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THE EFFECT OF SIMULATION GAME AS A LEARNING SUPPLEMENT ON CULINARY VOCATIONAL HIGH SCHOOL STUDENTS' MOTIVATION AND LEARNING OUTCOMES

Alisha Nismara Kalish Tambunan[1], Mauren Gita Miranti[2], Sri Handajani[3], Asrul Bahar[4]
[124]Program Studi Pendidikan Tata Boga, Fakultas Teknik, Universitas Negeri Surabaya, Surabaya, Indonesia
[3]Program Studi Pendidikan Kesejahteraan Keluarga, Fakultas Teknik, Universitas Negeri Surabaya, Surabaya, Indonesia
Correspondence Email: alishanismara.21030@mhs.unesa.ac.id

ABSTRACT

This study aims to analyze the effect of implementing simulation game on students' motivation and learning outcomes as a more interactive and effective learning approach. This quantitative study employed a One-Group Pre-test Post-test experimental design and correlation design with 17 students from the 11th grade culinary class as the subjects. The instruments consisted of motivation questionnaires and learning outcome tests, analyzed using paired-sample t-test, pearson product moment correlation, and MANOVA. The results indicate that the application of simulation games significantly influenced motivation levels (Cohen's d = 0,96) and learning outcomes (Cohen's d = 0,52). MANOVA analysis revealed a strong simultaneous effect (η^2 = 0,848), although the correlation between motivation and learning outcomes was not statistically significant (r = 0,452; p > 0,05). It is recommended that simulation games be used continuously as an innovative learning medium, and that further studies be conducted over multiple sessions to obtain more representative results.

Keywords: simulation-game; learning-motivation; learning-outcomes

INTRODUCTION

Vocational education, particularly in the Culinary Expertise Program of Vocational High Schools (SMK), plays a crucial role in preparing students to meet the demands of the ever-evolving culinary industry. As an educational institution focused on culinary skills, the Culinary Expertise Program at SMKs must equip students with learning outcomes and competencies aligned with the needs of the workforce.

SMK Dharma Wanita Gresik is one such school that offers a Culinary Expertise Program. Based on observations, the learning process still heavily relies on the use of whiteboards and PowerPoint (PPT) presentations. This method may cause students, as passive recipients of information, to feel bored and less motivated due to the lack of variation in instructional media. Furthermore, in the culinary program, practical activities are essential to apply the theoretical knowledge taught. However, in each lesson, practical sessions are often conducted in groups and usually only once per topic, meaning not all students gain sufficient hands-on experience individually. This situation may be caused by limitations in budget, manpower, and time, resulting in students merely following the activities without fully understanding the theoretical essence behind the practices. In skill-based learning, repetition and individual practice opportunities are essential for students to achieve better learning outcomes.

On the other hand, today's SMK students are part of Generation Z, a generation that has been familiar with technology from an early age. Their lives are highly integrated with various technologies such as game, social media, and digital applications. Therefore, technology-based learning must be developed to enhance students' engagement and motivation in the learning process. According to (Utomo, 2013), technology-based learning methods can increase students' interest in learning by 10.6% compared to conventional methods.

One innovative technology that can be integrated into vocational learning is the use of simulation game as a learning supplement. Simulation game provide students with more interactive and engaging learning experiences. (Langi et al., 2024) stated that interactive learning media can improve students' conceptual understanding more effectively than conventional methods. Simulation game also allow students to independently practice skills repeatedly (virtually), making them suitable for continuous training without consuming excessive resources such as cost, energy, and time. Thus, simulation game may offer a theoretical solution to the issues mentioned above.

This research aims to determine whether the implementation of simulation game affects students' motivation and learning outcomes. Therefore, this study seeks to analyze the effect of simulation game implementation on Grade XI Culinary students at SMK Dharma Wanita Gresik. It is hoped that the findings of this research will contribute to the development of more innovative teaching methods in vocational education, particularly in improving students' motivation and learning outcomes.

RESEARCH METHODS

This study employed a quantitative approach using a One-Group Pre-Test Post-Test design applied to a single experimental class that received the simulation game treatment. In addition, a correlational research design was used to analyze the relationship between post-test scores of learning motivation and learning outcomes in the experimental class following the simulation game intervention. The research designs are presented in Table 1 and 2.

