# Using an Online Student Response System to Promote Student Engagement in Critical Thinking Classes

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**Abstract**

Students' engagement has been considered an essential element in classrooms and students' academic performance. However, the pandemic caused schools to be closed temporarily for in-person learning and made interactions almost impossible for teachers and students in physical classrooms. Maintaining students' meaningful engagement in an online learning environment remains a concern for many educators in Cambodia. This may present a problem in teaching critical thinking as student engagement is important for developing higher-order thinking (Shcheglova et al., 2019; Strauss & Terenzini, 2007). Since both educational technology and critical thinking education in the country are still in their infancy, explorations into these practices are typically done by trial and error. Therefore, it is imperative that more empirical studies are conducted to elucidate a deeper understanding in this area. This paper aims to examine junior university students' experiences and perceptions towards their classroom engagement through the implementation of a web-based tool called Nearpod in teaching critical thinking (CT) in an English as a Foreign Language (EFL) class. The course is designed to help students develop their ability to use higher-order thinking to enhance effectiveness in communication. The study was conducted in five critical thinking classes at the university. As part of the implementation, the three lecturers utilized interactive videos, discussions, formative assessments, and others. Through classroom observation logs and interviews with students, it was found that most students were engaged in class activities when the digital tool was used. This experience opens the opportunity for modifications and appropriation for future use in teaching critical thinking and provides a deeper understanding of using technology in Cambodia's critical thinking classroom.

## 1 Introduction

An outbreak of a disease, which at the beginning was only a concern of a small town, escalated into a global pandemic at the beginning of 2020. 91% of students in approximately 194 countries were

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deprived of education due to the closure of schools and lockdowns (UNESCO, 2020). There were also school closures in Cambodia (Chheng, 2020), which led to a radical change in education, a transition to online learning (Tum, 2020). This shift has caused some concerns regarding teaching practices and students' learning experience, as some important elements of learning may be missing, one of which can be students' engagement. There has been some empirical evidence indicating the association between engagement and the development of higher-order thinking (Shcheglova et al., 2019; Strauss & Terenzini, 2007). It is important to explore different means to promote students' engagement in virtual CT classes. Although numerous studies have been conducted on teaching CT, most of them are related to teaching the skills in in-person classes and asynchronous online courses or developing the skills within certain subjects, and they do not focus on promoting students' engagement in a synchronous CT class. The current study intends to explore the teaching practices and investigate the experiences and perceptions of undergraduate students toward their engagement in CT classes when Nearpod, a web-based tool, was used. In this qualitative research, observation logs and focused group interviews were used to explore the efficiency of teaching practices online in promoting student engagement. Five classes with thirty students in each class were included in the study. The observation logs provided information regarding teaching practices that potentially engage students through Nearpod. The focus group interviews were qualitatively analyzed to obtain information regarding students' experience and perception towards the use of Nearpod.

The research questions that guide this study are:

1. In what way do EFL teachers of critical thinking promote students' engagement through online learning with the use of Nearpod?
2. What are students' perceptions towards the use of Nearpod for students' engagement?

## 2 Literature Review

### 2.1 Engagement

According to Wellborn (1992), student engagement is defined as the level of how a student is actively involved in learning. Axelson and Flick (2011) seemed to have expanded the definition and defined student engagement as "how involved or interested students appear to be in their learning and how connected they are to their classes, their institutions, and each other" (p. 38). They believed that students' engagement takes place when learners become interested and interact with the content, other students, and the teachers (Axelson & Flick, 2011). In their study, they stated that when a high level of engagement takes place, students are involved emotionally, cognitively, and behaviorally. This is consistent with the work of Fredricks et al. (2004) viewing engagement as a multidimensional construct and categorizing engagement into behavioral, emotional, and cognitive engagements. Therefore, this study uses this framework as a lens to examine students' engagement.

Behavioral engagement is defined as "the involvement in academic and social or extracurricular activities and is considered crucial for achieving positive academic outcomes and preventing dropping out" (Fredricks et al., 2004, p. 60). According to Pilotti et al. (2017), behavioral engagement encompasses students' participation in activities inside and outside of the classrooms, and students who are behaviorally engaged often attend classes and participate actively in class discussions regardless of whether they are asynchronous or synchronous discussion forums. However, the ability to interact with content in real time can affect students' behavioral engagement. A study conducted by Xiao et al. (2020) looked into how synchronous interactive classes influence student engagement. The result showed that behavioral engagement improved as students put more effort into completing their classroom tasks; however, the opposite happened in asynchronous interactive classes. Teacher-student rapport also plays a role in students' behavioral engagement. When students believe that their teachers care about them, they tend to be more behaviorally engaged compared to those who do not (Patrick et al., 2007). Moreover,

they are more likely to be engaged when teachers use class discussions and encourage students to expand their answers as the interaction and contribution become more significant (Applebee et al., 2003; Wang & Holcombe, 2010). Regarding the measurement of behavioral engagement, Fredricks et al. (2004) suggested that aspects of students' behavior should be separated into different scales in a study. Those aspects may include students' attention in class, efforts put into studying, and responsible behaviors.

