be difficult due to both teachers' and students' readiness. Teachers must adjust to their new role as facilitators rather than lecturers, and students must accept responsibility for their own learning through self-directed study. This necessitates a shift in perspective and preparation on both sides to accept the flipped classroom method (Xu & Shi, 2018). Readiness refers to teachers' and students' willingness and ability to use the flipped classroom. Previous research on future geography teachers found a high positive correlation between readiness and actual implementation

(Mahat et al., 2021). A correlation has also been observed between student and teacher readiness; students are more likely to be prepared when their teachers are (Kazu & Yalcin, 2022). The flipped classroom's success is contingent on students' ability to work in groups and independently (Fox & Docherty, 2019). Furthermore, increased student readiness fosters engaged involvement in the flipped classroom, thereby enhancing its efficacy (Wut et al., 2022).

A variety of factors influence flipped classroom readiness. According to a study conducted by Kazu and Yalçin (2022), the dimension of technology self-efficacy is particularly relevant as a determining factor for readiness among students and teachers. To effectively implement the flipped classroom, both students and teachers must have confidence and self-belief in their ability to use technology. If students feel proficient with technology, their opinions of the flipped classroom are more positive (Kazu & Kurtoğlu, 2020). The flipped classroom's readiness is also determined by the students' and teachers' willingness and ability to make necessary preparations prior to the flipped classroom sessions (Kazu & Yalçin, 2022). To ensure flipped classroom success, teachers prepare by generating online educational resources for students to use at their own pace, while students prepare by being willing to use the resources supplied by the teacher prior to class (Agyei & Razi, 2022). Furthermore, institutional support is considered a critical factor influencing teachers' readiness to adopt the flipped classroom approach because teachers need to show a high level of commitment to developing instructional design and putting it into practice (Ruslan et al., 2022; Wanner & Palmer, 2015).

**Methodology**
The study used a quantitative research approach using a survey questionnaire to assess the readiness of matriculation students and teachers for flipped classrooms. The study was performed at Selangor Matriculation College, a matriculation college run by the Ministry of Education in Banting, Selangor. The sample size for this study was calculated using Krejcie and Morgan's (1970) Sample Size Determination Table based on the whole population of students as well as teachers at this college. The study sample was obtained using a random sampling procedure, with 380 students and 128 teachers completing the questionnaire provided. The majority of the study sample for students comprises of students from the two-semester system, totaling 280 (73.7%), while 100 (26.3%) are from the four-semester system. Of these, 80 students (21.1%) were male, and the remaining 300 students (789.9%) were female. Students' race among the study samples reflects the multicultural composition that is present in matriculation college comprising Malays (88.2%), Chinese (6.1%), Indians (4.5%) and others (1.3%). Meanwhile study sample for teachers were from different department which is Science (42.2%), Mathematics (30.5%), Social Science (21.1%) and Student Management (6.3%). Most of the teachers were Malays (83.6%) and have taught in matriculation for more than 15 years (66.4%). Among the study samples, 63.3% have previously received exposure related to flipped classroom, while 36.7% had no prior exposure related to this approach.

The instrument for this study were questionnaires that were adapted, translated into Malay from English, and modified to suit the matriculation context. The first questionnaire for students consists of two parts: part (A) the respondents' demographic profile and part (B) the respondents' readiness towards flipped classroom covering five dimensions consisting of learner's control and self-directed learning, technology self-efficacy, in-class communication

self-efficacy, motivation for learning and doing previews. The items in part B of the survey instrument were adapted from the Flipped Learning Readiness Scale Hao (2016) which has been widely used in previous studies (Durak, 2020; Kazu & Kurtoğlu, 2022; Kazu & Yalçin 2022; Polat et al., 2022). The second questionnaire for teachers also consists of two parts where part A is to obtain respondents' background while part B is to assess respondents' readiness to implement flipped classroom strategy in four dimensions: institutional support, technology self-efficacy, teacher beliefs and teaching strategy. Part B of this instrument was adapted from *Flipped Classroom Teacher Scale* (Chou et al. 2020). Both instruments utilize a five-point agreement scale ranging from "1 = Strongly Disagree" to "5 = Strongly Agree".

