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THE EFFECTIVENESS OF MOOCS-BASED SAFETY MANAGEMENT SYSTEM LEARNING DEVELOPMENT

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Abstract

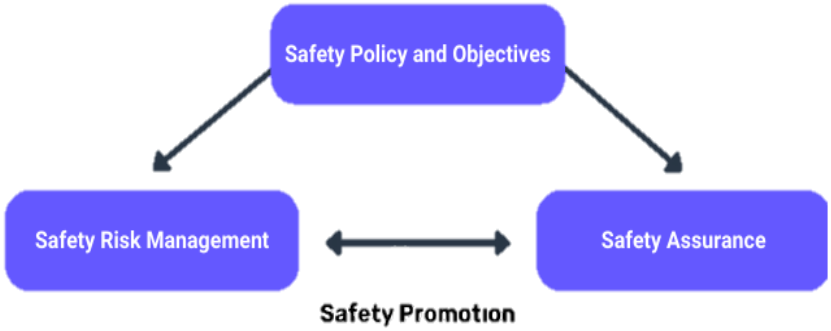
The purpose of this study is to test the effectiveness of the safety management system learning method through MOOCs compared to previous learning methods. This research is a type of quantitative descriptive research. The data collection technique is a non-test technique with a research instrument in the form of a response questionnaire. The data in this study were obtained from primary data sources, namely the results of filling out questionnaires by respondents. The research was conducted at the Palembang Aviation Polytechnic in November 2022. The population in this study was 250 Palembang Polytechnic cadets. The research sample was 105 cadets who took the Safety Management System course, which was taken using a purposive sampling technique. The data analysis technique uses the Paired-Samples T-Test with the help of SPSS software. Results research shows that the value of sig. (2-tailed) is less than 0.05, so H_0 is rejected and Ha is accepted. So it can be concluded that there is a significant difference between the effectiveness of the MOOC-based SMS learning method and the previous learning method.

Keywords Effectiveness; Safety Management System; Moocs

INTRODUCTION

A safety Management System (SMS) is a systematic approach to managing safety, including organizational structure, responsibilities, policies, and procedures (Batuwangala et al., 2018; Martadinata et al., 2021; Poerwanto, 2019). Safety Management Systems (SMS) were introduced to reduce workplace hazards, reduce injuries, and minimize material losses in the construction industry in the 1980s (Triadmojo & Sri Haryati, 2022; Umar et al., 2018; Yiu et al., 2019). The SMS framework consists of 4 elements, namely safety policy and objectives in the form of management commitment and responsibility, safety risk management in the form of hazard identification and mitigation, safety assurance in the form of monitoring of safety performance, and promotion of safety. (safety promotion) in the form of training and education (Adristy et al., 2020; Supriyanto, 2020).

Figure 1. Safety Management System Framework



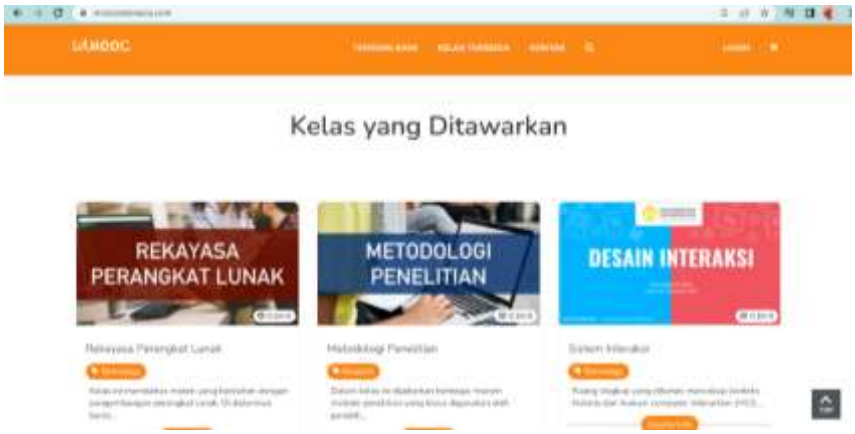
SMS is a management tool developed by international authorities in the aviation industry. Due to the nature of its operations, aviation organizations are required to ensure safety (Gerede & Kurt, 2018; Prinzel et al., 2021). The Safety Management System (SMS) focuses on a systematic approach to identify and deal with risks in an effort to minimize loss of human life, property damage and revocation of flight permits, streamline spending on funds, and reduce adverse impacts on society and environmental damage (Mafaza & Haryati, 2022; Nardo et al., 2020; Nugraha et al., 2020).