Emotional engagement refers to reactions to teachers, other students, and content and school that make them willing to complete given tasks (Fredricks et al., 2004). It may include optimism, confidence, and anxiety from the students (Yang, 2011). Luo et al. (2019) found that emotional engagement is strongly connected to students' academic achievement. Furthermore, emotional engagement can be promoted through task design. Svalberg (2009) stated that students can also be emotionally engaged when there is a competitive element in the tasks they are completing. In an online class, one way to do so is through gamification. A study by Özhan and Kocadere (2020) in higher education shows that it is possible for gamified online learning environments to trigger emotional engagement, which can positively influence students' motivation. Moreover, students also develop this type of engagement when their teachers are supportive and caring (Fredricks et al., 2004). Self-report is usually used to measure emotional engagement, and it is important to specify the source of positive feelings in the measurement as suggested by Fredricks et al. (2004). Therefore, Nearpod was specifically mentioned in the question in the interview schedule.

Finally, Fredricks et al. (2004) define cognitive engagement as an investment by students into putting effort into achieving the understanding of concepts or mastery of skills. Cognitively engaged students may apply a strategy to solve a problem or complete a task, which results in acquiring new knowledge and deep learning (Yang, 2011). There are a number of factors that contribute to students' cognitive engagement. Svalberg (2009) stressed the importance of task design in this type of engagement. A task should be enjoyable and compatible with students' learning levels and ways of learning. Moreover, students should be able to reflect on the study after completing the task. Newmann (1992) and Svalberg (2009) believe that a task should also motivate students to learn by promoting competitiveness but also having a clear purpose and making sure that it is achievable. Similar to emotional engagement, cognitive engagement may be assessed through self-report measures as it is not simply observable.

The prior studies may show ways to trigger all three types of engagement in in-person, asynchronous online, or flipped classrooms; however, whether these practices are effective in a synchronous online setting and especially in CT classes remains a black box In this study, the framework of multidimensional engagement by Fredricks et al. (2004) is used to examine students' perceptions of their engagement in synchronous online CT classes when Nearpod is used.

## 2.2 Teaching critical thinking

Critical Thinking is referred to as the use of skills or an attitude in the context of solving problems (Glaser, 1942). Kurfiss (1988) expanded the definition and defined it as "an investigation whose purpose is to explore a situation, phenomenon, question, or problem to arrive at a hypothesis or conclusion about it that integrates all available information and that can therefore be convincingly justified" (p. 2). Bean (2011) also added that the problems should spark students' curiosity and promote learning and thinking critically.

There have been a number of discussions regarding the thinking skills that should be taught in critical thinking classes. According to Swartz and Parks (1994), main CT skills include casual explanations, reasoning, generalizations, predictions, and the reliability of sources. Similarly, Alwehaibi (2012) developed a taxonomy of CT skills that consists of causal explanations, determining the reliability of sources, arguments, predictions, and part or whole relationships. However, Facione (1990) presented a more detailed and broader taxonomy of CT skills to be taught including six main skills, each of which contains two to three subskills. Skills presented by Swartz and Parks (1994) and Alwehaibi (2012) fit into

Facione's taxonomy. Therefore, Facione's main skills are used to analyze CT skills taught in the sessions in this study. Those main skills are:

1. Interpretation: Categorization, decoding significance, and clarifying meanings
2. Analysis: Examining ideas, identifying arguments, and analyzing arguments
3. Evaluation: Assessing claims, and assessing arguments
4. Inference: Querying evidence, conjecturing alternatives, and drawing conclusions
5. Explanation: Stating results, justifying procedures, and presenting arguments
6. Self-regulation: Self-examination and self-correction

There might not be one single best way to teach these skills in class. However, there is a positive association between classroom engagement and critical thinking skills, which confirms the importance of classroom practices that promote students' engagement (Shcheglova et al., 2019). Popova (2013) implied that critical thinking can be learned through impromptu problem-solving activities. A study by Ellis (2001) shows that educational products enhanced by multimedia can be effective in developing CT skills. Mandernach (2006) also stressed the importance of promoting engagement and student-centered approaches in teaching the skills instead of traditional didactic ways of teaching. The traditional way of teaching generalizes that the instruction is effective for diverse groups of students and allows limited room for critical analyses of the information presented in the class. Staib (2003) prefers classroom discussions, the use of case studies, and interaction between teachers and students for teaching critical thinking. In a study by Patel (2021), students believed that the discussions had played in part in developing their critical thinking skills when they used a framework developed by Paul and Elder (2019). Additionally, questioning techniques have also been used to teach CT skills. These techniques are often used to help students produce deep questions and better analyses. Yang et al. (2005) conducted a study on using questioning techniques in an asynchronous class discussion, and it has shown that CT skills can be enhanced using such techniques as it allows students to have sufficient time to analyze and reflect on their ideas while teachers can model and foster the students' CT skills in the discussion. Pithers and Soden (2000) also supported the use of questioning techniques as students are encouraged to reflect and analyze their ideas through teachers' asking questions regarding assumptions, alternatives, and other factors to consider. This paper investigates how these teaching strategies can be applied in a synchronous online setting and whether they can promote engagement.

