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Challenges to engage medical assistant students in 5E flipped learning environment

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Abstract: Flipped classroom approaches envision students using technology to access the lecture and other instructional resources outside of the classroom to engage them in active learning during class time. Although flipped classroom practices have been used in a number of educational studies and found positive outcomes, there were still some challenges with this approach. Therefore, there is a need for an innovative flipped classroom. In this article, the researcher presents a 5E-flipped learning environment approach and collected results of such data. The approach incorporates a 5E learning cycle model and flipped learning practices, making it accessible to anyone who wants to implement a 5E-flipped learning environment experience in their course. The 5E-flipped learning environment educational model proposes could help students to achieve higher order and deeper levels of learning as they engage in active work during online and face-to-face sessions. However, the thematic analysis of qualitative data three sources, participants learning dairy, focused group discussion and interview of 12 medical assistant students emerged some challenges they faced in a 5E-flipped learning environment. They faced challenges on learning activities which focused on fail to accomplish learning task and challenges on personal barriers related to lack of independent initiative and heavy responsibility on learners which influence their engagement in learning process. Therefore, the 5E-flipped learning activities need to be designed with these considerations in mind to encourage active student participation in online and classroom activities.

Keywords: 5E flipped classroom; learning challenges; learning task; medical assistant student

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1. Introduction

The flipped learning environment pedagogy requires students to master foundational knowledge before class so that class time can be devoted to higher-order learning exercises that challenge learners to use basic knowledge in novel contexts (Persky & McLaughlin, 2017; Van & Delport, 2022). The active learner-centered exercises designed for the flipped learning environment prompt learners to discuss complex course content with peers and instructors, fostering the development of students' collaborative and cooperative learning skills and allowing instructors greater insight into students' progress in learning (Shraddha et al., 2020). The flipped learning environment, an alternative

pedagogical approach focusing on student-centered instruction that reverses the traditional classroom environment, has recently gained much attention and has become more widely adopted in higher education (Brewer & Movahedazarhouligh, 2019). The flipped learning environment approach "introduces students to course content outside of the classroom so that students can engage that content at a deeper level in the classroom" (Strayer, 2012). The flipped classroom is grounded on student-centred learning, which is a set of theories and methods including constructivism, active learning, and peer-assisted learning (Bishop & Verleger, 2013; Koh,2019). Nerantzi (2020) and Gnutova (2020) also considered active learning and peer instruction as foundations of the flipped learning environment. Active learning and peer instruction shift the focus and responsibility of learning from educators to students (Carstensen et al., 2020; Owens, Sadler, Barlow, & Smith-Walters, 2020). Leatherman and Cleveland (2020) and Lee et al. (2022) argued that the success of a flipped learning environment is closely related to students' attitudes and engagement in learning and, to maintain or nurture their learning, lecturers should provide more participation opportunities for students.

OFlaherty and Phillips (2015) stated students felt interested learning in flipped classroom approach. Although the flipped classroom has its advantanges, there were studies that found challenges associated with the flipped classrooms approach. The challenges were in terms of required more time to restructure courses into a flipped classroom (Schlairet et al., 2014; Jdaitawi,2019), low self-regulated behavior among students (Sun et al., 2017; Yoon,Hill & Kim,2021), and disappointment of students to understand the learning content outside of the classroom (Lai & Hwang, 2016; Wang, Zhao, Fan & Li, 2022).Besides, Tolks et al. (2016) argued that adopting the flipped classroom approach in medical education without considering students' learning styles will disintegrate the learning process. Shrivastava and Shrivastava (2022) also reveal the challenges of the flipped classroom in medical education whereby they mentioned it is not just about the practice of online videos to substitute educators or leave the students to learn on their own, but appropriateness in designing the instructional approach to increase students individualised learning time and engagement is a vital consideration. This concern aslo be considered in medical assistant training, especially courses involved trauma care (Kironji et al., 2018). The medical assistant students need to understand and applied the concept and various emergency practical skills on trauma care with more confident and appropriately (Kleinpell et al., 2019). Hence, to complete the trauma care course in the traditional approach need longer duration. As the result, the flipped classroom is an alternative but this approach has some challenges on implementation. Therefore, this lead to some focused on integretion learning model with flipped claasroom is necessary.

