Effectiveness of the Implementation of Technology Integration Self-Efficacy (TISE) Based on Integrated Media Smart Class in Improving Intrinsic Motivation and Learning Interests of Air Force Academy Cadets in the Industrial Management Technical Study Program

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ABSTRACT

This study aims to analyze the effectiveness of implementing Technology Integration Self-Efficacy (TISE) based on integrated smart class media in enhancing intrinsic motivation and learning interest among cadets of the Air Force Academy (AAU) in the Industrial Management Engineering study program. The research employs a quantitative approach with a quasi-experimental design using a pretest-post-test control group design. The research sample consists of two groups: an experimental group that underwent TISE and smart class-based learning and a control group that used conventional methods. Research instruments included questionnaires on intrinsic motivation and learning interest, as well as a self-efficacy test. The data were analyzed using parametric statistical tests (paired sample t-test and independent sample t-test) to measure significant differences between the two groups. The results indicate that the implementation of TISE based on smart class significantly improved intrinsic motivation ($p < 0.05$) and learning interest ($p < 0.05$) among cadets compared to conventional methods. Additionally, there was a significant increase in the cadets' technological self-efficacy after the intervention. These findings suggest that technology-integrated learning through smart classes can be an effective solution for enhancing engagement and learning outcomes in military education settings. The implications of this study support the development of technology-based learning models in vocational education institutions, particularly in improving the quality of education in the digital era.

Keywords: Technology Integration Self-Efficacy (TISE), smart class, intrinsic motivation, learning interest, Air Force Academy cadets.

INTRODUCTION

Information and communication technology development has brought significant changes in the world of education, especially in learning methods. One of the innovations currently developing is the implementation of Technology Integration Self-Efficacy (TISE) based on integrated media smart class. This technology allows the integration of digital media in learning with the support of sophisticated classrooms and is able to provide an interactive and effective learning experience for cadets. TISE aligns with Kerensky (2001), who stated that the current generation, known as "digital natives," is more adaptable to technology and utilizes digital media in learning. Therefore, implementing TISE in the context of military education is very relevant to increasing learning effectiveness.

Garrison and Anderson (2003) state that technology-based learning can increase student engagement and facilitate more profound understanding, which is crucial in military training. In military education, especially in the Air Force, technology in learning becomes critical. The Air Force requires personnel with strong theoretical knowledge and practical skills that can be applied in real situations. By using Smart Class integrated media, the learning process can be tailored to the specific needs of the military, such as flight simulations, tactical training, and mastery of modern technology used in air operations.

In addition, integrating technology into learning can also increase cadets' intrinsic motivation and learning

interest. In a dynamic military environment, adapting to new technologies and understanding complex systems is crucial. With the implementation of TISE, cadets will be more confident in using technology, increasing their learning effectiveness and readiness to face challenges in the field. Supporting this, Dec and Ryan (2000) stated that intrinsic motivation is closely related to satisfaction and involvement in learning activities, which can be obtained through interactive and enjoyable learning experiences.

At the Air Force Academy, especially the Industrial Management Engineering Study Program, the need to increase intrinsic motivation and interest in learning for cadets is critical to optimize the learning process. High intrinsic motivation and a strong interest in learning will encourage cadets to be active and dedicated in academic activities. Therefore, the implementation of TISE based on the integrated media Smart Class is expected to have a positive impact on these aspects. This is reinforced by Sc-hunk's (2012) statement that a learning environment that supports and facilitates the use of technology can increase cadets' motivation and interest in learning, which is very important in military education.

Considering the importance of motivation and learning interest in military education, it is essential to provide a deeper understanding of how implementing TISE can affect cadets' intrinsic motivation and learning interest, which are key factors in achieving academic success and operational readiness. Second, the results of this study are expected to provide practical recommendations for developing curriculum and learning methods at the Air Force Academy to improve the quality of education and prepare cadets to face the challenges of the increasingly complex military world. Supporting this, Hattie and Kimberley (2007) emphasized that effective feedback and innovative learning methods can improve the learning outcomes of cadets, which is the main objective of this study.