The questionnaire instrument was subjected to face and content validity testing by two specialists with more than ten years of expertise in information resources and technology, as well as Malay language. The questionnaire's validity was then checked by pre-tests on 3 students and 3 teachers, where potential difficulties were found and small modifications were made. Following this, the research instruments were piloted with 10 teachers and 30 students from the same matriculation college who did not participate as respondents. The pilot study's findings served as the foundation for two methods of disseminating surveys to respondents: online via Google Form for students and a printed version for teachers.

The results of the actual study on students and teachers were then used to calculate the reliability coefficient, Cronbach's alpha, for both instruments. The instrument employed on students had a high reliability of 0.95, which is greater than 0.70, a value commonly recognized in most studies involving social sciences (Taber, 2018; Campillo-Ferrer & Miralles-Martinez, 2021). The reliability coefficients for each factor were as follows: learner's control and self-directed learning (0.88), technological self-efficacy (0.93), in-class communication self-efficacy (0.90), motivation for learning (0.83), and conducting previews (0.86). Furthermore, the instrument for teachers has strong internal consistency, with a Cronbach's alpha coefficient value of 0.92. The reliability coefficients for each variable were as follows: institutional support (0.84), technology self-efficacy (0.90), teacher beliefs (0.94), and instructional strategy (0.87).

The results of this study were analysed using the SPSS version 27.0 software. The students' and teachers' readiness to adopt a flipped classroom approach was examined using descriptive statistics such as mean value (M) and standard deviation (SD). The interpretation of the mean value in this analysis is grounded in the works of Farahana and Norhasniah (2018) and Landell (1977), who classify the mean value into three distinct levels: a range of 1.00 to 2.33 corresponds to a low level; 2.34 to 3.67 corresponds to a moderate level; and 3.68 to 5.00 corresponds to a high level.

## Results
### *Readiness of Students towards Flipped Classroom*
Descriptive statistics were employed to assess the level of matriculation students' readiness to implement a flipped classroom approach encompassing dimensions of learner's control and self-directed learning, technology self-efficacy, in-class communication self-efficacy, motivation for learning and doing previews such as Table 1.

Table 1
Overall readiness of students

| Dimension | M | SD | Interpretation |
|---|---|---|---|
| Learner's control and self-directed learning (LC) | 3.95 | 0.88 | High |
| Technology self-efficacy (TE) | 4.34 | 0.82 | High |
| In-class communication self-efficacy (CE) | 3.82 | 0.94 | High |
| Motivation for learning (ML) | 4.27 | 0.77 | High |
| Doing previews (DP) | 3.68 | 1.05 | High |
| Average value | 4.01 | 0.89 | High |

The level of students' readiness regarding all dimensions is notably high whereby the overall mean value is 4.01 and standard deviation 0.89. This indicates that students in this college have a high readiness to participate in flipped classroom. The readiness of students encompasses five dimensions, with the highest dimension being technology self-efficacy (M = 4.34, SD = 0.82), followed by other dimensions such as motivation for learning (M = 4.27, SD = 0.77), learner's control and self-directed learning (M = 3.95, SD = 0.88), in-class communication self-efficacy (M = 3.82, SD = 0.94), and doing previews (M = 3.68, SD = 1.05).

Table 2 displays the results of the analysis of the 27-item for the five dimensions. The overall mean value for dimension learner's control and self-directed learning is at high level in which the highest mean value is for item "I have higher expectations for my learning performance" (M = 4.31, SD = 0.78) while the lowest mean value is for item "I am not distracted by other activities when doing previews" (M = 3.23, SD = 1.09). Only two items in this dimension are at moderate level while the other six items are at high level showing that students have the ability to control their learning in aspects such as setting learning goals, carrying out study plan on their own and engaging in reviewing instructional materials repeatedly.