Given the importance of the Safety Management System (SMS) in the world of aviation, it is important to develop appropriate learning methods so that cadets have good knowledge regarding the Safety Management System (SMS). One of the learning methods being tested is the safety management system learning method through MOOCs.

Massive Open Online Courses (MOOCs) are the newest model of distance learning. MOOCs target an unlimited number of participants and open access via the website (Margaryan et al., 2015; Utomo & Rosmansyah, 2020). In other words, Massive Open Online Courses or better known as

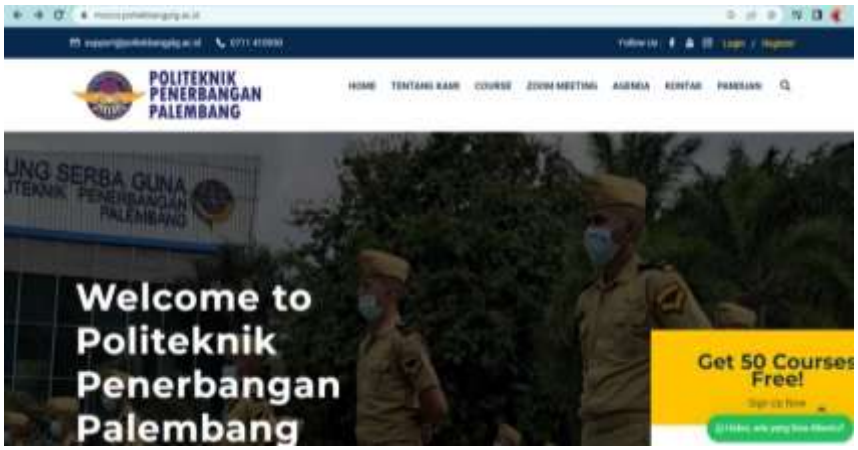
MOOCs are virtual learning methods that are open, apply on a large scale and can be accessed by anyone (Awang et al., 2021; Risdianto, Yanto, Kristiawan, et al., 2021; Wiliyanti et al., 2022). Even though this MOOC comes from a foreign country, Indonesia itself, recently there have been several MOOC models that can be accessed via the Website (Maqbul, 2020; Risdianto, 2021; Zhussupbekov, 2015).

Figure 2. One of the MOOCs Websites in Indonesia (https://moocindonesia.com/)



At the Palembang Polytechnic, the MOOCs system was developed, but not much material was available and not many lecturers used it.

Figure 3. Display of MOOCs Poltekbang Palembang



The development of MOOCs-based safety management system learning that has been carried out must be continued by testing whether the method is truly effective. There are several previous studies that are relevant to this research, including research conducted by Nugraha et al. (2020). In their research, Nugraha et al conducted online safety management system training activities through an e-learning portal for 19 Airport Operations Unit employees. Besides that, there are Praherdhiono et al. (2018) conducted research related to learning using MOOC. In their research

article, Praherdhiono et al. stated that MOOC is an effective learning system to implement. Next therePambudi & Authority (2020) conducted research to determine the effect of the MOOC learning model on student learning outcomes. From this study, it was concluded that MOOC was effective for use in the teaching and learning process in terms of improving student learning outcomes. Then there are Halim et al. (2020), who conducted research to determine student acceptance of the MOOC application at the Public University of Malaysia. In this study, the results showed that the MOOC platform is one of the best examples of platforms for implementing e-learning as a source of active, informative and interactive teaching and learning. Last, there is Puspitasari (2021), who conducted research on learning systems using MOOC. From this study it was concluded that MOOC was effectively used in learning, especially to increase students' motivation and independence.

