

A BYOD Hybrid Learning Approach to Incorporating The In-Field Social Study based on Guided Inquiry Learning Strategy: Design and Evaluation of Enjoy The Field Trip Ever Project (EFTE)

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Abstract: Social study plays a critical role in understanding different phenomena in the society from the past to the present. This involves several subjects ranging from geography, history, science to arts. Many schools promote this learning by taking students to study in the actual fields to experience their contexts; however, the students could not fully inquire the knowledge due to the limitations of learning activities. With the advancements in mobile technology, the students are encouraged to use their own devices to obtain more knowledge. Based on this perspective, the researchers aimed to tackle this challenge by redesigning such learning activities. Therefore, this study introduced the design of hybrid learning approach to incorporate the in-field social study. A careful analysis of learning activities has been designed to support the mobile learning; moreover, the missions to accomplish at the sites are developed to reflect the content of the certain subjects behind. After one-day field trip with the proposed approach, the debriefing session is given in the classroom to ensure that all students can reach and understand the historical story from their actions. To retrieve the initial feedback of this approach, a simple evaluation was done, and the results were collected for further improvement.

Keywords: BYOD, mobile learning, guided inquiry, field study, social study, hybrid learning, technology-enhanced learning, ubiquitous learning

1. Introduction

Social studies are considered as the integrated study which combined the social sciences, humanities, and history to promote civic competence. Within the school program, social studies provides coordinated, systematic study drawing upon such disciplines as anthropology, archaeology, economics, geography, history, law, philosophy, political science, psychology, religion, and sociology, as well as appropriate content from the humanities, mathematics, and natural sciences (Jorgensen, 2012). Also, the primary purpose of social studies is to help young people develop the ability to make informed and reasoned decisions for the public good as citizens of a culturally diverse, democratic society in an interdependent world (Vinson, 1999). Hence, it is necessary for the students to study social studies at all level since the kindergarten.

Social studies also are the branch of learning the emergence, present, and history of the societies in different contexts around the globe. This can deepen the learners to understand how the existence has become and how the future tends to be based on the history by studying various aspect of social studies. Normally, learning social study can be relevant to social sciences, history, and humanities. In the past, learning this subject happened in the traditional lecture-based instruction, in

which the students passively receive the knowledge. This caused the students just only learning by memorization, namely rote learning, regardless of the real context understanding. Nevertheless, lecturing in class is also considered as the limitation for learning because authentic social studies learning composed of various discipline; Geography, Architecture, Culture, and Science.

Although different modes of teaching methods have been adopted to help increase the learning achievement of social studies, educational researchers widely agreed that learning in the context (in-field study) is considered as one of the effective methods that could significantly help the learners to experience these phenomena, leading to better learning performance and learning motivation (Stoddard, 2009). The most significant thing for studying social studies inevitably be the teacher because they must understand the whole content of the subject in order to convey to the students. The best method to convey must be relayed through the instructor's experience. For example, teacher's experience discussed. Moreover, another significant thing is that the teacher should encourage the students to create the question that they suspect and encourage students to criticize, comment, and debate. It is a result of the effective learning experience (Adler, 2008). According to Susan Adler, the teacher is like to be the knowledge's storage, which is categorized as a limitation of knowledge. Hence applying technology device for learning is important to learning and developing (Meghan, 2017).

Therefore, learning in real field trip could increase student's comprehension and memorization too (Stoddard, 2009). Moreover, Field trip learning will effective when the students have been intellectually prepared for the trip. For example, students can best apply the field trip experience to construct knowledge in sites when teachers have intensively introduced students to the topic or are actualizing a sectional unit on a related topic (Noel, 2006, 2007). During a field trip, the learning may take place while the optimization will occur only when the contents of field trip are well integrating with the curriculum (Noel, 2007). Moreover, learners can also memorize the knowledge content better. Because knowledge comes from self-learning through his various senses, such as seeing, hearing and touching (Risinger, 2010).