In the dimension technology self-efficacy, the students demonstrate that they were confident in their ability to use communication application to interact with others (M = 4.66, SD = 0.62), while they lack confidence in their ability to identify the accuracy of online information (M = 4.12, SD = 0.84). However, the minimum value for all items within this dimension is at high level. In the dimension of in-class communication self-efficacy, the highest mean value is for the item "I feel confident discussing issues with teachers in classes" (M = 3.82, SD = 0.94). On the other hand, the lowest mean value with moderate level is for the item "I feel confident expressing myself in classes" (M = 3.67, SD = 0.98).

As for the dimension motivation for learning, the sampled students' motivation seems to be high. These students were confident that they are able to learn from mistakes (M = 4.39, SD = 0.71), sharing ideas with others (M = 4.26, SD = 0.74) and motivated to learn (M = 4.15, SD = 0.86). The last dimension of doing previews shows the lowest mean value among all dimensions indicating that students were hesitant to do preparation before flipped classroom. However, this result for this dimension is still considered as high. Students' willingness to engage in pre-learning by reading texts shows the highest mean value (M = 3.86, SD = 0.98) while students demonstrate moderate willingness to do previews by listening to their teacher's recorded lectures (M = 3.47, SD = 1.10).

Table 2
*Readiness of students for each dimension*

|  | Item | M | SD | Interpretation |
|---|---|---|---|---|
| LC1 | I can direct my own learning progress | 3.82 | 0.89 | Moderate |
| LC2 | I set my own learning goals | 4.04 | 0.85 | High |
| LC3 | I repeat reviewing the instructional materials based on my learning needs | 4.06 | 0.83 | High |
| LC4 | I have higher expectations for my learning performance | 4.31 | 0.78 | High |
| LC5 | I carry out my own study plan | 4.06 | 0.84 | High |
| LC6 | I am not distracted by other activities when doing previews | 3.23 | 1.09 | Moderate |
| LC7 | I seek assistance when facing problems when learning | 4.25 | 0.79 | High |
| LC8 | I have good self-discipline | 3.82 | 0.95 | High |
| TSE1 | I can download files from the internet | 4.48 | 0.76 | High |
| TSE2 | I can operate online media players to watch or listen to multimedia | 4.33 | 0.86 | High |
| TSE3 | I can use document viewing software to read materials | 4.38 | 0.83 | High |
| TSE4 | I can use online note-taking technologies to take or retrieve notes | 4.14 | 1.02 | High |
| TSE5 | I can use email to communicate | 4.18 | 0.94 | High |
| TSE6 | I can use instant messaging software to communicate with people | 4.66 | 0.62 | High |
| TSE7 | I can use information and communication technologies to organize materials I search for online | 4.37 | 0.77 | High |
| TSE8 | I can identify the information I need from online resources | 4.38 | 0.74 | High |
| TSE9 | I can identify the accuracy and objectivity of online information | 4.12 | 0.84 | High |
| CSE1 | I feel confident asking questions in classes | 3.79 | 0.97 | High |
| CSE2 | I feel confident expressing myself in classes | 3.67 | 0.98 | Moderate |
| CSE3 | I feel confident discussing issues with teachers in classes | 3.75 | 0.98 | High |
| CSE4 | I feel confident discussing issues with fellows in classes | 4.06 | 0.94 | High |
| ML1 | I learn from my mistakes | 4.39 | 0.71 | High |
| ML2 | I like to share my ideas with others | 4.26 | 0.74 | High |
| ML3 | I am motivated to learn | 4.15 | 0.86 | High |
| DP1 | I am willing to do previews by listening to our teacher's recorded lectures | 3.47 | 1.10 | Moderate |
| DP2 | I am willing to do previews by watching online videos | 3.71 | 1.06 | High |
| DP3 | I am willing to do previews by reading text | 3.86 | 0.98 | High |

### *Readiness of Teachers towards Flipped Classroom*

Descriptive statistics were used to analyze the level of matriculation teachers' readiness to implement flipped classroom that encompasses four dimensions: institutional support, technology self-efficacy, teacher beliefs, and teaching strategies such as Table 3.