Some of the previous research described above shows that there has been research on safety management systems and research on the application of MOOC in learning activities. However, there has been no previous research that examines the effectiveness of learning safety management systems using MOOCs. Therefore, researchers conducted research with the aim of knowing the effectiveness of the safety management system learning method through MOOCs compared to previous learning methods.

METHOD

This research is a type of quantitative descriptive research. The data collection technique is a non-test technique with a research instrument in the form of a response questionnaire. The type of questionnaire used is a closed questionnaire because closed statements can help respondents to answer quickly and make it easier for researchers to carry out data analysis and tabulate the results of all the questionnaire results that have been collected. This response questionnaire is used to obtain data related to the response of young people to the effectiveness of developing safety management system learning through MOOCs compared to previous learning models. The research was conducted at the Palembang Poltekbang in November 2022. The population in this study was 250 Palembang Polytechnic cadets.

The data in this study were obtained from primary data sources by distributing questionnaires to respondents. The hypothesis in this study consists of the Null Hypothesis (H0), which states that there is no significant difference between the effectiveness of the MOOCs-based SMS learning method and the previous learning method and Ha which states that there is a

significant difference between the effectiveness of the MOOCs-based SMS learning method and the learning method previously. The data analysis technique uses the Paired-Samples T-Test using SPSS.

Table 1. The instrument for Measuring the Effectiveness of the Development of MOOCS-Based Safety Management System Learning at the Polytechnic of Palembang

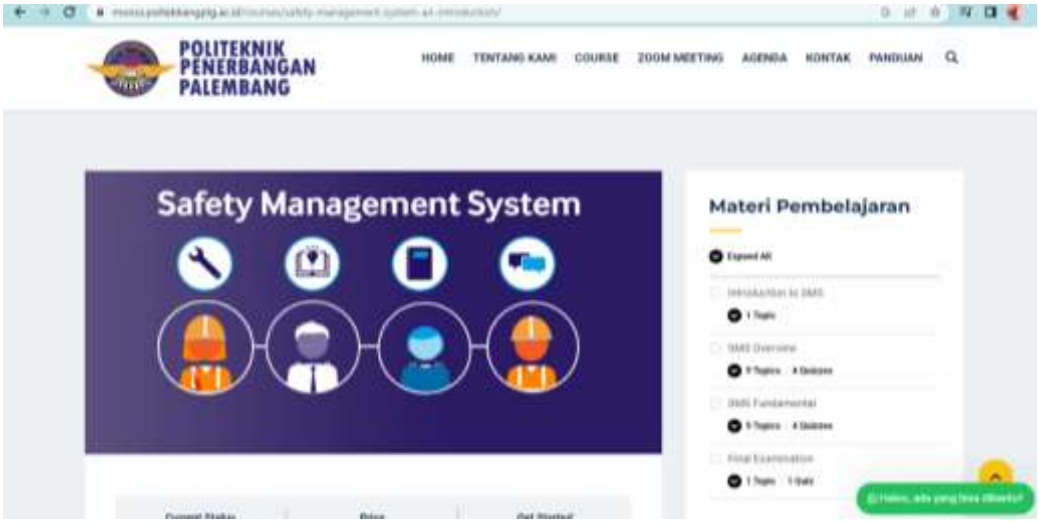
Prior Learning Methods				Aspects	MOOCs-Based SMS Learning Method			
1	2	3	4	Learning Innovation	1	2	3	4
1	2	3	4	Technology Utilization	1	2	3	4
1	2	3	4	Creativity	1	2	3	4
1	2	3	4	Cognitive Ability	1	2	3	4
1	2	3	4	Learning outcomes	1	2	3	4

FINDINGS AND DISCUSSION

Findings

Previously, the development of MOOCs-based safety management system learning had been carried out. This safety management system learning material is included in the MOOCs of the Palembang Poltekbang. The following is a display of the MOOCs-based safety management system learning that has been developed.