In the past years, mobile technology has been rapidly improved regarding both quantity and quality. This enables many learning opportunities for the students. Many educational institutes encourage students to bring their own mobile devices to the classrooms, widely known as BYOD, to obtain their learning participations and engagements. (Adhkari, Mathrani, & Scogings, 2016) With their devices, the teachers can employ different teaching methods to enhance their learning achievements. Moreover, this possibility could make the learning environments more challenging, while the learning activities are not only limited to the classroom but can be extended to many realities (Cristol & Gimbert, 2014). Furthermore, these activities can be designed to be a hybrid between online and offline worlds to suit with such environments and to be bridged among subject contents for better understand the situations in place.

Based on the limitations of learning social studies and possibilities of employing BYOD strategy to bring more learning success, this study aims to tackle such challenges for the benefits of students. Therefore, the researchers have considered the actual situation of learning social study subject at a school in Thailand as a case and designed a hybrid learning approach to incorporating the in-field social study based on guided inquiry learning strategy. In this paper, a study of related topics for developing such approach has been reviewed, and a detailed structure of the approach has been given. To extend the understandability, the analysis of content, the design of learning missions, and the development of BYOD hybrid learning activities have been presented. Finally, the evaluation of this approach has been conducted with a trial group of students, and the results could be used and considered for further improvement.

2. Related Study

2.1. Bring Your Own Device and Mobile Learning

In the recent decade, technology gradually plays an important role in promoting education. It is considered as a part of teaching and learning process. In addition, many research confirmed that the mobile device could offer advantages in education through the support of mobile technology, students

are allowed to explore and organize their knowledge in real scenarios (G.-J. Hwang, Chu, & Lai, 2017). A significant thing to study mobile device used to promote learning, the researcher must comprehend the concept of Bring Your Own Device (BYOD). It is used to describe the students using personally owned devices in education settings (Burns-sardone, 2014). Nowadays, BYOD rapidly popularized among educators because it could encourage the students to search and analyze the data from the website, and others channel. Moreover, it increased student participation which encouraged the student to drive learning and also increase their collaboration and communication skill through devices.

In the past decade, many research studies have applied BYOD strategy to promote learning in various aspects. For example, In 2012, Kingston et al., encouraged students to bring their mobile devices to investigate the landscape in the field study, while Handfield (2014) created Google Art Project allowing the students to see the art works from famous museums around the world. The museum is considered as an appropriate place for using a mobile device. According to Jang and Lien (2014) found that graphic-user-interface and mobile computing technology can improve exhibition form in the museum that enhances learning experience. In addition, studying in class and laboratory need to adopt BYOD to apply in education all levels (Hamza & Noordin, 2013).

In addition to that, mobile learning is widely considered by many educational researchers as the intersection of mobile computing and e-learning comprising of accessible resources. Wherever you are, students can search for the data that can support effective learning, and performance-based assessment (Robson, 2003; Hwang, Chu, & Lai, 2017). Mobile learning can be used to diversify the types of learning activities students partake in (or a blended learning approach). In the present, learning and studying are not only limited to lecture-based learning, but mobile learning could assist the students in constructing knowledge by exploring the real world and the virtual world (Shih, Chuang, & Hwang, 2010; Vishwakarma, 2015). Chatterjea (2012) created NIEmGeo, the app allows students to geo-tag data like text, photos, and videos onto a shared map for Geography field. In addition to their advantage and applications, the m-learning concept is a significant component for expanding education in the remote area and equal education access to citizens in the unreachable area (Kurzweil, Age, & Machines, 2007).

Based on these advantages, the concept of BYOD and mobile learning are used in this study to design the social learning activities by allowing the students to bring their own mobile devices to learn in the real context.