Table 3
*Overall readiness of teachers*

| Dimension | M | SD | Interpretation |
|---|---|---|---|
| Institutional support (IS) | 4.16 | 0.77 | High |
| Technology self-efficacy (TSE) | 4.35 | 0.64 | High |
| Teacher beliefs (TB) | 4.17 | 0.73 | High |
| Teaching strategies (TS) | 4.19 | 0.61 | High |
| Average value | 4.22 | 0.69 | High |

From the responses shown in Table 3, it is found that overall, matriculation teachers have a high readiness to implement flipped classroom where all four dimensions show high mean value. The dimension with highest mean value is self-technology efficacy (M = 4.35, SD = 0.64), followed by dimensions of teaching strategies (M = 4.19, SD = 0.61), teacher beliefs (M = 4.17, SD = 0.73) and institutional support (M = 4.16, SD = 0.77).

Table 4 displays the results of the analysis of the 19-item for the four dimensions of teachers' readiness towards flipped classroom. Research findings for dimension institutional support shows that in this college, the respondents agreed that their colleagues can assists each other (M = 4.35, SD = 0.77), their supervisors (M = 4.31, SD = 0.80) and their colleagues (M = 4.23, SD = 0.73) are positive towards flipped classroom implementation. Meanwhile, respondents show lowest agreement about their students' parents' support towards flipped classroom (M = 3.75, SD = 0.82), however this value is still considered as high. In the dimension of technology self-efficacy, the majority of the responses received indicate that teacher's readiness for this dimension is high since respondents tend to agree for all items based on mean value for each item exceeding 4.00. The item "I am confident that I can use computers and the internet to facilitate students' independent learning" shows the highest mean value (M = 4.49, SD = 0.56), while the item "I am confident that I can design and develop video lectures" recorded the lowest mean value (M = 4.07, SD = 0.71).

Table 4

*Readiness of teachers for each dimension*

| | Item | M | SD | Interpretation |
|---|---|---|---|---|
| IS1 | My supervisor has a positive attitude toward my implementation of flipped classroom | 4.31 | 0.80 | High |
| IS2 | My colleagues have positive attitudes toward my implementation of flipped classroom | 4.23 | 0.73 | High |
| IS3 | My colleagues can help each other at college | 4.35 | 0.71 | High |
| IS4 | My students' parents support my implementation of flipped classroom | 3.75 | 0.82 | High |
| TSE1 | I am confident that I can design and develop video lectures | 4.07 | 0.71 | High |
| TSE2 | I am confident that I can make use of e-learning platforms to understand students' learning conditions | 4.40 | 0.67 | High |
| TSE3 | I am confident that I can use computers and the internet to facilitate students' independent learning | 4.49 | 0.56 | High |
| TSE4 | I am confident that I can teach students how to judge information on the internet | 4.29 | 0.63 | High |
| TSE5 | I am confident that I can use internet technology to communicate with students | 4.47 | 0.57 | High |
| TSE6 | I am confident that I can use internet technology to improve students' cooperation | 4.38 | 0.68 | High |
| TB1 | I think the implementation of flipped classrooms can help students understand materials more deeply | 4.06 | 0.76 | High |
| TB2 | I believe that flipped classrooms are good for student development | 4.19 | 0.71 | High |
| TB3 | I agree with the principles of flipped classrooms | 4.17 | 0.72 | High |
| TB4 | I believe that the implementation of flipped classrooms can promote students' learning | 4.17 | 0.74 | High |
| TB5 | I believe that the implementation of flipped classrooms can develop students' abilities to undertake independent learning | 4.27 | 0.70 | High |
| TS1 | I can use different teaching strategies such as complex problem-solving and peer evaluations | 4.22 | 0.60 | High |
| TS2 | I can help students explore knowledge by designing group-collaboration activities | 4.24 | 0.59 | High |
| TS3 | I can help students improve their communication skills by designing group-collaboration activities | 4.20 | 0.62 | High |
| TS4 | I can identify a significant number of approaches to helping students who have diverse needs | 4.08 | 0.65 | High |