## 2.3 Online engagement

Although students' engagement can benefit learning, it can be difficult for engagement to take place in an online setting. One of the challenges of online learning is the internet connection and learning environment. A study by Nguyen and Nguyen (2021) showed that encountering frequent instability of internet connection and possessing low technical skills can affect students' online learning experience. However, a paper on undergraduate students' perception of engagement in English online learning showed that most of the students will have great behavioral engagement even if they encounter poor Internet connection and costly internet services (Laili & Nashir, 2021). They also tried to find solutions such as finding places with better connections. Moreover, some environmental factors such as noises and temperature can also affect students' behavioral engagement as well. Another challenge of online learning is establishing effective communication with instructors. Without engagement, learning can be less effective compared to in-person classes because it is difficult for learners to create meaningful conversations and clarify or contest assumptions (Henri & Kaye, 1993). Emotional engagement can be established by using active learning techniques and teaching strategies, which may include games, timely feedback, and storytelling (Caldas et al., 2020). These can also be done through the integration of educational and media tools, which promote cognitive engagement as well (Ruzek et al., 2016).

## 2.4 Online Student Response Systems (OSRS)

Online Student Response Systems is an online platform operating on a web browser on any device that can collect students' responses synchronously and learn about students' understanding (Chen & Yang, 2022). Some examples of the OSRS are Socrative, Zuvio, Peardeck, and Nearpod. Prior studies have found that OSRS can be beneficial to students' engagement and learning. Socrative was used in a study of a university-level online EFL course (Alghamdi & Shah, 2018). The students believed that the platform was beneficial and effective as it helped organize lecture notes and provided immediate feedback. It also made their lessons more interactive and interesting. The effect of Socrative was compared with Zuvio on student engagement (Chen & Yang, 2022). Although EFL undergraduate students in the six-week experiment believed that Socrative was more beneficial, they remained attentive for the majority of the question-answering activity, the researchers believed it was because students could remain anonymous and receive personalized feedback. Liu et al. (2019) studied the impact of Peardeck in a flipped classroom where students mostly study online materials outside their class time, and questions are encouraged in class. The result illustrated that students were more engaged in the flipped classroom compared to a conventional classroom. However, students' learning did not significantly improve their grammar skills. The authors mentioned that students may need more time to be accustomed to using OSRS in class. A similar study conducted on Nearpod shows that it can improve students' engagement (Putra et al., 2021). Nearpod was chosen for this study as it provides important functions in other OSRS in one place such as maintaining responders' anonymity, creating interactive learning environments, and providing immediate feedback along with other features to improve students' engagement and learning. Therefore, these functions can be taken into account at the same time in this study.

## 2.5 Nearpod

Nearpod, which can be found at https://nearpod.com, is a web-based application that creates an interactive learning environment. After creating an account, users can upload their slides onto the application or create slides on the application. Additionally, for the free version of Nearpod, they can add activities, including quizzes, polling, open-ended questions, filling in the blanks, interactive videos, drawing activities, and collaborate boards to collect the audience's responses. Table 1 describes each activity featured on Nearpod below.

Although there have not been many studies investigating the use of Nearpod in critical thinking classes particularly, Nearpod has been reported to create engagement in other classes by different researchers. A survey in a study by Wang and Chia (2020) indicates that many students believed that Nearpod makes learning sessions more engaging and interactive, and they enjoyed the learning experience in their synchronous online class. Moreover, Nearpod also made students more comfortable with participating in class discussions, answering questions, or polls as their submissions are anonymous except for their teachers. McClean and Crowe (2017) examined the use of Nearpod in classes of pharmacy and bioscience students at Ulster University. In the study, students' comments were mainly positive, and most students did not mind using their own smart devices for Nearpod activities. However, a small number of students raised concern over the internet connection at the university as the session was delivered to a large group of students. Similar findings were also stated in a study by Sarginson and McPherson (2021), in which students in Pathophysiology/Pharmacology responded very positively to the use of Nearpod when their classes were switched to online due to COVID-19, but the study also suggested that some students may have had difficulty completing the tasks if they came to classes unprepared. A similar study in an Indonesian language and literature study program in Indonesia by Dewi (2021) indicates that almost 90 percent of the participants found the session using Nearpod interactive and the materials easier to understand. The main issue with Nearpod in the study was that some students were not able to answer the questions in the interactive video due to a technical issue with the Nearpod system at the time.

Table 1

*Description of Activities Available on the Free Version of Nearpod*

| Nearpod Activities | Description |
| --- | --- |
| Quiz | Instructors can create a set of multiple-choice questions for students to answer. Instructors can also set the time limit for the activity. |
| Poll | This activity allows instructors to vote on one of the options created by the instructors, who can share the result of the poll after the vote ends. Instructors can also set the time limit for the activity. |
| Open-ended question | Instructors can ask a question for students to type and submit their responses. Instructors can also share a particular response from students with the whole class. Instructors can also set the time limit for the activity. |
| Fill in the blanks | To create this activity, the instructors need to type or import texts into Nearpod and select some portions of the texts to be omitted. Students are required to select the omitted texts at the bottom of the page and drag each one of them to complete blanks in the texts. |
| Interactive video | Instructors can upload a video or embed an online video onto Nearpod. The instructors have the option to allow the video to be played at the student's pace or according to the instructor's control. The instructors can also add a question at some points in the video, and at those points, the video will stop and ask students questions before allowing students to continue watching the video. |
| Draw it | Instructors can upload an image onto Nearpod, and during the session, students can draw on the uploaded image. Instructors can also share some drawings from students with the whole class as well. |
| Collaborate Board | Students can answer a question posted by instructors, and the answers will be posted onto a virtual board in real time without showing the students' names. Students can also "like" other responses. |
| Time to Climb | Instructors can prepare a set of multiple-choice questions for the activity. Students can choose their avatars for the race. The student with the highest number of correct answers and the shortest average time spent is the winner. Instructors have the option to pause the game in between questions. |
| Matching Pairs | Students match pictures or texts with their correct pairs. |