Based on the importance of motivation and interest in learning in the context of military education, as well as the need to understand how the application of Technology Integration Self-Efficacy (TISE) can affect the intrinsic motivation and interest in learning of cadets, a study will be conducted entitled "The Effectiveness of the Application of Technology Integration Self-Efficacy (TISE) Based on Smart Class Integrated Media in Increasing Intrinsic Motivation and Interest in Learning of Cadets of the Air Force Academy Industrial Management Engineering Study Program." Hopefully, this study can provide a deeper understanding of the influence of TISE on the intrinsic motivation and interest in learning of cadets, which are key factors in achieving academic success and operational readiness.

In addition, the results of this study are expected to provide practical recommendations for developing curriculum and learning methods at the Air Force Academy to improve the quality of education and prepare cadets to face challenges in the increasingly complex military world. This refers to Anderson and Don (2011) that the application of technology in education not only increases accessibility but can also enrich the learning experience, which is very important in military education.

In the same context, Siemens (2005) stated that integrating technology in education can create a more adaptive and responsive learning environment to the needs of Cadets, which is the key to preparing future generations to face global challenges. Thus, this study will also contribute to developing science in military education and integrating technology into learning. With valid empirical data, it is expected to be a reference for other educational institutions implementing technology in the teaching and learning process. Therefore, this study is relevant to the Air Force Academy and has broader implications for the development of education in the military environment and higher education in general.

METHOD

This study uses a quantitative approach with a quasi-experimental design through a pretest-post-test control group design to test the effectiveness of the implementation of Technology Integration Self-Efficacy (TISE) based on smart class in increasing intrinsic motivation and learning interest of Air Force Academy (AAU) cadets. The experimental group consisted of 16 cadets from class TMI 1, while the control group consisted of 16 cadets from class TMI 2. The sample selection was carried out by purposive sampling by considering the equality of academic background and access to learning facilities.

The independent variable in this study is the implementation of TISE based on smart class, while the dependent variables include cadets' intrinsic motivation and learning interests. The data collection instruments used consisted of an intrinsic motivation questionnaire (adapted from the Intrinsic Motivation Inventory), a learning interest questionnaire (adapted from the Student Interest Survey), and a technology self-efficacy scale (adapted from the Technology Integration Self-Efficacy Scale). In addition, observations of learning activities were conducted to assess cadet involvement during the intervention process.

The first stage of the study was a pretest, where both groups (experimental and control) were given an initial questionnaire to measure the level of motivation, learning interest, and technology self-efficacy. Next, the experimental group followed TISE and smart class-based learning, which included digital platforms, interactive simulations, and real-time feedback. Meanwhile, the control group followed conventional learning with lecture and discussion methods without special technology integration. After the intervention had been going on for a certain period, a post-test was conducted to measure changes in both groups.

The collected data was analyzed using SPSS with the following steps:

Normality test using Alamogordo-Smirnoff or Shapiro-Will to ensure data distribution.

Test homogeneity with Levelness's Test to verify the equality of variance between the experimental and control groups.

Hypothesis testing uses a paired sample t-test to compare pretest-post-test results in each group and an independent sample t-test to compare significant differences between experimental and control groups. If the data is not normally distributed, non-parametric tests are used (Wilcox-on for paired tests and Mann-Whitney for independent tests).

RESULTS AND DISCUSSION

In the era of digitization of education, integrating technology into learning is necessary. This study departs from the need to understand how the application of technology can increase students' self-efficacy in mastering learning materials. The concept of Technology Integration Self-Efficacy (TISE) is the main theoretical basis in this study.

The concept of Technology Integration Self-Efficacy (TISE) refers to an individual's belief in their ability to effectively integrate technology into the learning process. In the context of vocational education, self-efficacy becomes a critical factor that influences intrinsic motivation and learning interest, especially when technology is introduced as a learning medium. Bandanna's theory (1997) states that self-efficacy is built through four main sources: mastery experience (success experience), vicarious experience (observational learning), verbal persuasion (social support), and emotional states (psychological conditions).