In the dimension teacher beliefs, the teachers demonstrate that they believe flipped classroom implementation can foster students' ability to learn independently (M = 4.27, SD = 0.70). The lowest mean value is for item "I think the implementation of flipped classrooms

can help students understand materials more deeply" (M = 4.06, SD = 0.76). Overall, the mean value for each item in this dimension is at a high level. As for the dimension teaching strategies, findings indicate that respondents hold positive attitudes towards various aspects of teaching strategies for implementing the flipped classroom, as evidenced by means scores for all items that exceed 4.00. Analysis of the mean values shows that teacher respondents can employ different teaching strategies such as complex problem-solving and peer assessment (M = 4.22, SD = 0.60), facilitating student exploration of knowledge through designing collaborative group activities (M = 4.24, SD = 0.59), and enhancing student communication skills through designing collaborative group activities (M = 4.20, SD = 0.62). The lowest mean is for the item identify a significant number of approaches to helping students who have diverse needs (M = 4.08, SD = 0.65).

**Discussion**
***Readiness of Students towards Flipped Classroom***
The study shows that students in this matriculation college have a high readiness to implement flipped classroom. Technology self-efficacy was the most prepared dimension across students. The high level of readiness originates from the existing background of matriculation students, who are part of Generation Z that have accumulated a great deal of technology experience since their school days, especially with computers (Mansor et al., 2021). Furthermore, modern technology has become an indispensable component of students' daily lives (Alakrash & Razak, 2020). A flipped classroom that uses technology for self-learning before class can benefit from high technology self-efficacy. According to a study conducted by James Jemson et al (2020), pre-university students in Sabah have a high level of acceptance for mobile learning. The same findings were found by Gnanasagaran et al (2023): pre-university students embrace mobile learning, including mobile flipped classrooms, which increase student interest and participation. Thus, the flipped classroom approach can use mobile learning to enable self-directed learning anywhere by providing instructional materials or activities online and accessible across devices. However, matriculation students are less confident in their capacity to appropriately assess online information, showing that while they are proficient in technology, they are novices in information evaluation. This competence is regarded as a high-level skill essential for future graduates, increasing their employability in the current era of Industry 4.0 (Khuraisah et al., 2020). As a result, it is critical to teach this skill to matriculation students in order to provide them with information literacy and digital abilities that will help them evaluate the accuracy of material via self-directed learning prior to engaging in the flipped classroom.

The motivation to learn dimension demonstrates the second-highest level of readiness among student responses. Even with the presence of competent teachers, enhancing student accomplishment can be difficult if students lack the motivation to learn (Filgona et al., 2020). The degree to which the learning process is effective is therefore determined in large part by the motivation of the students. Overall, the study findings on this dimension imply that matriculation students at this college are highly motivated to learn. According to a study conducted on postgraduate students in China, motivation acts as a mediator between technology acceptability, technology self-efficacy, and student attitudes toward technology-based self-directed learning (Pan, 2020). As a result, students with high levels of motivation are considered as being ready to embrace and adapt to the flipped classroom method that

incorporates technology, because motivated students are more passionate about engaging in self-directed study before class and actively participating in class activities.