# 3 Methodology

## 3.1 Context

The study will be based on critical thinking subject, one of the core subjects of the bachelor's degree in English at the university. This means that all students pursuing the degree are required to take the course. English is used as a medium of instruction for this subject. The purpose of the course is to develop students' ability to interpret, analyze, and evaluate ideas and arguments in different settings including fiction, non-fiction, daily life, and academia and develop the English language used for critical thinking. The CT subject at the university was the only first stand-alone CT subject at a university level in the EFL bachelor's degree program in Cambodia at the time of the study. The study examined teaching CT as a stand-alone subject instead of teaching CT skills embedded in other subjects to uncover more explicit teaching of CT skills.

The university is located in Phnom Penh, the capital city of Cambodia where there is sufficient infrastructure for online learning. All students have sufficient equipment to participate in the class conducted synchronously through Microsoft Teams. The only evident limitation known ahead of time was the occasionally slow Internet connection that can affect the quality of the lesson due to the unstable nature of the Internet speed in the country (Waring, 2017).

## 3.2 Participants

Purposive sampling was conducted to recruit participants for this study. Only CT lecturers who had used Nearpod in their teaching were selected while other CT lecturers at the university did not have any experience using the platform. There was no prior training provided to the selected lecturers. Therefore, lecturers' lesson designs were not influenced by the researcher but only based on their prior experience and their research, which is important to capture purely their actual use of Nearpod for teaching CT skills. Only two sessions were part of the study as the majority of the class sessions were in-person sessions before the pandemic and the two sessions after the study would be for revision and training for an online final examination conducted by the university, which did not contain instruction of CT skills. The two sessions covered two units: Judging the credibility of sources skillfully and Reasoning about causal explanations, which are considered main CT skills (Alwehaibi, 2012; Facione, 1990; Swartz & Parks, 1994).

The study included 5 classes of 30 students. According to the university's policy, students in the class were expected to have advanced English proficiency or C1 according to the Common European Framework of Reference for Languages (CEFR), which means that students could understand implicit meanings and long texts and communicate fluently in English (Council of Europe, 2022). No student took part in more than one class. The result of students' participation was generated in percentages on Nearpod from both sessions. The percentages of participation were used to ensure that both students with different levels of participation were selected for the focus group interviews. The purpose was to understand the perceptions of both students who are engaged or those who are disengaged in the two sessions.

## 3.3 Data collection

The data collection methods of the current study consist of online classroom observations and qualitative focus group interviews. An observation protocol was developed for this research to observe student engagement in online classroom activities and how teachers engaged students in those activities in Microsoft Teams Calls. This protocol was developed based on two different protocols in studies by Topçu et al. (2018) and Wheeler et al. (2019) (see Appendix A).

In the observation logs, the researchers took notes on a number of aspects of the class, including lesson content, classroom techniques and activities, technical problems, instructional problems, students' engagement, and how teachers engage students in the activities. All recordings of the sessions were used for the observation to avoid any changes in students' behaviors due to the presence of the observers. The purpose of the observation was to obtain data related to how Nearpod is used to teach CT skills and engage students and confirm the data collected later in the interviews.

Qualitative focus group interviews were conducted after the observation. Each interview was conducted via Microsoft Teams and lasted 30 to 40 minutes. Five students from each class took part in a focus group interview via Microsoft Teams; therefore, there were five focus groups in total. According to Wilkinson and Birmingham (2003), the number of participants in the interview should be more than four to avoid jeopardizing the group dynamic and should not be more than twelve to avoid any difficulties in carrying out this interview. In each focus group, students were asked nine questions to assess their

engagement in their classes (see Appendix B). The questions were inspired by the work of Fredricks et al. (2004) regarding how each dimension of engagement should be measured. Students were informed about the purpose of the study and the procedure of the interviews. Students were also invited to comment on the interview transcript when ready to ensure that the themes and concepts create reflect their perceptions and experiences.

### 3.4 Data analysis

#### 3.4.1 Observations

The observation logs were analyzed qualitatively to group the Nearpod activities used by the lecturers in the sessions to teach CT skills. The activities were categorized and matched with CT teaching techniques and the main CT skills being taught. Details such as technical errors, teachers' personalities, and student-teacher interactions in classes were also used to triangulate findings from the focus group interviews (Merriam, 2009).

#### 3.4.2 Focus group interviews

The interviews were transcribed and coded based on the three dimensions of engagement (Fredricks et al., 2004) and factors affecting each type of engagement to identify whether students were engaged according to their perceptions from the literature. Although a deductive approach was used to start the coding process, the data were also analyzed for other emerging themes instead of force-fitting the data into the preexisting codes as there may be other factors affecting engagement besides those in the literature.

