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DESIGN OF PEDAGOGICAL MOBILE ANCIENT HUMAN SETTLEMENT LEARNING FOR SUPPORTING GEO-HISTORY COMPREHENSION, 21ST CENTURY SKILL THROUGH GOOGLE EARTH APPLICATION

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Abstract

The advancements in educational technology has developed rapidly over the decade. The convenience to access information from online databases has prompted schools worldwide to start

incorporating certain technologies into teaching and learning practices as deemed appropriate. In this research, the Google Earth application was utilized to design learning experiences for Grade 10th students to enhance their comprehension of Geography and History including the 21st century skill, which was achieved from Khok Phanom Di Archaeological site fieldtrip, and assessing learning outcomes by creating the ancient human settlement through the Google Earth application. According to the learning achievement, and the self-assessment of the 21st century skill founded that most of learners could develop the essential skill and gain a deeper comprehension in term of academic comprehension after exploring the PMAG field trip significantly, the statistic significant findings ($p<0.05$). In addition, most of learners could accurately create the ancient maps according to geographical principles, plate tectonics theory, it can be concluded that the pedagogical mobile ancient human settlement learning through Google Earth could support the acquisition of Geography and History knowledge effectively.

Keywords:

Ancient Human Settlement, Mobile Learning, Google Earth

1. Introduction

Geography course is basically considered as the essential fundamental knowledge for Social studies. In addition, it aimed to develop toward the trend technological tool and application because it's necessary to use tools to study and research the physical change in Geography. In the last decade, Geography information systems has continuously developed various potential instrument to support classroom learning through student driven inquiries in many aspects of natural and social domains. In particular, the use of Problem-based learning (PBL) in classroom activity.

The technological education disrupted the barrier in accessible education. In particular, the remote area, IOT, Internet of Things covered and also disrupt those obstacles. Learners can even use smartphone to search any data and knowledge through online database. As learning geography, In addition to GIS, there are various mobile applications supporting Geography education accessibly. For instance, Google map, Google Earth, Map Me, Here We Go, etc. In addition to support learning, it also supports the navigation.

Currently, mobile learning's necessary in every aspect of daily life inevitably. It's considered as an essential part of both virtual and physical learning. By the way, exploring, experiencing in the field can be an absolute advantage. Learners can see and visit in the real world. According to the significance of mobile learning, and field learning, author studied the advantage of hybrid learning between Google Earth application, and field trip in Khok Phanom Di Archaeological site in ordered to stimulate the human ancient settlement during the Pre-historical period.

2. Literature Review

2.1 Ancient Human Settlement Studies

The Ancient human settlements studies is categorized as a part of Archaeological studies. It aimed to study the understanding of human history, adaptation to environments, and the evolution of civilizations, providing insights into human-land relationships, social structures, including the development of technologies and cultures. Tan et al divided the significance of these learning approach as following; Firstly, Understanding Human-Environment Interactions, learners could comprehend in adaptation and transformation, geographical factor, environmental archaeology. Secondly, Unveiling Social Structures and Cultural Development, it comprised of the social organization, division labor. Thirdly, learners could trace the Evolution of

Civilizations(Tan et al., 2022). In addition, these approach could be studied and investigate in other relevant science involved. For instance, nutrition, anatomy, etc.

Learning of human settlement could be traced in various approach. Generally, they were explored through stones, bones, the instruments, or even in the ancient shelter as the evidence. Tan et al studied the human settlement using the environmental preference as the conditional criteria(Tan et al., 2023). Similar to Dong et al, In addition to the environmental issue, the agriculture remained as a significance evidence which's impact on the cultural expansion(Dong et al., 2013). Nevertheless, research concerning settlement dynamics is mainly based on data from archaeological field survey. Li et al opined that data from archeological excavation's considered as the essential information to studying the accuracy(Li et al., 2022). According to the example, and trend of archeological studies, they are necessary to be supported by the technological advancement.

2.2 Mobile Learning & Google Earth

Mobile learning can be defined as "any educational provision where the sole or dominant technologies are handheld or palmtop devices". Traxler also defined as anywhere and anytime learning that is supported by mobile devices which learners use to access the content (Traxler, 2014). In addition, there are various significance of those learning approaches. First, It corporate education, it has become the norm to own multiple devices and use them for different activities. Second, It support learning interaction, Mobile devices can be used for a blended learning approach. Third, It encourage motivation in learning. Lastly is the real time feedback(Sarrab, 2012). Nevertheless, there are some opposite site, Traxler divided it into 3 aspect. For instance, learning distraction, lack of internet connection, and size of device(Traxler, n.d.).