2.2 Hybrid Learning and Guided Inquiry Learning in Social Study

Hybrid learning was created to design the courses that combine traditional, face-to-face (FTF) instruction with online instruction (Kurthen & Smith, 2005). The goal of combined online and traditional education is to take full advantage of each (Osguthorpe & Graham, 2003). Many pieces of research showed that the use of hybrid learning is more effective than FTF or online models alone in higher education (Boyle, Bradley, Chalk, Jones, & Pickard, 2003; Poon, 2013). The hybrid format for the lab-based class showed positive experience in student's learning which was using the large part of 50/ 50 hybrid delivery format (50% online + 50% FTF) (Park, 2011). Hybrid learning or blended learning enables the student to become more interacted in the learning process, and they were more behaviorally, intellectually and emotionally elaborate in their learning tasks (Wang, Shen, Novak, & Pan, 2009). The advantage of using blended learning was course flexibility, and this flexibility helped students with varied learning styles (Poon, 2013). Due to the potential benefits, an increasing number of institutions are interested in developing hybrid courses, programs, and degrees (Meydanlioglu & Arikan, 2014).

Inquiry-based learning is a pedagogy for teaching and learning that applies questions, ideas, and observations of students at the focus of the learning experience. Underlying this methodology is the concept that both instructors and students share responsibility for their learning (Scardamalia, 2002). Guided inquiry is a way of teaching and learning that build the school's culture to a collaborative inquiry community and respond to the critical requirement for transforming the school into nowadays world (Kuhlthau, Maniotes, & Caspari, 2015).

Many recent pieces of research applied the concept of guided-inquiry learning in various social science contexts. Shih et al. (2010) presented the integration of the mobile learning concept with social science in-field inquiry, resulting in the students' higher learning achievements. Hwang, Chiu, & Chen (2015) applied game based learning to develop students' inquiry-based learning performance in social studies. The results showed that it could positively affects the students on learning achievement, learning motivation, satisfaction degree and flow state. Furthermore, Hwang et al. (2015) and Shih et al. (2010) suggested that inquiry based learning strategies could be helpful for the students to learn social studies.

The integration of hybrid learning and guided inquiry learning in social study presents a number of significant challenges. Therefore, this study focuses on designing BYOD hybrid learning approach to incorporating the in-field social study based on the guided inquiry strategy.

3 EFTE Design and Development

3.1. Background and Overall Structure

Unlike subject-based teaching at many schools in Thailand, a special classroom, namely ESC, teaches students based on the historical timeline, in which each period can associate with several subjects. In the past years, the 10th grade ESC students have learned the topic of early Rattanakosin period by visiting the selected archaeological sites as an academic field trip led by social study teachers. During the site-by-site visit, students simply walk around, take photos and seek for some pieces of evidence. After the trip, they were required to give a presentation and submit a report. Consequently, it was found that the students could not associate the visited sites into the historical timeline and cherish the relevant subjects behind. To say, the visited contexts are not aware; and the learning process is limited.

Based on this perspective, the teachers, here as the researchers, have redesigned the activities by taking the advantages of mobile technology to address theses shortcomings. Therefore, Enjoy The Field Trip Ever (EFTE) approach was developed. The overall structure of EFTE shows in Figure 1. The students can now bring your own devices (BYOD) to learn the topic in the field of four temple sites to inquire the knowledge of early Rattanakosin topic in respect of historical timeline. Besides that, this version of EFTE emphasizes on two hybrid components for further enhancing the social learning performance and learning motivation. First, we hybrid relevant content subjects, i.e., geography, science, architecture and design, and history, in the learning activities. Second, we hybrid online and offline learning activities, which is the former requires Internet access while the latter requires face-to-face communication.