Table 2

*Coding Scheme for Types of Student Engagement*

| Types of Engagement | Elements indicating engagement | Factors contributing to engagement |
| --- | --- | --- |
| Behavioral engagement | Level of attention | Interaction with the lesson content |
| | Level of effort | Quality of Internet connection |
| | Level of responsibility | Display of teachers' effort |
| | | Display of classmates' effort |
| | | Appreciation of contribution |
| Emotional engagement | Positive feelings towards Nearpod | Interesting and enjoyable content |
| | | Competition |
| | | Level of support from the instructor |
| Cognitive engagement | Perception toward learning strategies | Interesting and enjoyable content |
| | Willingness to participate in Nearpod activities | An appropriate level of tasks |
| | | Purposefulness of tasks |

## 4  Results

### 4.1 Research question 1: In what way do EFL teachers of critical thinking promote students' engagement through online learning with the use of Nearpod?

#### 4.1.1 Nearpod features and classroom activities

Table 3

*Summary of the Use of Nearpod Features in CT Classes*

| Nearpod Features | Examples of Activities | CT Teaching Practices | CT Skills Instruction/ Development |
|---|---|---|---|
| Collaborate Board | **Lecturer X:**<br>Warm-up activities<br>(Example: List down three people they trust the most, and students with high numbers of likes were asked to explain their picks.)<br><br>**Lecturers Y and Z:**<br>Classroom Discussions<br>(Example: Read a scenario and write down whether to believe the person or not.) | Classroom Discussion (Staib, 2003, Yang et al., 2005)<br><br>Questioning Techniques (Yang et al., 2005, Pither & Soden, 2000) | - Students provided justification for their decisions.<br>- Lecturers connected the student's justification to the framework of analyzing the reliability of sources. |
| Interactive Videos | **Lecturers X and Z:**<br>Crime Investigation<br>(Example: Show a crime scene with clues for students to identify the possible cause.)<br><br>**Lecturer Y** did not use the function | Using multimedia content (Ellis, 2001)<br><br>Questioning Techniques (Yang et al., 2005, Pither & Soden, 2000)<br><br>Impromptu Problem Solving (Popova, 2013) | - Students practiced evaluating the situation and narrowing down the possible causes. |
| Polls | **Lecturers X, Y, and Z:**<br>Warm-up activities<br>(Example: Choosing the person who is unlikely to be a perpetrator) | Classroom Discussion (Staib, 2003, Yang et al., 2005) | - Students evaluated the options based on the given clues to pick the correct answer. |
| Quiz | **Lecturer Z:**<br>Checking students' understanding of lesson key concepts | | - Students used their understanding of CT concepts to pick the correct answers. |
| Open-ended Questions | **Lecturers X and Y:**<br>Case study analysis<br>(For example: evaluate the reliability of an article)<br>**Lecturer Z:**<br>Case study analysis (with a countdown timer) | Classroom Discussion (Sharon, 2003; Yang et al., 2005)<br><br>Questioning Techniques (Yang et al., 2005; Pither & Soden, 2000)<br><br>Impromptu Problem Solving (Popova, 2013) | - Students evaluated the reliability of the sources used in the article.<br>- Students provided justification and explanation for their answers. |
| Fill in the Blank | **Lecturers X, Y, and Z:**<br>Matching key concepts with their definitions or examples | | - Students used their understanding of CT concepts to pick the correct answers. |
| Time to Climb | **Lecturers X, Y, and Z:**<br>A game consisting of:<br>- Matching concepts with their definitions<br>- Short case analysis | Questioning Techniques (Yang et al., 2005; Pither & Soden, 2000) | - Students used their understanding of CT concepts to pick the correct answers.<br>- Students evaluated the reliability of sources used in the cases<br>- Students evaluated the options based on the given clues to pick the correct answer. |

Table 3 indicated that Nearpod features, except "Draw It" can be used to develop students' main CT skills in judging the reliability of sources and causal explanations and other main CT skills as well including evaluation and explanation skills (Facione, 1990). However, some features like "Quiz", "Fill in the Blank", and "Time to Climb" may not foster the use of CT skills but foster the understanding of CT concepts instead. Although the same features were used, different lecturers used them differently. When Lecturer Z used the "Open-ended Questions" feature for case study analysis activities, a countdown timer was used to limit the time students had to answer the question. Furthermore, when using "Time to Climb", Lecturer X paused the game after the answer was revealed for each question to provide the rationale behind the answer or ask students to provide one. Lecturer X also made connections between the warmup activities to the lesson as it was introduced to the students.

The observations also suggested that teaching practices deemed effective for developing CT skills can also be implemented through Nearpod features. Firstly, classroom discussions, a practice supported by Staib (2003) and Yang et al. (2005) for teaching CT, can be utilized in "Collaborate Board", "Polls", and "Open-ended Questions" although "Poll" may serve more as a discussion starter because it depends on whether lecturers decide to ask students to justify the options they pick after the polls are closed. Secondly, using multimedia content for teaching CT was recommended by Ellis (2001). Lecturers added such content, such as photos and videos onto their Nearpod slides, and they also made their videos interactive through Nearpod to present a case study or a scenario in the class. Thirdly, questioning techniques were also used in their teaching through "Collaborate Board", "Open-ended Questions", and "Interactive Video". The first two features allowed lecturers to see their students' answers and use the techniques to refine their answers while using the latter feature, the lecturer could not see students' written answers and could only obtain students' rationale verbally before using the techniques to refine their answers. Lastly, Impromptu problem-solving activities, suggested by Popova (2013) for developing CT skills, could also be implemented through Nearpod. Lecturers presented problems as a case study or a scenario through "Collaborate Board" and "Open-ended Questions" or presented the case as an interactive video.