Google Earth is a web-based virtual globe that has seen increasing use over the past five years as a teaching tool and learning resource for geography, earth and environmental science students(Schaaf et al., 2012). This virtual web-based learning's considered as the enable tool supporting learning. Rocky Alfatikh et al use Google Earth to explores some of the potential uses of Google Earth in sustainable development education(Rocky Alfatikh et al., n.d.). Owing to their convenience to explore map, learners could use it as appropriate. Google Earth could enhanced learning achievement in particular Geography(Thankachan & Franklin, 2013). However, there are not only increase in knowledge's content, but also increase interactivity among user.

Device's considered as a necessary tool in our daily routine without doubt. In particular, the education. The common device were used in learning Archaeology extensively. Ibáñez-Etxeberria et al studied the effectiveness of mobile device supporting Archaeological learning through learner's satisfaction(Ibáñez-Etxeberria et al., 2014). In addition, they also applied mobile device into tourism in the cultural heritage around Europe. In addition to the education, tourism sector, Hölscher used the concept of mobile learning to develop Science Outreach in Archaeological site too(Hölscher, 2020).

3. Description of Overall Framework

3.1 Background and Overall Structure

Exploration in the field trip is an essential learning activity for Social studies, students explored the real world archaeological site to learn History, Archaeology through ancient antique. Mobile learning was applied to assist learners through studying terrain, geography in the area studies. Learners were assigned to use mobile application creating the ancient human settlement around Khok Phanom Di Archaeological site in ordered to compare with archaeological evidence founded. Khok Phanom Di trip are a required field trip for Grade 10th students in the Engineering Science Classroom, King Mongkut's University of Technology Thonburi.

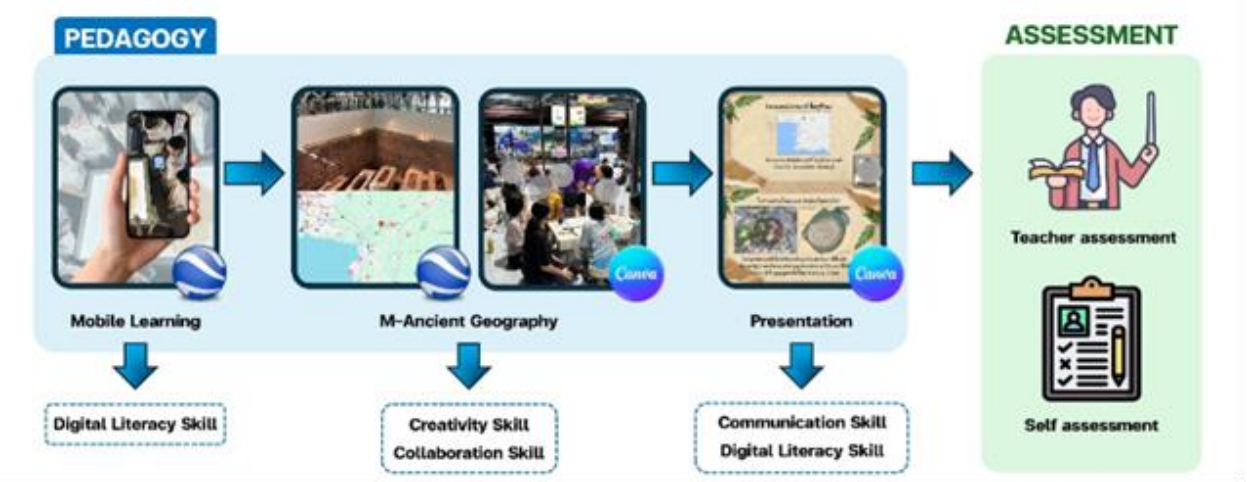


Figure 1. *Framework of Pedagogical Mobile Ancient learning in Geography : PMAG*

3.2 Research Design

3.2.1 Participants

79 students in Grade 10th of Engineering Science Classroom, King Mongkut's University of Technology Thonburi were participants in this study. All participant enrolled in ESC416 The Ancient Civilization course. All participants already learned the historical of ancient human settlement and the plate tectonics. As well as the participant was trained Google Earth before joined the field trip in the area of Khok Phanom Di Archaeological site, Chachoengsao Province, Thailand for 3 days and 2 nights.

3.2.2 Procedure

The pedagogy process of this study will start with all of participants enrolled in the ESC416 course. After that, the processes were divided to 4 part which were presented in figure 2-3.

Figure 2. *The process of PMAG in part 1-3*

Part 1 will start with all of participants learned the history of ancient human settlement and geographical changes caused by the movement of plate tectonics in the classroom (A). The use of Google Earth applications was trained for students before the trip (B). In part 2, will start with all participants participating in a field trip for 3 days 2 nights. During the field trip all participants assigned to the group and explored on the geographical changes of the area from the past to the present. Data collection by using information on internet and the Google Earth application on their mobile phone (C). After that, part 3 will start with participants brainstorming to explain the relationship between ancient human settlements and geographical changes using data from their exploration (D). Then, created the ancient human settlements map (E). After that, all participants will designed the online presentation to present their exploration to teacher and peers (F). Finally,

part 4 will start with teacher evaluation the participants work. At the same time, the participants conducted self-assessments after completing the activity.