The student respondents' third-highest mean for flipped classroom readiness is shown by the learner's control and self-directed learning dimension. The majority of respondents have high expectations for their learning performance and agree that they receive help when struggling. However, it was discovered that student's readiness to be undistracted by other activities during previews is moderate. The ability to focus in today's digital world is getting increasingly difficult, with the presence of digital gadgets and social media applications interfering with productivity, including learning. While total distraction avoidance is unachievable during the learning process, children must develop internal self-control to handle potentially upsetting events (Schmidt, 2020). Students with a high level of focus are less likely to be distracted when studying (Widodo et al., 2020). However, even though students are aware of the effects of multitasking with media at the same time, self-control is viewed as insufficient to effect change, and additional strategies such as setting up additional devices solely for academic purposes and using website blockers to reduce social media usage are required (Dontre, 2021). Findings from this study show that while students agree that they are distracted during self-directed learning, this element is manageable and students can still regulate their own learning processes. Students that excel at self-directed learning have been found to perform better academically (Torun, 2020). Thus, matriculation students in this college are viewed as ready to adopt the flipped classroom model, which will demand them to play an active role in their learning process and progress.

The fourth highest mean value is in-class communication self-efficacy, where students are less agreeable about their confidence to ask questions, discuss issues with the teacher, or express themselves in class. Current artificial intelligence advancements have the potential to be able to support online flipped classrooms, in which students can use chatbot applications to get clarification and improve their comprehension if they don't feel compelled to ask questions to the teacher (Wut et al., 2022). Nonetheless, the majority of respondents feel comfortable talking to their classmates about problems in the classroom. According to Fadhil et al (2021), graduates with strong communication skills are more likely to get employment; nevertheless, many Malaysian graduates still lack confidence in their abilities to communicate (Nadarajah, 2021). Thus, teachers must develop techniques to create a supportive learning atmosphere where students feel comfortable and secure communicating and actively participating in classroom learning. This is important because low communicative self-efficacy might hinder students' engagement in a flipped classroom, affecting their learning and achievement.

The dimension of doing previews reflects the lowest average perception among student respondents. Students' desire to participate in pre-learning activities, such as reading passages from books or watching internet videos, is only marginally agreed upon, while their readiness to listen to lecture recordings from their teachers is least agreed upon. These findings imply that teachers should improve their instructional video production skills by sketching or writing on a board while instructing in front of a screen or adding subtitles (Mayer et al., 2020). To lessen cognitive burden and keep students' attention, long lecture videos can also be split into separate shorter series (Harris et al., 2021). The low level of this dimension will affect the readiness of matriculation students to execute the flipped classroom approach. Students who have reviewed learning materials before class view the flipped classroom as beneficial Subramaniam & Muniandy (2019), while those who have not are less likely to

participate in class activities (Durak, 2020). The effectiveness of flipped classroom is influenced by the quality of the learning experience, such as the provision of high-quality pre-learning materials (Cho et al., 2021). If students consider the resources are of lower quality, they may become disinterested in their pre-class self-directed learning. Therefore, in order to increase students' interest and motivation for pre-reading prior to class, teachers must create or provide engaging learning materials to supplement their instructional strategies.

### Readiness of Teachers towards Flipped Classroom

The research findings indicate that the level of readiness among matriculation teachers for the flipped classroom in all four dimensions are high, with the highest readiness demonstrated in the technology self-efficacy dimension. Technology self- efficacy refers to an individual's confidence in their ability to accomplish a particular task. Technology self-efficacy and motivation are tightly linked; those who have high self-technology efficacy will also be highly motivated, which will help them achieve their goals (Ackerman, 2018). It is evident from the study's results that matriculation teachers are regarded as being capable and motivated when it comes to using technology in the classroom. Teachers that possess advanced technological skills are more inclined to embrace and execute flipped classroom methodologies (Arpaci & Basol, 2020; Kazu & Kurtoğlu, 2020). However, competency in using various current apps must be developed to guarantee that teachers' knowledge and skills remain relevant to current advances (Othman et al., 2021). It is essential to provide continual professional development to teachers in order to improve their technological abilities and adapt to changing educational environments.