In this study, a 5E-flipped learning environment on a pre-hospital trauma care course was developed and implemented among medical assistant students. This course was designed with a 5E-flipped framework adapted from Schallert (2021). As a new approach, this study has focused to explore the medical assistant students' experiences of challenges to the 5E-flipped learning environment. Thus, this study provided information to educator on developing more engaging 5E-flipped learning environment with considering the challenges that students faced.

2. Materials and Methods

2.1 Research Design

A qualitative study was carried out to explore the experiences of university undergraduate medical assistant students on practices of the 5E flipped learning environment in one of their emergency course modules. Its nature was explorative on learning experiences among medical assistant students. In other words, it was a case study research exploring individuals' experiences on challenges they faced with the 5E flipped learning environment approach.

2.1.2 Material Collection

It was a qualitative study carried out for eliciting the experiences of the respondents on practices in the 5E flipped learning environment. A total of 12 learning dairies, two focus group discussions, and 4 individual interviews to be used as research tools to collected data. All these research tools were prepared after the literature review and in the light of nature and research questions of the study. Expert opinion helped the researcher in finalizing the tools. The main question was to explore what were the challenges that the students faced in the 5E flipped learning environment. In this study, a pilot study was conducted to test data-generation instruments, especially the participant learning diary,focus group discussion protocol, and individual interview protocol. Two students from year two medical assistant program were selected to go through and provide feedback on the quality and understanding of the participant learning diary content, focus group discussion protocol and individual interview protocol. The feedback from them were used to make improvement of the data collection tools.

2.2 Research Subjects

This study was delimited to undergraduate students from medical education, especially to medical assistant disciplines at one of the private university in Malaysia. University undergraduate (Diploma in Medical Assistant Studies Programs) students were selected to participate in this study. It adopted convenience purposive sampling procedure(s). There were 12 students participated in this study. These students were required to attend a 7-week pre-hospital trauma course which was designed with a 5E flipped learning approach.

2.3 Data Collection Techniques and Types of Instruments

The researcher first obtained approval from the university administration and the course leader. Follow by this, a meeting was arranged at week 1 with the students. This meeting was held to introduce the researcher and explained about the study. The researcher had explained the study process and their task trought out the course. The researcher also clarified any questions from the students. In addition, during the meeting, students' consent was obtained through a consent form. At week 2 the first part of course was started with online and classroom sessions. The first round of participant learning diaries were collected from week 2 to week 4. Then at week 5 the second part course was continued with online and classroom sessions. At the week 9, second round of participant learning diaries were collected. At week 10, 2 focus group discussions was conducted, follow by individual student individual at week 11.

2.4 Data Management Techniques

Data collected from participant learning diaries were transferred into the form of documents and focus group discussions and individual interviews were transferred into the form of interview transcriptions. For answering the study purpose of this study, the researcher had used thematic analysis approach for data analysis.

In this study, participant learning diaries, the focus group discussions and interview transcriptions has been analysed by following Braun and Clarke (2020) thematic analysis with six stages. The thematic analysis is a versatile method that can be used in a variety of theoretical and epistemological contexts (Braun & Clarke, 2006). In other words, this analytic method does not prescribe specific data collection methods, theoretical positions, epistemological or ontological frameworks (Braun & Clarke, 2006). Themes or patterns in thematic analysis can be identified in an inductive or 'bottom-up', or deductive or 'top-down' manner. In the inductive approach, data is analysed with little or no predetermined theory or framework, resulting in data-driven analysis. The deductive approach, on the other hand, entails fitting the data into a predetermined framework or the researcher's analytic preconceptions to investigate specific theoretical concepts (Braun & Clarke, 2006; Burnard et al., 2008). An inductive thematic analysis method was used in this study

(Braun & Clarke, 2013). To elaborate, themes are identified based on what is contained in the data. Furthermore, the data is used to investigate specific theoretical concepts (Braun & Clarke, 2013).

3. Results

The responses of students collected through learning dairies, focused group discussion and individual interviews were grouped thematically according to purpose of the study. The results were extracted from thematic analyses individually for students respectively. Table 1 shows the summary of data collection sources.

Table 1. Summary of data collection sources

Research Method	Description	No. of Participants/activities involved
Study Logs with Reflections	Collecting students' learning diary	12
Student Focus Group Discussions	Conducting focus group discussion with students divided into 2 groups with each group consisted of 6 students	2
Student Individual Interviews	Interviewing selected students	4

There were 12 students involved in this study. Out of the 12 students, 8 were females while 4 were males, aged between 20 and 22 years. In terms of ethnicity, only one student was Malay, four were local ethnics from Sabah while the other seven were local ethnics from Sarawak.