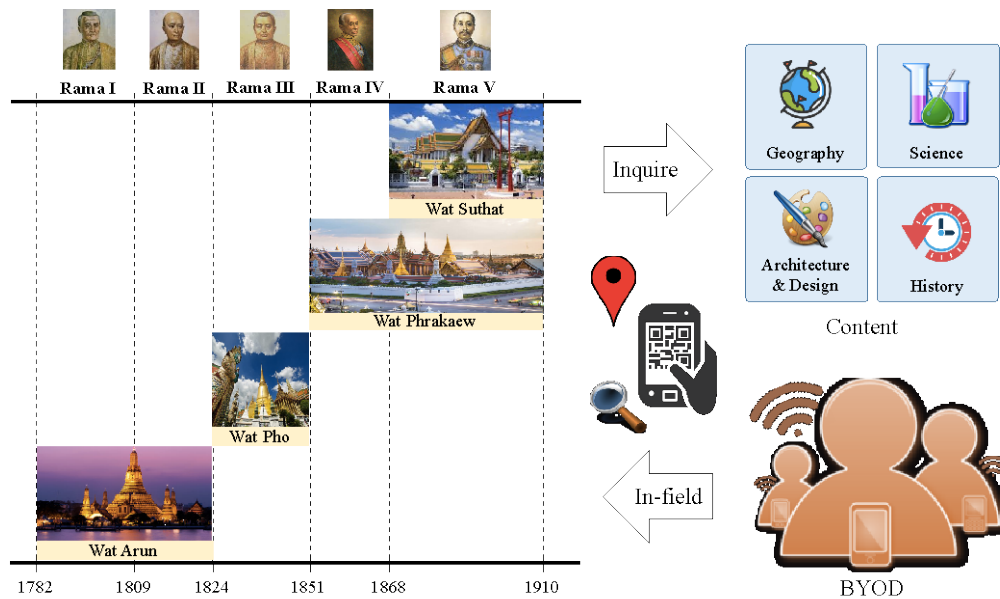


Figure 1. Overall Structure of EFTE.

3.2. Content Analysis

Before designing the BYOD hybrid learning activities, the researchers have gone a rigorous process of content analysis under the scope of history in the early Rattanakosin period. It ranged between 1782-1910 under the reigns of five kings: 1782 to 1809 for King Rama I, 1809 to 1824 for King Rama II, 1824 to 1851 for King Rama III, 1851 to 1868 for King Rama IV, and 1868 to 1910 for King Rama V. To reflect and understand the history during that period, the contexts of four temples, i.e. Wat Arun, Wat Pho, Wat Phrakaew and Wat Suthat, are selected to best visualize the story through many relevant subjects of Geography (GEO), Science (SCI), Culture (CLT), Architecture and Design (AnD), and History (HTR), as presented in Table 1.

Table 1: Content analysis of early Rattanakosin period used in EFTE.

Temple	Reign	Content)Subject(
Wat Arun	Rama I	In front of Wat Arun on the Chao Phraya River named its pier as Thaprajan)Pier of Moon(and Thapraarthit)Pier of Sun(in ordered to consistent with Hindu cosmology. -- <i>GEO</i>
	Rama II	The King has molded the Buddha's statue of the Buddha, and bring the Buddha to preside over the temple of Wat Arun. -- <i>AnD</i>
Wat Pho	Rama III	The King appointed Wat Pho as the center of education and take the Thai massage inscription at the temple. So Wat Pho is the place to learn massage. -- <i>CLT</i>
Wat Phrakaew	Rama IV	The King was trying to develop the country with the science of Western knowledge. There appeared a statue of the constellation Zodiac of the solar in Wat Pho. -- <i>SCI</i>
	Rama V	The King expanded his political influence to Khmer. Khmer built Khmarin Palace. Building due to representation of the royal authority of the Khmer kings that did not colonized by the power of Siam. From their location, architecture was quietly similar to the Grand Palace in Siam. -- <i>HTR</i>
Wat Suthat	Rama V	The King was graciously pleased to build the Chakri Maha Prasat Throne Hall)Located in the area of Wat Phra Kaew(. The roof of the building as Thai architecture, and for buildings are a form of the West. -- <i>AnD</i>

3.3 Design of Learning Missions

Upon the completion of the content analysis, the learning activities are now designed by taking four temples as visiting sites in EFTE. At each site, the students are required to work on three missions to

inquire the knowledge of early Rattanakosin period (A1-A3 for Wat Arun, B1-B3 for Wat Pho, C1-C3 for Wat Prakaew and D1-D3 for Wat Suthat). Hence, there are 12 missions in EFTE, as shown in Table 2. Each mission is associated with a range of subjects content behind, which can be accomplished with certain skills (critical thinking, creative thinking, and logical thinking).