Figure 4. Display of MOOCs-Based Safety Management System Learning



In this study, researchers asked trainees to fill out response sheets to find out the participants' responses to the old learning method and the MOOCs-Based Safety Management System learning method. The results can be seen in the following table.

Table 2. Comparison of Old Learning Methods with MOOCs-Based SMS Learning Method

Prior Learning Methods (%)	Aspects	MOOCs-Based SMS Learning Method (%)
71%	Learning Innovation	86%
65%	Technology Utilization	87%
69%	Creativity	85%
70%	Cognitive Ability	80%
71%	Learning outcomes	85%

Based on the comparison table above, it can be seen that the effectiveness of MOOCs based SMS learning method is higher than the previous learning method. The average effectiveness of the previous learning method= 69% and MOOCs based SMS learning method= 85%. To prove the significance of the difference MOOCs based the SMS learning method and previous learning methods, need to be tested statistically with a correlated (related) t-test.

Table 3. Paired Samples Statistics

		Means	N	std. Deviation	std. Error Means
Pair 1	Old Method	13.8571	105	.97496	.09515
	New Method	16.9619	105	1.36525	.13324

Table 3 shows that the average score for the new method (MOOC-based SMS learning method) is higher than the average score for the old method. In addition, the distribution range of the new method's score data is also wider and with a higher standard error.

Table 4. Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Old Method & New Method	105	003	.975

To proceed to the T-Test result interpretation stage, make sure the two data (variables) are not correlated. The basis for the decision is that if the Sig. > alpha 5% (0.05), it can be concluded that the two data (variables) are not correlated. From table 4 it can be seen that the value of Sig. of 0.975 which means it is greater than 0.05 so that the process can proceed to the T-Test result interpretation stage.

Table 5. Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Means	std. Deviation	std. Error Means	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Old Method - New Method	-3.10476	1.67518	.16348	-3.42895	-2.78057	-18,992	104	.000

The basis for decision making is based on the level of significance, if the probability/significance level is > 0.05, then H_0 is accepted, and if the probability/significance level is ≤ 0.05 then H_0 is rejected. From the table above it can be seen that the sig. (2-tailed) of 0.000 which means less than 0.05. Based on the basis of the decision, then H0 is rejected and Ha is accepted. This means that there is a significant difference between the effectiveness of the MOOCs-based SMS learning method and the previous learning method. It is also supported by the data in table 2 so that it can be decided that MOOCs based SMS learning method more effective than previous learning methods.

Discussion

The results showed that there were significant differences between the effectiveness of the learning methods Safety Management System (SMS) based MOOCsand previous learning methods, where the MOOCs-based SMS learning method is more effective than previous learning methods, both in aspects of learning innovation, use of technology, creativity, cognitive abilities, and learning outcomes.

The MOOCs-based learning method is a form of learning innovation in courses SMS that utilizes technology in its application. The results of research conducted by (Khojir et al., 2022) also shows that MOOC is effectively used in the learning process because it is supported by technological features such as interaction, collaboration, self-reflection and evaluation systems in accessing learning resources based on knowledge and experience. This of course will affect the creativity of teachers and students.

Based on the results of a systematic literature review conducted by (Pambudi & Wibawa, 2020) in 8 research journals that discuss the effect of the MOOC (Massive Open Online Courses) learning model on student learning outcomes, it is concluded that MOOC learning is also effective and appropriate for use in the teaching and learning process in terms of significantly improving student learning outcomes. This is in line with the results of research conducted by researchers.

CONCLUSION

The research was carried out by giving questionnaires to Palembang Polytechnic students who took the Safety Management System course to find out the effectiveness of the safety management system learning method through MOOCs compared to previous learning methods. The data obtained were analyzed by producing t test sig. (2-tailed) of 0.000, which means less than 0.05. Based on the basis of decision, then H_0 is rejected and Ha is accepted. This means that there is a significant difference between the effectiveness of the MOOCs-based SMS learning method and the previous learning method.

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