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The Influence of Mobile Technology-Assisted Flipped Classroom Model on Student Learning Outcomes of Map Read Material

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ABSTRACT: This study aims to determine the effect of using the flipped classroom learning model assisted by mobile technology on the learning outcomes of Infantry Officer School of Indonesia Marine Corps students about reading maps. Officer graduates are required to have a good understanding of the concepts in each topic related to assignments. The ability to read maps is a top priority that must be mastered by the marine corps in war military operations. Time allocation in class is not enough for mastering the concept of map reading. It takes more time to master the material for the soldiers. The use of mobile technology provides access for Marine Corps students to additional study time online. The research method used is quasi-experimental or quasi-experimental using t-test data analysis techniques. The research design used a static group comparison design. Comparing the two groups that were taught using the flipped classroom model assisted by mobile technology and the conventional model. The subjects of this research were 133 students of Marine Corps Officer Formation Education at the Advanced Stage (Sargolan) who were divided into two groups, namely the experimental group of 67 students and the control group of 66 students. The findings in this study indicate that students who are taught with the flipped classroom model assisted by mobile technology obtain a better average learning outcome score. The flipped classroom model with the help of mobile technology is very suitable for Marine Corps Officer Formation Education students at the Advanced Class Basic Stage (Sargolan).

KEYWORDS: Flipped classroom, mobile technology, marine, learning outcomes

I. INTRODUCTION

The Marine Corps Infantry Officer School is an education that forms Marine Corps officers who are expected to be able to lead platoon-level troops both in daily service in units and operational tasks. The Education Curriculum for the Formation of Marine Corps Officers (Diktukpa) emphasizes that this educational institution aims to educate and equip prospective Marine Corps officers to become soldiers who fight and have the physical ability and professionalism of marine dimensions with knowledge and technical and tactical skills in the infantry field. Based on the formulation of objectives, 3 aspects must be possessed by graduates, namely: 1) personality aspects, 2) physical aspects (physical fitness), and 3) professional aspects (knowledge and skills of techniques and weapons tactics). Apart from being required to be able to lead his subordinates in assignments, he is also expected to be a teacher for his subordinates to educate and train professional skills whose implementation is in the form of Danton Clock.

Danton Clock is a scheduled time in a Unit that is a vehicle for platoon-level leaders to teach and train their subordinates on various weaponry materials and at the same time a vehicle to increase the solidity of their units so that they are better prepared to support each assignment. For officers to be able to educate and train their subordinates, the main requirement is the importance of mastering techniques and tactics according to the field of assignment. Mastery of techniques and tactics begins with understanding the concept of professional material needed in the assignment. Without mastering professional material, it is very difficult for an officer/Platoon Commander to educate and train his men. Besides that, regarding the competencies that must be mastered by Platoon Commanders, which in this case is the ability to make decisions, Platoon Commanders need to master skills in problem-solving, especially problems related to tasks within the unit.

So that graduates of Officer Formation Education (Diktukpa) are expected to have a good understanding of concepts in every topic related to their duties. Map Reading Material is a priority that has domination in every assignment, both in Military Operations for War (OMP) and Military Operations Other Than War (OMSP). Compulsory subjects that are included in the Diktukpa curriculum are included in the core classification and must be mastered in theory and practice by every Marine Corps Diktukpa student are map reading subjects. The Map Reading Subject provides theoretical and practical provision for every Marine soldier, because it is closely related in every assignment, both in training activities carried out by units to increase their professionalism and in every implementation of actual operational assignments. The ability of soldiers/students to apply map reading will greatly determine their success in assignments, especially when moving to an area of operation that is foreign to them. Even though in this modern technological era it is possible to use sophisticated equipment to determine a location with high

accuracy, the subject of map reading as a basic science is still given to every student so that graduates are more likely to survive in the worst possible situation in carrying out assignments.

Map reading is one of the skills that must be mastered by every Platoon Commander, to be able to maneuver or find targets on the assignment field by the Operational Orders given by the Upper Unit. For students to have these skills, the Marine Diktukpa curriculum is given a Map Reading subject which outlines the theory and practice of how to determine places on a map or the terrain using the coordinates of a topographic map. Mastery of theory is very important in supporting students' abilities when practicing map reading. As a basis for students to practice, mastery of the material for reading maps must be mastered seriously by students. In the Map Reading Instruction Package Book for Marine Corps Diktukpa Students published by the Education and Training Doctrine Development Command (Kodiklatal), it is emphasized that the purpose of the Map Reading subject is to educate and equip students with the Map Reading Subject to have knowledge and skills on how to determine a place with the coordinates of a topographic map so that it can apply in service as an Infantry Platoon Commander or other positions at the same level. By the objectives of the subject, each student is expected to be able to understand theoretically and then be able to apply this theory in practice in the field using topographical maps and a compass to determine/find a location/coordinate on the actual terrain according to the problem. Two competencies that must be mastered by students are 1) theoretically being able to solve the problem of reading maps correctly, and 2) being able to read a map properly to find coordinates on the actual terrain. This research was conducted to emphasize the first competency, regarding solving the problem of reading maps correctly theoretically.