The second-highest degree of respondents' readiness for the flipped classroom was reported in the teaching strategies dimension. Matriculation teachers have a favorable opinion of their capacity to apply the teaching strategies required to execute the flipped classroom model. According to the findings, respondents agree that they can facilitate student knowledge exploration by designing collaborative group activities, can use various teaching strategies such as problem solving and peer assessment, and can help students improve their communication skills by designing collaborative group activities. However, the respondents' level of agreement regarding their capacity to identify a range of effective teaching approaches to address various needs of students is somewhat limited. Designing meaningful learning activities for diverse students is crucial for the success of flipped classrooms (Kazu & Kurtoğlu, 2020). In order to enhance the professionalism of educators and familiarize them with contemporary teaching and learning methodologies, it is imperative that seminars and the exchange of teaching practices be implemented (Mansor et al., 2021). Teachers must be educated with pedagogical expertise, particularly in the use of various types of educational technology (Omar & Mohmad, 2023), as well as become more creative and flexible in providing instruction (Danuri et al., 2021). These measures are crucial for providing a stimulating and efficient learning environment in flipped classrooms.

The third highest mean value is teacher beliefs in which respondents agree that implementing a flipped classroom can improve students' ability to participate in independent learning and is beneficial for student development. Additionally, respondents agree with the flipped classroom's underlying principles and think that its implementation can improve student learning. However, respondents' level of confidence in the flipped classroom's ability to help students absorb learning materials more deeply is less encouraging. In a study conducted by

Yusuf and Taiye (2021), it was discovered that secondary school educators in Malaysia hold the belief that the flipped classroom approach optimizes students' capacity for learning, allows for collaborative learning opportunities, and cultivates advanced cognitive talents and problem-solving capabilities. Teachers that are confident in the flipped classroom's benefits will be intrinsically motivated and driven to execute it (Jiang et al., 2021). According to the study's findings, 36.7% of teachers have never been exposed to flipped classrooms. Teachers who are unfamiliar with the flipped classroom approach or have never seen it successfully implemented are more likely to be dubious of its influence on student learning. Thus, it is important to carefully plan teacher professional development programs or training to support educators in gaining confidence in the flipped classroom, which will improve their instructional strategies and boost their efficacy (Alali, 2020). Matriculation teachers will be more inclined to implement the flipped classroom approach if they think it benefits students and has the potential to raise the standard of teaching and learning.

The institutional support dimension records the lowest readiness of teacher respondents towards the flipped classroom, yet it still remains at a high level. According to Muniandy et al (2022), institutional support is a major element impacting the readiness of physical education teachers in Kuala Lumpur to utilize the flipped classroom. Thus, the degree to which teachers are willing to adopt the flipped classroom model will depend on their level of preparation in this area. Majority of respondents in this research believe that their peers can help one another in college. According to the respondents, both their colleagues and their leaders exhibit a positive attitude towards the implementation of the flipped classroom program. However, respondents are less in agreement with the statement that the students' parents support the adoption of the flipped classroom. While parental support is beneficial, it may not be the most significant factor in influencing teacher preparation, particularly if teachers feel adequately supported by their leaders and colleagues. Teachers' workloads are likely to grow in the flipped classroom because teachers must methodically develop compelling materials and activities for student use (Rohmah & Aditya, 2023). This requires teachers to commit more specifically to time management, making institutional support critical in keeping teachers motivated to implement the flipped classroom (Chou et al., 2020). Overall, matriculation teachers believe they have strong support from their institution, and they are seen to be ready to adopt the flipped classroom method.

**Implications**
This study has practical consequences for students, teachers, matriculation college management, and Matriculation Division policymakers. With the help of this study, areas for growth and strengths can be identified. This allows for the design of focused interventions to improve students' readiness for the flipped classroom, such as the provision of tools and assistance to raise students' technological self-efficacy and the encouragement of self-directed learning techniques. Prior to participating in a flipped classroom, students must receive training in time management, self-directed learning strategies, and learning commitment (Hoshang et al., 2021; Altas & Enisa, 2021). Encouraging and inspiring students to participate in pre-learning and self-directed learning activities in the flipped classroom seeks to increase their autonomy and accountability for their own learning, making them more prepared for the flipped classroom. Students that are ready for the flipped classroom will gain most from it, improving academic performance and knowledge.