The implementation of smart classes in this study is designed to facilitate these four sources. For example, the use of interactive simulations and augmented reality provides direct experience (mastery experience), while the real-time feedback display on the smart class screen functions as verbal persuasion that strengthens the cadets' beliefs. In addition, the smart class environment equipped with digital devices (such as interactive projectors, tablets, and gratification systems) creates opportunities for cadets to learn through observation (vicarious experience) and manage emotions related to technology anxiety (emotional states).

From a pedagogical perspective, smart class integration also aligns with constructiveness learning theory, where technology acts as a tool to actively construct knowledge. The collaboration between smart class features and TISE principles is expected to create a learning environment that encourages independent exploration, increases engagement, and ultimately strengthens intrinsic motivation.

For further details regarding the specifications and implementation of smart classes in this study, the use of devices and learning activities can be seen in the table below:

Figure 1. Initial view of the smart class application

At this stage, Tartan will automatically enter the Smart Class application if they correctly enter the username and password and can use the features in the application. If wrong, Tartan will not enter the Smart Class application. Next, Tartan can see the list of lectures held today:

1. Click on the lecture menu 13.

2. Click the Today's Lecture submenu14, and then today's lecture that will be held will appear.

Attached in the image below:

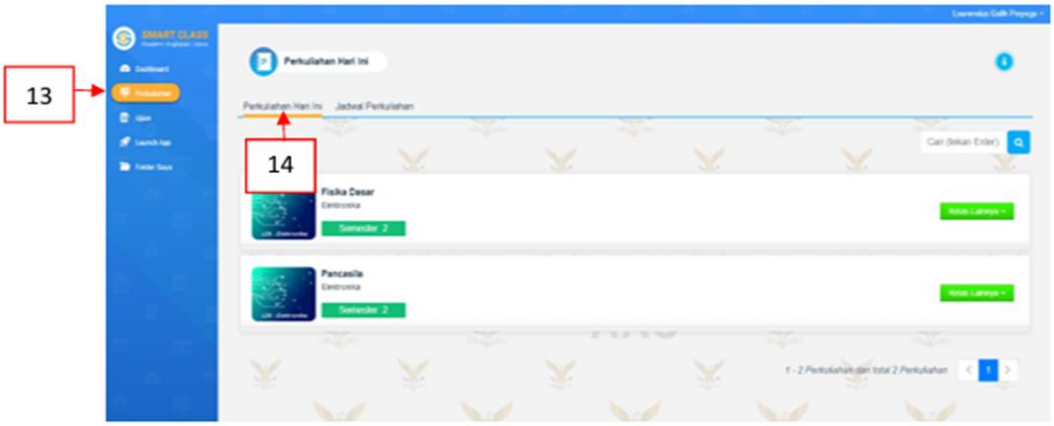

Figure 2. Course selection process in the smart class

In Smart Class, there are two types of classes, namely Class Learning and Class Collaborative System. What distinguishes it is the learning method, where Class Learning is carried out as in general learning, while the Collaborative Class System uses a method where several classes are combined at the same time, the same subjects, but classes that follow more than one class, or two, three, or four or more. Attached in the image below:

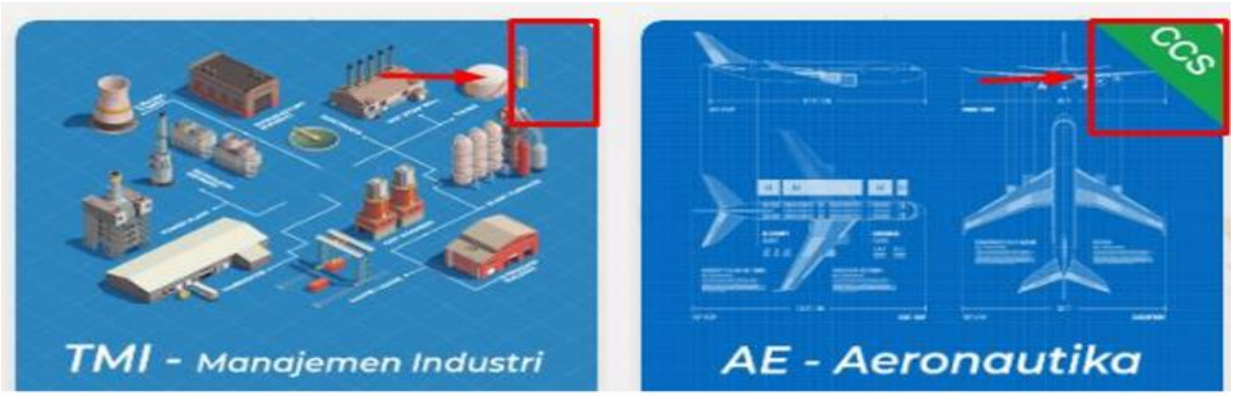

Figure 3. Class types in the smart class

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Smart class can also display details of lectures containing information related to courses, classes, meetings, archives, teaching lecturers, class types and so on. The display of lecture details is dynamic, so its contents will follow the courses displayed and their contents. As seen in Figure 4:

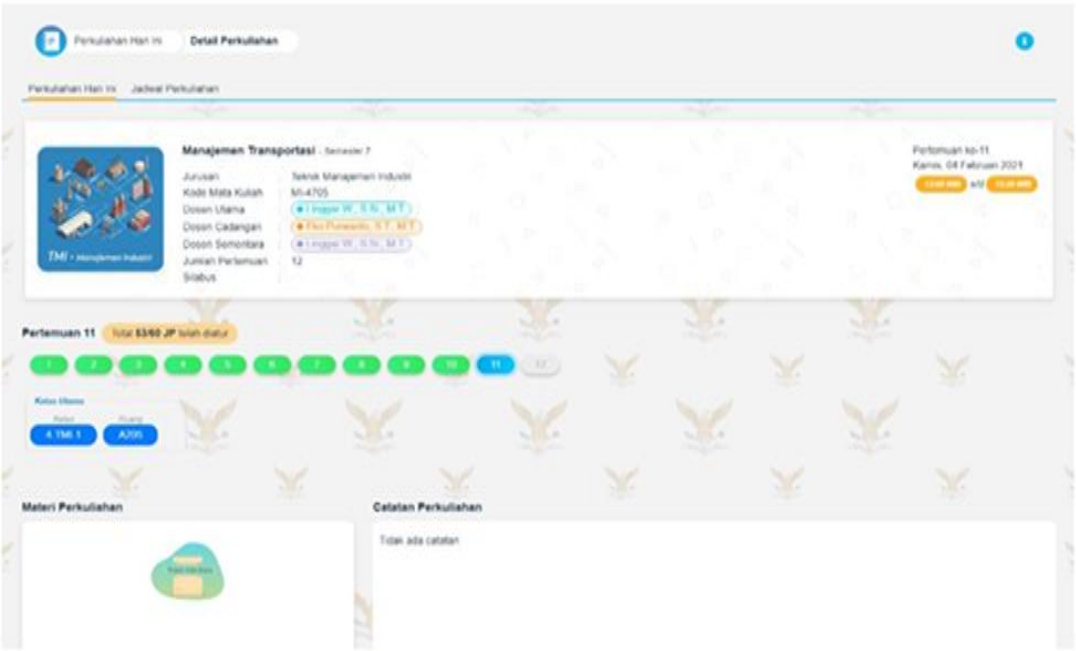

Figure 4. Lecture details in the smart class

In addition, the smart class application can also be used as a means to implement