Figure 3. *The process of PMAG in part 3-4*

3.2.3 Data Collection and data analysis

The data collection in this study were divided into 2 forms: First, the teacher evaluates participants based on their work and presentation, considering their ability to use the application on mobile devices to search the information and collected data for drawing an ancient human settlements map based on geographical changes. In order to confirm that the participant have gained a comprehension of geography, have developed digital literacy skill, and can effectively communicate their information as well as creativity and critical thinking skill. In this assessment it will be evaluated following the rubric score. Second, ability to use google earth on mobile device, ability to comprehension in geography as well as comprehension to the relation between ancient human settlements based on geographical changes and collaboration skill form self-assessment before and after participating in the field trip. Using self-rating on a scale of 1-5 in each questionnaire. Finally, all of data will be analyzed by statistical program using t-test.

4. Result and discussion

4.1 Learning Achievement by Teacher Evaluation

Based on the evaluation of participants' work and presentations to assess their digital literacy, communication skills, critical thinking and creativity skills. It was found that most of student able to be drawing an ancient human settlement map from exploration using google earth applications on mobile devices very well (Figure 4). The information used to explain the map was accurate, and participants were able to present the data clearly, concisely and in a way that was easy to understand. Students achieved an average score as shown in table 1.

Figure 4. *An ancient human settlement map from some student group*

Table 1. *Learning Achievement Score by Teacher Evaluation*

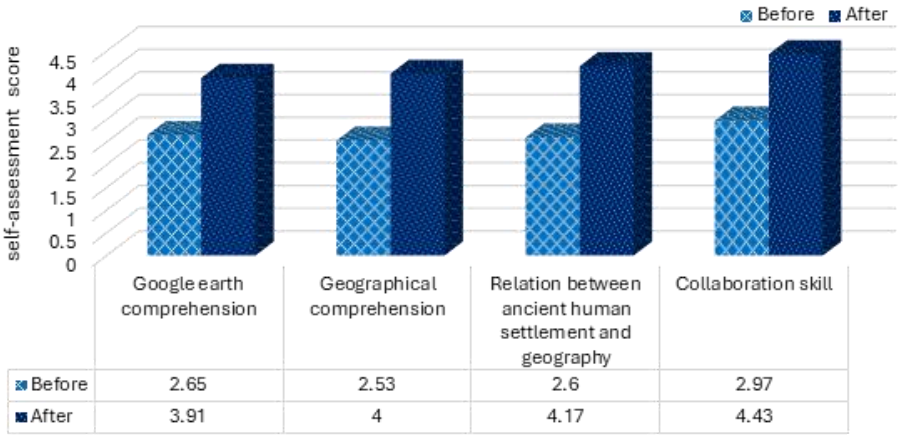
Items	Mean score (10)	n
Digital literacy skill	8.37 ± 0.07	79
Communication skill	8.75 ± 0.05	79
Critical thinking skill	7.79 ± 0.11	79
Creativity skill	9.71 ± 0.21	79

4.2 Student- Self Assessment Score

Based on the self-assessment results of student before and after participating field trip (Table 2). It was found that most student perform at the higher score of learning achievement after participating in field trip. It means that student able to develop their skill after joined the trip (figure

Table 2. *Students' self-assessment score*

Skill	Experiment	*n*	Mean±SD	*t*	P
Google earth comprehension	Before	79	2.65 ± 0.78	11.25	*<0.001*
	After		3.91 ± 0.81		
Geographical comprehension	Before	79	2.53 ± 0.86	12.15	*<0.001*
	After		4.00 ± 0.83		
Relation between ancient human settlement and geography	Before	79	2.60 ± 0.82	12.37	*<0.001*
	After		4.17 ± 0.72		
Collaboration skill	Before	79	2.97 ± 0.52	11.42	*<0.001*
	After		4.43 ± 0.22		



	Google earth comprehension	Geographical comprehension	Relation between ancient human settlement and geography	Collaboration skill
Before	2.65	2.53	2.6	2.97
After	3.91	4	4.17	4.43

Figure 5. *Student's self assessment score*

5. Conclusion

In this study, authors designed the Pedagogy which applied M-learning to support learning in Khok Phanom Di Archaeological site through Google Earth application. From the results can conclude that most student are able to use application on their mobile phones such as a google earth application as a tool to help them study in geography, archaeology and history. In addition, it can be inferred that PMAG, Pedagogical Mobile Ancient learning in Geography develop the 21st century skill. In particular, Creativity skill and Communication skill.

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