Critical thinking skill (CTC) is that mode of thinking about any subject, content, or problem in which the thinker improves the quality of his or her thinking by skillfully analyzing, assessing, and reconstructing it. Creative thinking (CRT) is thinking about new things or thinking in new ways. Logical thinking (LGC) is thinking based on proven knowledge and information that is accurate and certain (Knight, 2005).

Table 2: Missions design for hybrid learning at visiting sites.

Code	Mission	Subject	Skill
A1	What is the relationship between Wat Arun and the establishment of Rattanakosin Kingdom? Please take 3 photo which express its relationship to the establishment of Rattanakosin Kingdom with the explanation of photos.	GEO HTR AnD	CTC
A2	For the second question, take a photo of painting, architecture or Buddha status in Wat Arun, and discuss the value, story of the photo that you choose.	AnD	CRT LGC
A3	Why Wat Arun pagoda's considered as the landmark of Rattanakosin period, and discuss what is the joining belief between Wat Arun pagoda-Tha Prajan-Tha Praarithit pier.	GEO HTR CLT	CTC LGC
B1	Why does the cosmology's diagram picture is appear on the chapel wall. Please take a photo and discuss the association between knowledge in the Reign of Ayutthaya Kingdom and King Rama IV of Thailand.	HTR SCI	CTC LGC
B2	The reclining buddha is considered as the landmark of Wat Pho. So where's an appropriate zone for seeing the Buddha. Please draw or sketch that picture from the zone that you choose.	AnD	CTC CRT LGC
B3	Make a video clip of teaching massage. And discuss about the history of Wat Pho massage.	HTR SCI CLT	CRT LGC
C1	Please make the history of the emerald Buddha and the seasonal attire of Wat Phra Kaew)In the form of Infographic(.	HTR SCI CLT	CRT
C2	What is the relation between Wat Phra Kaew and Khmer Kingdom? -Painting of on the Ramayana at Wat Phra Kaew's wall. -Khemarin Palace-Angkor Wat. Please discuss in the term of history.	HTR AnD	CTC LGC
C3	What is the meaning of Farang Suam Chada, the crown which thai people mostly called? Please take a photo of it and explain its history.	HTR AnD	CTC

Code	Mission	Subject	Skill
D1	Get the QRcode from teacher and the question is "What is Rang Wat Sra Ket Pret Wat Suthat? Please give an explanation.	GEO HTR SCI	CTC LGC
D2	What is the history of Sri Sagayamuni Buddha status? Where is it located in this chapel?	HTR	CTC LGC
D3	Please draw the wall painting in Wat Suthat chapel, and discuss about history, story and value of your drawing.	HTR AnD	CRT

By working on the missions, the students are engaged to aware the context of the visiting sites and motivated to learn upon the missions to be received and to be accomplished on their mobile devices. These guided-inquiry learning activities facilitate them to explore by searching and asking surrounded people and attain a deeper understanding of the content under the in-field social study. Moreover, they also share and discuss knowledge within the team and finally, construct their knowledge via collaborative inquiry community.

For example, mission B3 requires the students to explore the history of Wat Pho massage. As in the process with CRT and LGC, the students may discuss with the team how to explore this and who can explain us. Furthermore, the mission asked the team to make a video clip of giving massage to a friend. This encourages the team to apply what they have learned in the real context. The results of this mission are recorded for further discussion and scaffolding. Note that this mission incorporates HTR that the students understand the political history during Rama I-IV reigns, SCI that students integrate massage onto the body system, and CLT that Thai massage now becomes the cultural treasure.

3.4 Development and Learning Process

To facilitate the proposed hybrid learning for EFTE, several learning materials were developed for teachers and students with a wide range of educational technologies. There are four different sets of learning materials according to the visiting sites. Each set includes 1) QR codes for entering the learning activities from any QR readers, 2) Google Forms for presenting learning missions and collecting answers/works, 3) Video clips on Youtube for engaging students in the learning missions, which were recorded at the sites, edited and subtitled by the researchers, and 4) Quiz on EdPuzzle for evaluating the students' understanding with multimedia-based online MCQs. Note that students can access and work on all materials with their mobile devices, while some may share Internet access with others. Some of the learning materials are presented in Figure 2.