This study further emphasizes the necessity of offering professional development opportunities to matriculating teachers with the goal of improving their readiness for the flipped classroom. Teachers must be prepared to embrace change and adapt to the needs of the current industry by using transformative teaching practices that educate students to tackle the Fourth and Fifth Industrial Revolutions (Juhary, 2019). Programs to improve teacher quality may include 21st-century teaching strategies for the flipped classroom, technology integration, and exposure to the flipped classroom's effectiveness to boost teachers' confidence. Teachers also require training in flipping the classroom and creating and managing high-quality learning resources (Narihan et al., 2023). This is due to the fact that teaching and learning in the flipped classroom necessitate a significant amount of time investment from teachers, particularly during the early stages of instructional design and implementation (Wanner & Palmer, 2015). Therefore, without significant flipped classroom handling experience and institutional support, teachers find it difficult to adopt and maintain this technique.

The findings of this study can also be used by college administrators to make decisions about how to use financial resources to help students and teachers become more ready to implement the flipped classroom. Resources needed include technology infrastructure, professional development activities such as course and training organisation, and support services. The flipped classroom's full potential can be realised if educational institutions can give support in areas such as technology and materials management to assure availability and accessibility (Persky & McLaughin, 2017; Ali et al., 2022). Furthermore, by understanding the preparedness characteristics of students and teachers, colleges can foster an environment that promotes innovative teaching approaches. This can be accomplished by launching campaigns to raise knowledge of the flipped classroom and its benefits for both students and instructors (Chan et al., 2020; Hoshang et al., 2021).

The Matriculation Division's policymakers and stakeholders can use the study's findings to build policies and programmes aimed at fostering the integration of educational technology and student-centered learning. Financial resources and assistance can be provided to matriculation colleges to improve readiness for the flipped classroom by providing technical infrastructure, professional development, and incentives for creative teaching practices. This research also suggests that curriculum can be adjusted to enable flipped classrooms to improve student learning and 21st-century abilities. Incorporating flipped classrooms into curriculum design necessitates the development of effective courses that accommodate the unique requirements of students who, as inherent to the flipped classroom model, require ongoing assistance from both instructors and peers during self-directed and collaborative learning activities (Fox & Docherty, 2019). According to Hoshang et al (2021), implementing the flipped classroom can be problematic for practical and hands-on learning. Practical classes are required for courses at the matriculation level because scientific courses make up the majority of the courses offered. Thus, curriculum developers might come up with ways, like employing augmented or virtual reality, to modify practical classes to the flipped classroom model. Overall, the Matriculation Division is critical to ensure that the flipped classroom is successfully implemented in matriculation institutions during the brief and intensive study period.

## Conclusion

This study successfully identified the matriculation students' and teachers' readiness levels for the flipped classroom. Students are more likely to engage in flipped classroom activities if they have the appropriate components (Wut et al., 2022). This is critical since the flipped classroom requires more student engagement than traditional classes. Technology has substantially revolutionized the educational landscape, and the use of technology in teaching and learning can improve education quality in the digital age. Technology self-efficacy is a prerequisite for the flipped classroom approach, which incorporates technology and calls on both teachers and students to possess it. The results of this study show that teachers' and students' levels of readiness for the technological self-efficacy dimension are the highest when compared to other dimensions, suggesting that technology proficiency is not a barrier to the use of flipped classrooms. The flipped classroom is a 21st-century teaching strategy that can give numerous benefits, particularly to students. However, exposure to the flipped classroom is required for students and teachers so that changes in teaching and learning methods can be adopted gradually rather than abruptly to achieve good acceptability (Chan et al., 2020). Overall, the study's findings indicate that matriculation students and teachers are highly ready to embrace the flipped classroom, providing motivation and confidence for the matriculation community to adopt this strategy. To ensure the success of the flipped classroom, it is still necessary to investigate potential challenges and obstacles that might occur while applying this approach at the matriculation level.

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