### 4.1.2 Technical issues

There were three main technical problems in the observations. First, at the beginning of the session, several students in Class E had problems with joining the Nearpod session. While the majority of the students joined the class via their computers, a number of them joined the session using their smartphones and were not able to join the Nearpod session through their smartphones' browsers as there were no guidelines provided on how to do so in the class. Lecturer Z managed to explain the process to the students. However, the communication was not very supportive as students were reprimanded for using smartphones to join the class. Second, some students across all three classes experienced slow internet connections and were not able to connect to Nearpod sessions during the class. Some of them managed to notify their lecturers regarding the issue. Third, some students had some difficulty navigating through the interface of Nearpod. They mostly had problems with using the "Filling in the Blank" as they clicked on an option instead of dragging it to fill in the blanks. Lecturers X and Y managed to provide help to the students by explaining how to complete the task, and Lecturer X also shared his screen with the student view to demonstrate how to complete the task. However, Lecturer Z did not manage to explain this to his students and told students to type the answer into the Microsoft Teams' chat box instead.

## 4.2 Research question 2: What are students' perceptions towards the use of Nearpod for students' engagement?

### 4.2.1 Students' definition of classroom engagement

There were a high number of similar definitions of classroom engagement given by the students. Many

students agree that engagement occurs when students pay attention to a lesson and participate in all class activities. Moreover, the participants also mentioned that engagement can also occur before and after class. Below are some common responses by students:

- Students would join all activities in the class and not do any other tasks that are not relevant to the lessons. (Class B – Speaker 2)
- An engaged student would try to complete all the homework assigned before deadlines. (Class C – Speaker 2)
- Students who are engaged will do some research and read some materials related to the lesson before attending the session. (Class E – Speaker 4)

### 4.2.2 Behavioral engagement

Students' perception of their behavioral engagement was examined through their level of attention, their efforts, and their responsibilities.

**Level of attention**. The majority of students believed that they paid full attention to the lesson. The main reason was the ability to interact with the content in real time through the Nearpod tools, which is aligned with the finding by Xiao (2020). One student said, "I really like the tools on Nearpod. Everything is there on the screen. I got to pay more attention to the lesson when I can do exercises or tasks on the slides".

However, since Nearpod requires a good internet connection, a small number of students mentioned that they got distracted sometimes due to bad internet connections, which contradicts a study by Nguyen and Nguyen (2021) showing that students may still be behaviorally engaged when experiencing poor internet connections.

**Students' effort**. All participants claimed that they put a lot of effort into the course because they felt that they needed to work hard when their teacher put effort into their instruction. One student said, "the fact that my teacher puts effort [in]to finding a platform to help with the teaching motivates me to work hard too".

This is also true in a study by Patrick et al. (2007), which shows that students tend to be more behaviorally engaged when they believe that their teachers care about them. Some students also felt obligated to contribute more when seeing their classmates' responses. One student from Class C said, "I just feel that I have to work hard and complete the tasks when I can see my classmates submitting their work on Nearpod."

Although neither of these factors was a direct result of using Nearpod features, Nearpod provided a platform for lecturers to create their content and show students their peers' responses on a feature called "Collaborate Board".

**Level of responsibility**. Most students believed that they were highly responsible for their studies because of their teachers' and peers' efforts. They also mentioned that they felt more responsible when their answers were noticed by their teachers, and they were asked to explain their answers. Prior studies also had similar findings indicating that encouraging students to expand their answers may improve students' engagement (Applebee et al., 2003; Wang & Holcombe, 2010). Data from the observations have shown that all lecturers used questioning techniques to help students refine their answers. Nearpod allows teachers to create class discussions and see students' responses in real time. Therefore, teachers were able to generate questions to help students refine their answers based on their responses.

### 4.2.3 Emotional engagement

Most participants felt positive about using Nearpod for their critical thinking class because it made the class more interesting and enjoyable. One student said:

> *I love Nearpod. I feel like my class becomes more interesting. I do not like it when my lecturer just gives a lecture, and we just listen. It is good to have some competition to keep us interested. I hope we can use it as many times as possible in class.*

Students also tended to be more emotionally engaged when there was a competitive task to complete (Svalberg, 2009). Moreover, emotional engagement can also be improved through gamified online learning environments. Nearpod feature called "Time to Climb" allowed teachers to gamify their questions and create such environments to promote emotional engagement.

Some participants, however, did not enjoy their Nearpod experience as they found the platform difficult to use. More importantly, they did not receive support from their lecturers. Some of their responses were:

- "I am not sure about it. It is quite hard to use, and I am afraid that I will lose my score if I cannot join the app." (Class D – P2)
- "My lecturer was not very happy about it when I could not join the app." (Class E – P3)

The observation in Class D and E confirmed that some students had difficulty using the application and that the lecturer failed to provide them the technical support and became hostile instead. However, a few students in other classes who had the same difficulty still felt positive about their learning experience with Nearpod as they were supported by their lecturers. This confirmed a finding by Fredricks et al. (2004) indicating that students' emotional engagement can develop with a supportive and caring teacher. Therefore, although Nearpod can be considered difficult to use by some users, clear instruction and support from instructors can provide students with positive learning experiences.