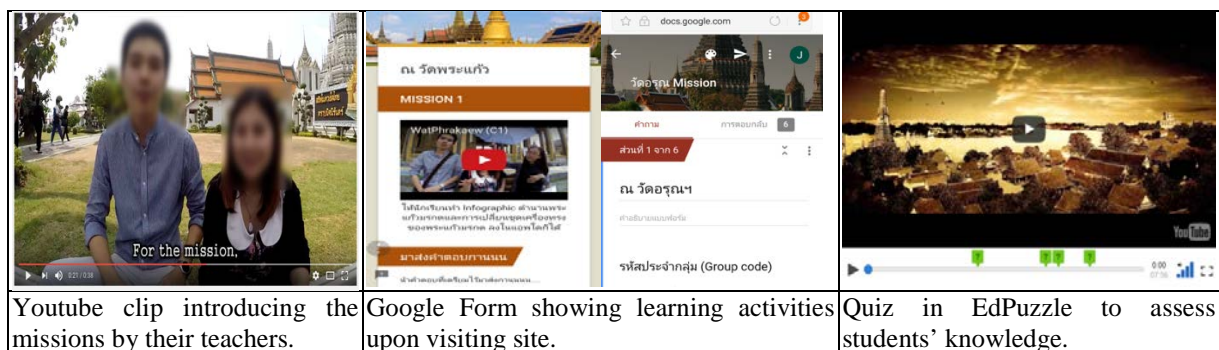


Figure 2. Learning Materials Examples.

EFTE practices collaborative learning among students where as the teachers play the role of trip facilitators. The learning process of EFTE can be broken down into three major phases as follows.

Pre-field: A brief introduction to EFTE is given to all students before the field trip. Teachers also demonstrate how to get the link from taken photos, recorded video clips and assignment files.

In-field: Before visiting, students are divided into groups of three members, and each group is assigned to the sequence of visiting the temples (60 mins for each); in the meantime, teachers proceed to the temples with QR code for final preparation. Once visiting, each group of students is introduced to the temple by reading the QR code, followed by working on the learning missions on mobiles. At this moment, students are collaboratively working to accomplish the missions on site. The trip is finished after each group rotates to visit all four sites.

Post-field: The face-to-face discussion is held in the classroom to finalize what the students have gathered from the trip to make the historical timeline of the early Rattanakosin period. In the beginning, each group presents their works. The teacher then post the discussion points with question word What?, How?, Why? and What if? to help to activate student's critical thinking. Students can search more information from the internet if needed. Finally, the students are requested to reflect their understanding of the timeline. This is essential whether or not they can hybrid everything in reflecting the history story; consequently, the evaluation is made on EdPuzzle quiz.

4 Evaluation and Results

Due to the summer break at ESC (May ~ June), there were only six students (two groups) participating in the trial phase of evaluation. Although the statistical tests would not be performed for significant impact, the results of this study much rely on descriptive feedbacks, which could be used for further improvement.



Figure 3. Some of EFTE Learning Activities.

Based on the submitted works and presentations of EFTE activities, a simple evaluation was done by the teachers based on the scoring rubrics shown in Appendix. As shown in Table 3, it was found that both groups scored 63.44 and 67.19 out of 100, and they could not complete all missions. This could be implied that the missions were quite difficult and needed more time to accomplish.

Table 3: Results of evaluating works of EFTE activities.

Group	Score		Missions accomplished											
	M	SD	A1	A2	A3	B1	B2	B3	C1	C2	C3	D1	D2	D3
1	63.44	11.18	o		o	o		o		o	o	o		o
2	67.19	8.12	o		o		o	o	o		o	o		o

To assess the satisfactions of the participating students, we asked them to answer two simple questions on the questionnaire: 1(Do you like EFTE project? Why? And 2(Do you dislike EFTE project? Why?

After the analysis, we found that EFTE were in their favor, while some of them were not. Moreover, they supplied the answers with their reasons and feedbacks, as revealed in Table 4. Consequently, this results showed that they preferred learning in this style, in which some activities could be revised.