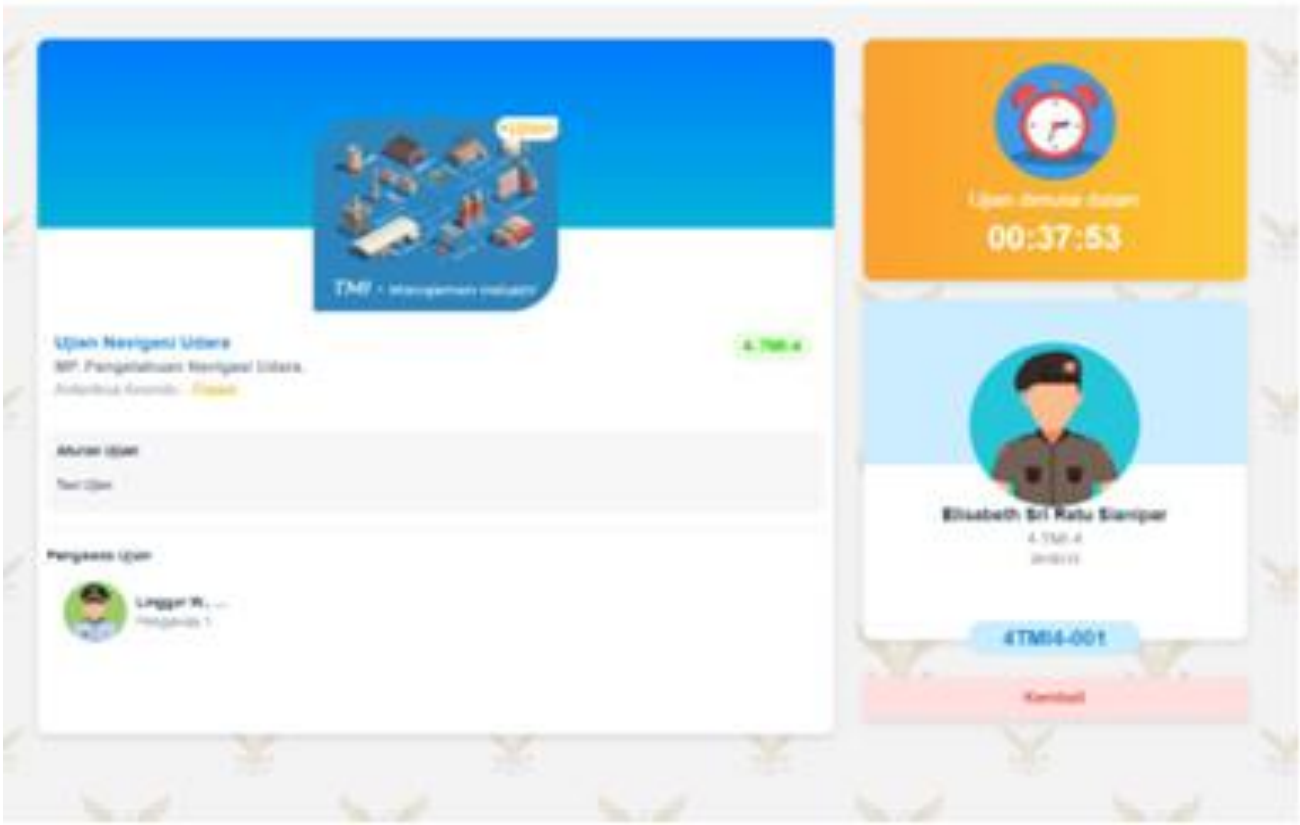

Figure 5. Exam via the smart class application

Before implementing the smart class application, a pretest is carried out, which produces the data below:

Table 1. Test of normality and homogeneity

		Intrinsic Motivation	Interest in Learning	Self Efficacy
Normality	Experiment	0.320	0.082	0.055
	Control	0.210	0.150	0.480
Homogeneity	F	1.223	0.745	0.112
	P	0.277	0.394	0.740

The analysis results show that the data for intrinsic motivation, learning interest, and self-efficacy in the experimental and control classes are typically distributed. For intrinsic motivation, the experimental class has a p-value = 0.320. In contrast, the control class shows a p-value = 0.210, both greater than 0.05, indicating that the data do not deviate from the normal distribution. Similarly, for learning interest, the experimental class has a p-value = 0.082 and the control class p = 0.150, indicating normality. In the self-efficacy variable, the experimental class shows a p-value = 0.055, close to the normality limit, while the control class has a p-value = 0.480, far above 0.05. In addition, the results of the homogeneity test show that the F value for intrinsic motivation is 1.223 with p = 0.277, for learning interest is 0.745 with p = 0.394, and for self-efficacy is 0.112 with p = 0.740. All p-values of this homogeneity test are greater than 0.05, indicating that the variances between groups are homogeneous. Thus, the results of this analysis provide a strong basis for proceeding with further statistical analysis, such as the T-test, to compare the differences between the experimental and control classes in terms of intrinsic motivation, learning interest, and self-efficacy.