### 4.2.4 Cognitive engagement

Students' cognitive engagement was assessed through their perception toward their learning strategies and their willingness to participate in Nearpod activities to improve their critical thinking skills.

**Perception towards learning strategies**. The participants from the first three classes (A, B, and C) were more invested in forming their learning strategies compared to the last two classes (D and E) because the class was enjoyable, and the level of the task was appropriate, so they believed that it was achievable. The typical students' responses were:

- "It is not hard to study hard in CT class. When we make a mistake on Nearpod, our teacher will tell us what is wrong, and then I can just take notes and learn from it." (Class B –P1)
- "The activities are not too hard if you pay attention and take notes in class. Most lessons are fun, so when I review the lessons, I don't feel like I need to force myself to do it." (Class A – P2)

This is aligned with a suggestion by Svalberg (2009) that a task should be enjoyable and suitable for students' levels to promote cognitive engagement. However, the opposite can be seen in responses from Class D and E where some participants believe that some questions were too difficult for them, and they were not motivated to form any learning strategies for the subject. One student said, "CT is just really difficult for me. Some cases are very difficult to analyze. I feel like we don't have enough time sometimes to work on the cases." (Class E – P2)

The observation of Class D and E also confirmed that the lecturer did use the countdown function on Nearpod to limit the time for open-ended question activities, which were used for case analysis exercises. This may have raised the level of difficulty of the tasks.

**Willingness to participate in Nearpod activities**. Most students were very willing to participate in sessions using Nearpod to enhance their critical thinking skills because they believed that it could make the lessons enjoyable; however, a few students requested more interesting content and more relevant activities. Some of the participants said:

- "Of course, Nearpod helps me a lot, but I hope that my teacher can use some interesting content in the session as well so that my brain can absorb the content better." (Class D – P4)

- "Sometimes I do not see how Nearpod exercises are related to the lesson. Maybe there is no need to use it when the lesson does not need it." (Class E – P3)

The observation indicates that Lecturer Y and Lecturer Z occasionally failed to make connections between the Nearpod activities and the lessons, especially between the warmup activities and the lessons when introducing the lessons to the students. Svalberg (2009) suggested that a task should have a clear purpose in order to promote cognitive engagement. Therefore, failing to help students see the purpose of the task may cause them to be less cognitively engaged in the lesson.

## 5 Discussion

Findings from our work indicate that Nearpod can be used to teach CT skills and promote students' engagement in CT classes. "Collaborate Board", "Interactive Video", "Polls", and "Time to Climb" were Nearpod features used by instructors for students to practice their evaluation and reasoning skills while the "Open-ended Question" feature could also be used to help students develop their ability to present arguments after analyzing information posed by the instructors. These skills are considered important CT skills to be taught in classes (Facione, 1990). In addition, teaching techniques considered effective for developing CT skills can be deployed through Nearpod. For example, impromptu problem-solving activities suggested by Popova (2013) can be conducted through "Open-ended questions" or "Interactive Video". Class discussions can be implemented through "Collaborate Board", and questioning techniques, supported by Yang et al. (2005) and Pither and Soden (2000), can also be used to refine students' answers through "Collaborate Board" and Open-ended Questions.

Nearpod also creates an opportunity for engagement during online synchronous critical thinking classes. The ability to interact with lesson content in real time can improve their behavioral engagement. This is consistent with a prior study on an online synchronous "knowledge media and learning" class by Xiao et al. (2020), in which interactive classrooms were proven to behaviorally engage students. Moreover, features like "Collaborate Board" and "Polls" allow students to see their peers' efforts in contributing to the class, which can make students feel the need to participate in the activities, thus improving their behavioral engagement. Nearpod also enables instructors to gamify their questions and create enjoyable and competitive learning environments, in which students can be emotionally engaged, as suggested by Svalberg (2009). However, a stable internet connection is required for Nearpod. Students can be behaviorally and emotionally disengaged when there is a disconnection.

Nearpod alone may not be sufficient for engagement to take place in a CT class. Some teaching practices are still important for students' engagement in all three dimensions when using Nearpod. First, it is important for instructors to put effort into making their lessons interesting. The CT students appeared to be appreciative of their instructors' hard work and behaviorally engaged. The findings also suggest that interesting lesson content is a factor that can enhance students' cognitive engagement as well. Second, instructors may need to be supportive especially when students encounter technical difficulties. The result of the study shows that it is possible for students to stay emotionally engaged even when facing technical problems with using Nearpod as long as the instructors are supportive and willing to assist them. This is confirmed by Fredricks et al. (2004) that being supportive as an instructor can help students develop emotional engagement. Conversely, students can be emotionally and cognitively disengaged when instructors fail to do so and created a hostile learning environment. Third, tasks in the lessons should be at an appropriate level of difficulty and purposeful. In terms of cognitive engagement, the students were more likely to invest in developing learning strategies when knowing that tasks in the course are attainable, and Nearpod activities should have a clear purpose, which was also suggested by Newmann (1992). More importantly, in order for students to see the purpose of a task, instructors should communicate it well to students. The data of this study shows that failing to make connections between the task and the lesson can cause students to be cognitively disengaged.