Table 4: Reasons supplied in answering the satisfaction questions.

Dimension	Positive	Negative
Environment	- It was the real situation in-field.	- The temperature was very hot.
Technology	- I used the internet for searching.	- I could not find the data from internet.
Learning	- This style of learning was better than lecture in classroom. - I engaged a lot during the mission. - I learned history by myself. - It is the new way of learning with fun. - I was observing the things around me.	- I only need to complete the mission. - I had got the wrong data from searching.

In addition to that, we adopted some of the questionnaire items from (Hwang, Yang, & Wang, 2013) to assess the cognitive load on the students. As shown in Table 5, it was found that the learning activities in EFTE appropriately accommodated the students' cognitive capacity. Nevertheless, further exploration beyond the results presented in this initial study is suggested.

Table 5: Results of cognitive load.

Items	M	SD
1. I felt frustrated answering the questions in this learning activity.	2.13	0.64
2. The learning content in this learning activity was difficult for me.	2.63	0.92
3. It was troublesome for me to answer the questions in this learning activity.	2.75	0.71
4. I did not have enough time to answer the questions in this learning activity	3.00	0.76
5. I had to put a lot of effort into answering the questions in this learning activity	3.25	1.39

5 Conclusions and Suggestions

This study attempted to promote the success of learning social study with the in-field activity. Therefore, we adopted the ideas of BYOD to gain more participations and attentions from students. Consequently, the hybrid learning activities were carefully designed. For the actual implementation, a case of one school's social study context has been adopted in this study. The researcher firstly performed a careful analysis of the selected content in considering of hybrid learning activities. Owing to that, in-field learning missions can be made and accomplished on the students' devices. However, to confirm students understand and make relevant among subjects behind the activities, we spend another session in the classroom for their presentations, discussions, and debriefing. Consequently, a simple evaluation was made for initial results for the future improvement of this novel approach.

Based on the results of this initial study, as the teachers, we are thrilled to make further improvement; moreover, the follow-up studies will be conducted. As most students were happy with this style of learning, we consider adding more places into the activities for more challenges; this could increase the success of in-field study. However, some students felt that some learning missions were difficult to understand and could not reflect the story of that place, the researchers will adjust them by discussing with the local people and more experts. To maximize the benefits of BYOD, we consider adding more active missions in the activities; this can be accomplished by their collaboration and a number of mobile applications. Accordingly, the future studies can be the exploration of learning outcome variables, the in-field learning behaviors of the students, the factors affecting the students' learning performance, and the acceptance of this learning method on different school contexts. Moreover, more number of students should be recruited in the future study, and a quantitative analysis can be performed to strengthen the research impacts. In addition to that,

To apply this proposed workshop, EFTE, to your particular contexts appropriately, the researchers would like to provide the brief guidelines for the teachers as follows. First, the content used in this study was specific; therefore, the teachers may need to carefully consider the learning objectives and measurements and adapt to meet our proposed learning activities. This process may require some times to complete. Second, the proposed activities require the trip to certain places for experiencing the real contexts for knowledge inquiry. In case, this is not possible to your situation; you may consider mimicking the contexts in somewhere in the schools or even in the classroom.

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Appendix

Table 6: Scoring rubric for evaluating submitted works in EFTE.

Content Accuracy)score = 60(25 points	20 points	15 points	10 points
	Answer correctly from learning, also can collaborate and criticize the learning’s topic and field trip correctly.	Answer correctly from learning, also can collaborate and criticize the learning’s topic and field trip	Can answer from learning but can’t collaborate, criticize the learning’s topic.	Lightly answer from learning, the answer’s quietly incorrect and can’t collaborate, criticize the learning’s topic at all.
Timeline presentation)score = 40(20 points	10 points	7 points	3 points
	Can present in the form of story rationally, and using language appropriately correct.	Can moderately present in the form of story rationally, and using language appropriately correct.	Discontinuously present, using language inappropriately.	Discontinuously present, using language inappropriately, using informal language.