The responses to this question were categorised under two main themes, namely Theme 1) Challenges on learning activities, and Theme 2) Challenges on personal barriers. In general, these two themes are organised into 3 sub-themes. Theme 1 has one sub-theme while Theme 2 has two sub-themes. Table 2 shows the summary of result. All the themes and their sub-themes are explained.

Table 2. Summary of result for all the themes and sub-theme

Themes	Subthemes	Codes	Frequency (f)	Total Frequency (f_t)
Challenges on Learning Activities	Fail to Accomplish Learning Task	Unable to complete all the task in online.	5	22
		A lot of tasks at online need to be completed before attending classroom session.	5	
		Questions more on subjective which make difficulty to answer.	4	
		Long instructional video, easy get boring	4	
		The instruction approach in English, difficulty in understanding	4	
Challenges on Personal Barriers	Lack of Independent Initiative	Lack of self-confidence	4	16
		Need to be self-motivated	4	
		Less self-preparation	3	
		Less independent	2	
		Less self-promotional	2	
		More self-doubt	1	

Themes	Subthemes	Codes	Frequency (f)	Total Frequency (f_t)
	Heavy Responsibility on Learners	Student needs to complete learning tasks	5	15
		Student needs to led the classroom discussion	4	
		Student needs to do self-study and prepared themselves	3	
		Student needs to make self-assessment on their learning achievement	3	
	Total		53	53

3.1 Theme 1: Challenges on learning activities

a. Fail to Accomplish Learning Task

The first challenge came from failing to accomplish a learning task which was quite different from the traditional lecture-based model. The 5E flipped learning environment promoted students to be self-directed learners and pushed them to be independent in their learning, forcing them to function as directors rather than actors or actresses. The teacher provided students with situated support through online resources based on the learner's current state of understanding. The students completed the video learning, practices and answered the questions independently. The general reaction of students revealed that accomplishing the learning task was a challenge for them. As the students commented (1) :

"If there's something we don't understand, the teacher will explain. However, we need to take control of our own learning progress" (FG2 S4).

"It is really different from our previous classes… It's really difficult for us to learn all by ourselves" (FG2 S6).

"5E flipped classrooms placed more requirements on their pre-class learning sessions, which was a big challenge for us" (IS4).

"I prefer the way I used to, at least I don't think I need to be trapped in the learning task before" (IS9).

"The activities need to be done as instructed, I have more responsibility to complete the task" (RE S9). (1)

One of the accomplishing tasks that students found to be challenging was the quizzes. The 5E flipped learning environment was designed in a way of placing quizzes for each of the topics. The students were instructed to complete the quizzes to enhance their knowledge. However, for students, this was one of the challenges in the learning approach. The students described this as follows (2):

"There were also many quizzes; if possible, reduce this quiz. This caused me to feel too tired to answer all the quizzes" (FG2 S8). (2)

Another noticeable challenge that many students mentioned was the heavy learning workload. The 5E flipped classroom model required students to do out-of-class activities such as watching instructional videos and doing online quizzes before coming to class.

Hence, the students voiced that they had to work more in the 5E flipped classroom. Also, they had to devote more time to the course at home. For example, one student complained in the interview (3):

"It took me a lot of time compared to the traditional classes. In the past, I didn't have to do anything before class meetings. But now, you know, I must spend time on a lot of homework including watching the videos, doing the quizzes…" (IS6). (3)

The responses were also similar when it came to extra links provided for additional information. The student's felt that it was challenging to complete this task. As student 1 shared (4):

"This made it difficult for me to complete the online session in the allotted time. Sometimes the online link provided has a lot of information to look at… for me it's good but for us, students need a concise note. We had to spare a long time to follow all those sessions. So, there was not enough time for us to attend the session" (FG1 S1). (4)

3.2 Theme 2: Challenges on Personal Barriers

Theme 2 has two sub-themes, which are a) Lack of independent initiative and b) Heavy responsibility on learners; all the findings referring to these themes are described below.

a. Lack of Independent Initiative

The 5E flipped learning environment eliminated the teacher-led process and focused more on student discussions and presentations. Students believed that they have become the leader in advancing the classroom process in the 5E flipped learning environment which was something they had rarely tried before. As the students said as well as wrote (5):

"What we said and did were more than the teachers" (IS6).