# 6 Conclusion

The objective of the study is to examine how student engagement in online EFL critical thinking classes can be promoted through Nearpod. The data collected from classroom observations and focus group interviews allows the researcher to investigate different teaching practices and factors that can affect different dimensions of student engagement, which is important for CT classes. According to the findings, CT skills can be taught through Nearpod, and Nearpod alone can improve student engagement to a certain extent. However, instructors and task design play a bigger role in establishing student engagement in classes. Although Nearpod provides various tools that help engage students, teachers may utilize those tools in certain ways such as creating interesting content, communicating clear purposes of tasks with students, and being supportive during technical difficulties. Furthermore, like other online courses, Nearpod requires stable internet connections and conducive learning environments. Therefore, it is important to have clear guidelines regarding online learning related to required equipment, services, and learning environments. Universities may also provide support through providing internet services or required equipment as well for more effective learning. This study has implications for future studies to be conducted. The current study was conducted for only two sessions per class, covering only two main CT skills. A longer study may be conducted to learn more about student engagement when Nearpod is used for a longer time and for teaching other main CT skills. Additionally, this study did not take into account the improvement of students' CT skills; therefore, future research can also study the development of students' CT when Nearpod is used in a CT class.

# Appendices

## Appendix A

*Observation Protocol*

**Online Classroom Observation Sheet**

**Teacher's Name:** _____     **Class:** _____

**Actual Time Observed (start and end):** _____

**Lesson:** _____

**Start of the online class**

Description of how the teacher started the class and the Nearpod functions used

**Activities in the online class**

| Activities | Nearpod Functions | Descriptions |
|---|---|---|
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**How teacher encourage students to participate in the activities**

**How students participate and interact with their peers and teachers**

**Report any technical issues in the online class**

**Report any instructional issues in the online class**

# Appendix B

*Interview Protocol*

*Practices to promote student engagement in Critical Thinking Classes*

You are invited to participate in a research study conducted at the institute.

**PURPOSE OF THE STUDY**
The study aims to explore the tool used to promote engagement in online Critical Thinking Classes at the institution in Cambodia during the COVID-19 pandemic.

**PROCEDURES**
Participants will be invited to participate in a focus group interview with particular focus on their perception towards the tool used to promote engagement in online Critical Thinking Classes by the teachers.

Each interview will last from 30 to 40 minutes. The participants can choose not to answer any particular question during the interview process. Considering Covid-19 situations, the interviews will be conducted online via Microsoft Teams. The interviews will be recorded, and the participants also have the access to the records.

**POTENTIAL RISKS / DISCOMFORTS AND THEIR MINIMIZATION**
Participants will be asked to share personal experiences and feeling while participating. They will be encouraged to share the tensions that they do not normally verbalize. Some of the questions will require participants to share their perceptions towards the tool used by the teacher and their experiences. To facilitate this process, the researcher will build a relaxed and conducive atmosphere where participants do not feel the pressure of having to answer the questions. Essentially, the participants can express their discomforts or ask for extra time to contemplate the questions.

**COMPENSATION FOR PARTICIPATION**
Participants in this study will not be offered any monetary reward. The participation is voluntary and based on intrinsic interests.

**POTENTIAL BENEFITS**
This research study will contribute to the understanding of factors contributing to engagement in online CT classrooms. The reflection by students will allow other teachers teaching during COVID-19 pandemic to learn more about benefits, weaknesses and other important information before adapting the tool introduced by the teachers in this research into their own EFL classrooms.

**CONFIDENTIALITY**
The researcher ensures that the data obtained from the participants will be safely stored and secured in the researcher's laptop. Only the researcher will have access to the data. The data will be used solely for the research purpose, not for any other endeavor. The audio-taped interviews are available for review by the participants if they so choose, and any part of the audiotape can be erased and eliminated from the study based on the participants' requests.

**DATA RETENTION**
In this study, anonymous status will be maintained for all the participants. No personal identifiers will be mentioned in the research report. The researcher will assign codes to each participant (e.g. P1, P2, and so on) for the discussion of the findings. The personal identifiers will be only used by the researcher for the purpose of clarifying the findings, if necessary, or for the structured management of data prior to writing the research report. The data will be stored for a period of three years after the publication of the study. Should there be no concern upon the issues of consent, fabrication, and falsification within the retention period; the data will then be destroyed.

**PARTICIPATION AND WITHDRAWAL**
Your participation is voluntary. This means that you can choose to stop at any time without negative consequences.

SIGNATURE

I_____(Name of Participant) understand the procedures described above and agree to participate in this study.

**INTERVIEW QUESTIONS**

1. In your own understanding, what is students' engagement?
2. Did you pay attention to the lesson when Nearpod was used? How focused were you when Nearpod was used? What makes you pay more or less attention to the lesson?
3. Do you think you put effort into the course or worked hard when Nearpod was used?
4. To what extent do you feel responsible for the study for your critical thinking class when Nearpod is used?
5. How do you feel about the use of Nearpod in your critical thinking course? Would you want it to be used in class more often in class?
6. What do you think about your learning strategies when you study critical thinking using Nearpod online?
7. Would you participate in Nearpod to improve your critical thinking skill?
8. In your opinion, what about Nearpod that make you more or less engaged in learning critical thinking online?

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