Further analysis can be conducted to explore significant differences between the two groups, which can provide deeper insight into the effectiveness of the interventions implemented in this study. The results can be seen in the table below:

Table 2. Comparison of experimental and control classes

Variables	Mean (Experiment)	Mean (Control)	T	Df	p-value
Interest in Learning	4.81 ± 0.40	2.75 ± 0.45	14,217	16	0.000
Intrinsic Motivation	4.69 ± 0.48	2.63 ± 0.50	12,345	16	0.000
Self-Efficacy	4.63 ± 0.50	2.56 ± 0.51	11,876	16	0.000

The results of the comparative analysis between the experimental and control classes showed significant differences in the variables of learning interest, intrinsic motivation, and self-efficacy. For the learning interest variable, the average (mean) in the experimental class was 4.81 with a standard deviation of ± 0.40, while in the control class, the average was 2.75 with a standard deviation of ± 0.45. This significant difference resulted in a t value = 14.217 with degrees of freedom (d) = 16 and a p-value = 0.000, indicating that the difference between the two groups was statistically very significant. This indicates that the intervention implemented in the experimental class significantly increased Tara's learning interest compared to the control class.

Furthermore, for the intrinsic motivation variable, the experimental class had an average of 4.69 with a standard deviation of ± 0.48, while the control class showed an average of 2.63 with a standard deviation of ± 0.50. The t-value for this comparison was 12.345 with d = 16 and p-value = 0.000, which also showed a very significant difference. This indicates that the cadets in the experimental class had much higher intrinsic motivation compared to the cadets in the control class, which can be interpreted as the teaching method applied in the experimental class that succeeded in increasing the cadets' learning motivation effectively.

Finally, for the self-efficacy variable, the average in the experimental class was 4.63 with a standard deviation of ± 0.50, while the control class had an average of 2.56 with a standard deviation of ± 0.51. The t-value obtained was 11.876 with d = 16 and p-value = 0.000, indicating a significant difference between the two groups. These results suggest that cadets in the experimental class felt more confident in their ability to learn and achieve

academic goals compared to cadets in the control class. Overall, the results of this analysis confirm that the intervention implemented in the experimental class not only increased cadets' learning interest and intrinsic motivation but also strengthened their self-efficacy, which is an important factor in academic success.

CONCLUSION AND ACKNOWLEDGE

Based on the research results, the intervention implemented in the experimental class significantly increased the cadets' learning interest, intrinsic motivation, and self-efficacy compared to the control class. The results of the analysis showed that the cadets in the experimental class had an average learning interest that was much higher, with a value of $t = 14.217$ and $p = 0.000$, which indicates that the teaching method used succeeded in attracting attention and increasing the cadets' interest in the material being taught. In addition, the intrinsic motivation of the cadets in the experimental class also showed a significant increase, with a value of $t = 12.345$ and $p = 0.000$, which indicates that the cadets felt more motivated to learn independently and were actively involved in the learning process. The increase in self-efficacy reflected in the value of $t = 11.876$ and $p = 0.000$ indicates that the cadets in the experimental class felt more confident in their ability to achieve academic goals, which is an important indicator of long-term learning success.

The suggestions that can be given based on these findings are for educators and education managers to consider implementing teaching methods similar to those used in the experimental class, which have proven effective in increasing the learning interest, motivation, and self-efficacy of cadets. In addition, educators need to continue to explore and develop innovative and engaging learning strategies, which can encourage cadets to participate more actively in the learning process. Educators are also advised to provide cadets with constructive and positive feedback so they feel appreciated and motivated to continue learning. In addition, further research can be conducted to explore other factors that may influence learning interest, motivation, and self-efficacy, as well as to test the effectiveness of this teaching method in various contexts and populations of cadets. Thus, the results of this study can provide a meaningful contribution to the development of education, especially in the field of technology and vocational education, and help create a more effective and enjoyable learning environment for cadets.

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