"It is difficult for us to be the master of the class" (IS9).

"The student needs to work hard to complete the task given, they need to be self-motivated to complete the task. They also need to work together in the classroom to complete the task given" (RE S10). (5)

Sometimes students attended the classroom session without going through the online session. This led to difficulty for other students during the classroom session. There were still some students who did not complete the task before coming to the class and they were seen as less independent. Student 6 in her individual interview commented (6):

"I have one more problem, I found that they were students who came to the classroom without going through the online lesson. This made it difficult for me and others when it coame to the classroom discussions" (IS6). (6)

In addition, there was a student who felt like she should have the self-motivation to continue in this learning environment (7).

"I feel the challenge from myself, I think we need to have the spirit to learn because in this session there were five steps that we have to continue so when we do not have self-motivation it is difficult for us to follow all that" (FG2 S10). (7)

b. Heavy Responsibility on Learners

Some students believed that one of the factors that determined learning challenges in the 5E flipped learning environment was the heavy responsibility for performance.

Some students excelled at delegating responsibility to themselves and responded more enthusiastically to such challenges. These students commented (8):

"Our group desired to be the high-performing group, thus all the members were pushed to be consistently cognizant of the norms of ensuring mutual participation" (IS6).

"The level of autonomous competence dictated whether the good performance could take place or not. We had to progress independently" (FG1 S11). (8)

Some students believed that taking on this kind of responsibility caused them to perform poorly since they were under pressure (9).

"We had a lot of pressure on class performance……. We appeared to be underperforming as well" (IS9).

"As I mentioned earlier, students in this learning environment need to be responsible and always need to take charge of their own learning achievement" (RE S12). (9)

There were students who believed that the difficulty in accepting responsibility stemmed from the fact that they were all reliant on their current learning orientation and habits (10).

"We were used to the traditional class in which it was relatively easy for us to sit and listen. Suddenly changes happened, which required us to be more proactive, we all know that it would not be easy" (IS4).

"We preferred to receive knowledge passively, rather than actively taking over the classroom" (FG2 S6). (10)

4. Discussion

The students' experiences on the challenges they faced in the 5E flipped learning environment are discussed in three themes a) Fail to accomplish a learning task, b) Lack of independent initiative and c) Heavy responsibility on learners.

4.1 Fail to Accomplish a Learning Task

This study's finding showed that students have noticed a few challenges in 5E flipped learning, and one of those noticeable challenges which many students mentioned in the interview session was having a heavy learning workload. The 5E flipped learning environment classroom model required students to do out-of-class various activities such as watching instructional videos and going through online quizzes before coming to class. This made the students voice out that they had to work more in the 5E flipped learning environment. They also had to devote more time to the course at home. Song et. al. (2020) pointed out that the increased amount of out-of-class preparation time may negatively influence students' satisfaction levels. The heavy workload of pre-class activities may overwhelm students' time at home. Similar findings made by Dizon et al. (2022) indicated that the students' new roles in the flipped classroom give them a much higher demand. They may feel more pressure to complete the pre-class activities and therefore become uncomfortable with the in-class practices. As such, the flipped classroom would not be effective at all. According to some researchers such as Owens et al. (2020) and, Machado and Carvalho (2020), one big challenge is related to students' resistance to a totally new teaching mode. This is because students have become familiar with traditional lecture methods and they find that initially it is a struggle to adjust to an innovative teaching style with new routines, responsibilities and expectations.

Zhao et al. (2021) indicated that students may not view the full video lesson or may not fully comprehend the video contents and therefore be unprepared for the learning activities during class meetings and it becomes difficult to keep pace with their classmates. Besides, they added that the conditions under which the student watches the videos may

not be the best for learning new concepts. Students have to be responsible for their own learning but the fact that there are many distractions with the online session of the flipped class may lead to the lack of concentration. Students often get distracted by other websites or social networks and the surroundings, which make them unable to fully focus on watching the video lessons. In another study, Wang et al. (2022) mentioned such challenges that students might face as their attendance fluctuates, some lack a responsible attitude towards knowledge construction, some difficulty in coping with the continuous learning pressure in the before-class session. Also, Jiang et al. (2022) included a lack of instant help or out of class support as one other challenge. Some students lamented that they cannot ask their questions immediately during pre-class activities. Song et al. (2020) categorised the above-mentioned challenges as student-related ones. Since the flipped classroom approach heavily relies on homework and technology use, Dizon et al. (2022) identified several operational challenges related to infrastructure, classroom availability and limited high-speed Internet access. Some students might not have internet access at home while others might have no laptops or mobile devices to view the digital lessons. This study finding was also similar with other findings where students in the 5E flipped learning also had a high workload in online sessions.