Efforts made to increase the understanding of the concept of reading maps were carried out by instructors during class learning using learning resources in the form of Instruction Packages available at the institution. The learning process in the classroom generally uses the media in the form of PowerPoint containing a summary of the material presented using the lecture method as well as questions and answers and practice to apply the theory that has been taught. Some of the obstacles that occur when students carry out field practice (practical exercises) to apply the theory that has been accepted in class are that there are still many students who do not understand the theory of map reading, whereas, in the last three batches, an average of 35% of students have not understood the concept of map reading material. , especially material that is mathematical (calculation) so errors occur in the process and result in not being able to find the correct coordinates. Some of the causes that can be identified based on the researchers' preliminary observations carried out at the Infantry Officer School of Indonesia Marine Corps are 1) sourced from the curriculum, namely the lack of relevance between determining the time allocation in the curriculum and the material load that students must master; 2) sourced from activities outside of academics, but must be carried out by students, namely protocol activities that can reduce student learning time in class. Both of these results in limited student learning time in class when faced with learning objectives that expect students to be able to understand map reading very well.

Additional study time is not available for the learning process in class, because the curriculum has determined the time allocation for map reading material. However, the additional time is in the form of independent learning by students whose material will be sent online by the teacher to be studied at home before the implementation of learning in class. So that when studying in class students are more prepared and confident because they have studied before. Based on some of these real problems and conditions, a learning model is needed that can increase student learning time and optimize scheduled time in class to make the student learning process more substantial and achieve maximum learning outcomes. The learning model used by researchers, in this case, is the Flipped Classroom method. The flipped classroom is the opposite of the conventional class and is also called the reverse class. Several previous studies have shown that flipped classrooms can improve student learning outcomes. Research conducted by Juniantari, Pujawan, and Widhiasih (2019) shows that students' understanding of mathematical concepts using the flipped classroom method is higher than that of students participating in conventional learning. In other words, the reverse class approach has a positive impact on students' understanding of mathematical concepts.

Two strong elements in the flipped classroom are using technological media as learning media outside the classroom and building interactive and communicative learning while in the classroom (Zappe, Leicht, Messner, Litzinger & Lee in Halili & Zainuddin, 2015: 3). The rapid development of technology has changed learning patterns, which inevitably have to utilize information and communication technology that is connected to the internet, as one part of the learning resources or media used. Technology products that can be utilized include cellular phones, tablets, and laptops which are further categorized in this study as mobile technology. Mobile technology is a collective term used to describe various types of mobile communication technologies that are practical and highly mobile. According to Genc in his article entitled Analysis of Documents Published on Mobile Technology of Hearing Impaired in Web of Science Database the concept of "mobile" which is loaded with communication technology, is used in the sense of wireless communication, mobility, and portability. Portable devices that provide quick access, use, and processing of information are generally in the form of tablet computers, smartphones, and MP3 players (Odabasi, et al, 2009 in Genc: 2020: 170). In implementing this model, researchers use mobile technology in the form of cell phones (smartphones) owned by students as a device for accessing subject matter, both in the form of learning videos and other learning materials uploaded by instructors online via Google Classroom or WhatsApp groups.

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The choice of using a cell phone as a learning tool is based on the consideration that each student has a device that is capable of computing and can be connected to the internet. This is also supported by regulations that apply in educational institutions that students of the Formation of Officers Education stratum are allowed to carry and use cell phones to support learning activities. With the implementation of the flipped classroom model assisted by mobile technology, it is hoped that it will be able to strengthen and improve learning outcomes for students' understanding of the concept of reading maps. In line with the efforts to realize graduates of the Marine Diktapa mandated in the education curriculum, and the real conditions of problems in implementing learning, the author is interested in researching the effect of the mobile technology-assisted flipped classroom model on understanding concepts and material Reading Maps for Marine Officer Formation Education students.

II. METHODS

The research method used is quasi-experimental or quasi-experimental using t-test data analysis techniques. The research design used a static group comparison design. Comparing the two treatment groups being taught using the flipped classroom model assisted by mobile technology and the conventional model. The subjects of this research were 133 students of Marine Corps Officer Formation Education at the Advanced Stage (Sargolan) who were divided into two groups, namely the experimental group of 67 students and the control group of 66 students.

The data collection method used in this study uses tests that are used to measure learning outcomes in understanding the concept of reading maps from research subjects. The learning outcomes test instrument uses multiple choice test questions on the material for understanding the concept of reading maps. The test instrument was prepared to refer to the indicators of conceptual understanding put forward by Krathwol and Anderson (2002) in the Revised Bloom's Taxonomy which includes (1) interpreting; (2) setting an example; (3) classifying; (4) summarizing; (5) conclude; (6) compare; (7) explained. The data analysis technique used in this research was to compare the experimental group and the control group using the t-test.

III. RESULT AND DISCUSSION

The results of data analysis by comparing the two groups, namely the experimental and control groups in (table 1) show that the average acquisition of students who are taught using the mobile technology-assisted flipped classroom model shows better learning outcomes compared to the group taught with the conventional model. Based on the calculation of the independent sample t-test in (table 2), it shows that the significance of the t-test for equality of means is p = 0.000 <0.050. It can be concluded that the flipped classroom model assisted by mobile technology affects learning outcomes for understanding the concept of reading maps.

Table 1. Differences in the Value of Learning Outcomes Understanding Concepts

Group Statistics		
	Concept Understanding	
	Learning Model	
	Flipped Classroom Model	**Convensional**
N	67	66
Mean	14.97	13.58
Std. Deviation	1.705	1.890
Std. Error Mean	.208	.233

Table 2. Independent Sample Test Results Learning Outcomes Understanding Concepts

			Concept Understanding	
			Equal variances assumed	**Equal variances not assumed**
Levene's Test for Equality of Variances	F		.934	
	Sig.		.336	
t-test for Equality of Means	t		4.469	4.465
	df		131	129.219
	Sig. (2-tailed)		.000	.000
	Mean Difference		1.394	1.394
	Std. Error Difference		.312	.312
	95% Confidence Interval of the Difference	Lower	.777	.777
		Upper	2.012	2.012

The findings in this study indicate that students who are taught using the flipped classroom model assisted by mobile technology have better learning outcomes than students who are taught using conventional learning models. The use of the technology-assisted flipped classroom model can have a positive influence on students (Mehring, 2017). Student understanding can be influenced by the teacher's role in flipped classroom learning as a reinforcement of the concepts mastered by students. Flipped classrooms can accommodate more interactions between teachers and students (Lag & Saele, 2019). Interactions that lead to closer relationships between teachers and students can improve student academic achievement (Robinson, Scott & Gottfried, 2019).

Understanding of a concept can be strengthened by supporting students as well as possible in managing the material to be analyzed by students. The use of mobile technology can amplify observations or experiences by supporting their presence, capture, or management (Spector, 2013). In addition, mobile technology can be used as a tool to expand thinking that has the potential to assist students in making deeper connections between their daily lives and knowledge construction (Spector, 2011). Assisted by technological devices can make it easier for students to understand learning material will support the convenience of students. Devices in mobile technology will be very helpful if used in learning activities (Arianto, 2016).

Flipped classroom implicitly includes the use of technology for learning outside the classroom (Herrald & Schiller, 2013). Flipped classrooms allow students to learn at their own pace, encouraging students to actively engage with lecture material, and freeing up real class time for so much more (Gilboy, Heinrichs, & Pazzaglia, 2015; Betihavas et al., 2015). With students controlling their learning, students can measure their conceptual understanding. Using the flipped classroom model allows students to be responsible for their learning (O'Flaherty & Phillips, 2015). To obtain an even better understanding of results, it is recommended that the flipped classroom use several mechanisms to ensure student preparation, for example in the form of quizzes before or at the beginning of class (Talbert, 2017).

IV. CONCLUSIONS

There are differences in learning outcomes between students who carry out learning activities using the flipped classroom model assisted by mobile technology and the learning outcomes of students who carry out learning activities with conventional models. Students who are taught with a flipped classroom model assisted by mobile technology get better average learning outcomes. The flipped classroom model with the help of mobile technology is very suitable for Marine Corps Officer Formation Education students at the Advanced Class Basic Stage (Sargolan). Giving more time to apply the model is needed so that students can get used to and better understand the concept of reading maps with the help of mobile technology. Coaching and guidance must be continuously given to students so that they are more mature in mastering theory so that in the future they are more prepared and have stability as Marine Corps Officers who are tough in mastering techniques and tactics on the battlefield

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