4.2 Lack of Independent Initiative

The effectiveness of the 5E flipped learning environment method is linked to the autonomy and responsibility of the student, as students are required to be autonomous in the preparation of the 5E flipped learning session. The students were required to be more self-directed in learning and prepare themselves for this learning environment. Online sessions make the students study with the online material and the in-class sessions encourage them to focus on student interaction in learning. The arrangement of both sessions was accordingly focused on the 5E learning cycle stages that encourage the students to be more independent learners. Focusing on higher education, especially in medical education, it is true that the literature has emphasised that having the responsibility of one's own learning is, in some cases, more demanding and more frustrating when there is an obvious lack of structure and direction (Malone & Lepper, 2021). However, one of the main aims of university teachers was the attempt to foster students' independent learning, differently from school pupils, and to actively pursue their own autonomy in their learning progress (Tran & Duong, 2020). Moreover, this study finding showed that students felt challenges in fostering independence in a 5E flipped learning environment. In this sense, autonomy in students' learning process could be a clear factor that could have a significant impact on carrying out 5E flipped learning interventions, as students are required, among other activities, to read documents, watch videos, connect to the Internet and pay attention to their tasks. This was similar to the finding by Ainulluluah et al. (2022) in which students learn in flipped classrooms with independence. Furthermore, Mojtahedi et al. (2020) supported this study finding by summarising that students face challenges in flipped classrooms to actively engage in independent learning.

4.3 Heavy Responsibility on Learner

The focus group discussion in this study indicates that engagement with pre-flipped classroom learning is fundamental to enable students to benefit from the active flipped session as it provides foundation knowledge for further learning. Unlike in the traditional lecture, the 5E flipped learning environment requires students to take responsibility for their own learning by requiring them to complete independent learning before attending the scheduled session. Focusing on the flipped classroom concept and according to Bloom's taxonomy, pre-class learning commonly requires lower-order cognitive skills involving remembering and understanding. Conversely, the learning activities that usually take place during the face-to-face contact session require higher-order cognitive skills; for instance, applying, analysing and evaluating (Kwangmuang et al., 2021). It is important to note that higher-level cognitive skills in the taxonomy integrating with

lower-level cognitive skills, for instance, mastering the two foundational cognitive skills, remembering and understanding, is necessary for a task that requires the next cognitive domain-application (Nadhilah, Asyril & Azainil,2021;Şanli & Pinar, 2020). The findings from this study noted that the students felt they should encounter more responsibility to study in this 5E flipped learning environment. The high workload activities in this learning environment that facilitate an active learning environment were the potential barriers to a successful learning environment. To explain this further, engaging with both pre-class independent learning and in-class learning, which are sequenced in terms of cognitive complexity, is necessary for achieving the intended learning outcomes. High workload activities for students by using the 5E flipped learning approach to teach a new or difficult concept were found to discourage students from engaging in independent learning. This finding was similar to Abdullah et al. (2021) where students expressed their concern about increased responsibility with having high load activities in student-centred teaching and learning environments. Thus, delivering the active learning session with a 5E flipped learning environment was found in this research to be a challenge for students to learn and perform.

5. Conclusions

This study identified challenges to consider when implementing the 5E-flipped learning environment in medical education. It revealed that the 5E flipped learning environment resulted in some challenges, students reported that individual initiatives were significant challenges that impacted the implementation of the 5E flipped learning environment. Lecturers, instructional designers, and institutions should pay attention to encouraging students' active involvement in 5E flipped learning environment. The design and implementation duration of the 5E flipped learning environment also could be considered in various time period to see for better results.It could be shorter and better outcomes. Morever, this study finding is useful for them in the future so they can prepare themselves more optimally if they want to apply the 5E flipped learning environment as an instructional approach for their teaching and learning.

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