Table 1 Research Design 1

Group	Pre-test	Treatment	Post-test
Experiment	O_1	X	O_2

Table 2 Research Design 2

Group	Motivation	↔	Learning Outcomes
Experiment	O_2^1		O_2^2

The data collected from the sample included students' levels of motivation and learning outcomes related to the topic of chocolate processing. This research aimed to examine the effect of simulation games as a supplementary learning tool on the motivation and learning outcomes of eleventh-grade Culinary students at SMK Dharma Wanita Gresik.

The research participants consisted of 17 eleventh-grade Culinary students at SMK Dharma Wanita Gresik. Data were collected using questionnaires and tests. The research instruments included a motivation questionnaire and a learning outcome test (pre-test and post-test), with validity assessed using the Content Validity Ratio (CVR) and reliability measured using Cronbach's Alpha and KR-20 (Dewi et al., 2020).

The data analysis techniques comprised both assumption testing and hypothesis testing. The assumption testing included the normality test. If the data met the assumptions, hypothesis testing was conducted using parametric statistics, specifically the Paired-Sample t-Test and Multivariate Analysis of Variance (MANOVA). To interpret the magnitude of effects or relationships between variables, Cohen's d and partial eta squared (η^2) were used.

The decision rule for the Paired-Sample t-Test was: if Sig. > 0.05, then the null hypothesis (H_0) is accepted and the alternative hypothesis (H_a) is rejected, indicating no significant effect of the simulation game on students' motivation or learning outcomes (partially). If Sig. < 0.05, then H_0 is rejected and H_a is accepted, indicating a significant effect of the simulation game on students' motivation or learning outcomes (partially).

The decision rule for the MANOVA was: if Sig. > 0.05, then H_0 is accepted and H_a is rejected, indicating no simultaneous effect of the simulation game on students' motivation and learning outcomes. If Sig. < 0.05, then H_0 is rejected and H_a is accepted, indicating a simultaneous effect of the simulation game on both variables.

The decision rule for the Pearson Product-Moment correlation was: if Sig. > 0.05, then H_0 is accepted and H_a is rejected, indicating no significant relationship between motivation and learning outcomes after the implementation of the simulation game. If Sig. < 0.05, then H_0 is rejected and H_a is accepted, indicating a significant relationship between motivation and learning outcomes following the simulation game treatment.

RESULTS AND DISCUSSION

The data in this study were obtained from a learning motivation questionnaire administered both before and after the treatment, as well as a learning outcome test comprising a pre-test and post-test. The results of both data sources are presented in Table 3.

Table 3 Data Sources

Data	Learning Motivation		Learning Outcomes	
	Pre	Post	Pre	Post
Mean	67.29	72.94	66.73	79.23
Max	86.67	94.67	100	100
Min	60	54.67	21.88	28.13

Assumption Test Results (Normality Test)

A normality test was conducted to determine whether the data were normally distributed (*Usmadi R16 UM Sumbar*, n.d.). Given that the sample size was fewer than 50 participants, the Shapiro-Wilk test was used. The results of the Shapiro-Wilk normality test are presented in Table 4.

Table 4 Normality Test Results

	Shapiro-Wilk		
	Statistic	df	Sig.
Pre-Motivation	0.945	17	.377
Post-Motivation	0.908	17	.092
Pre-Test	0.866	17	.320
Post-Test	0.870	17	.307

Based on Table 4, the Shapiro-Wilk significance values were 0.377 for the pre-motivation and 0.092 for the post-motivation. For the pre-test and post-test, the significance values were 0.320 and 0.307, respectively. Since all significance values were greater than 0.05, it can be concluded that the data in this study are normally distributed.

Hypothesis Test Results

This study tested four hypotheses:

1. Simulation games as a supplementary learning tool have an effect on students' motivation;
2. Simulation games as a supplementary learning tool have an effect on students' learning outcomes;
3. Simulation games as a supplementary learning tool simultaneously affect both motivation and learning outcomes; and
4. There is a correlation between motivation and learning outcomes after the implementation of simulation games.

These four hypotheses were tested using parametric statistical methods, including the Paired-Sample t-Test, MANOVA, and Pearson Product-Moment Correlation Test (Amiruddin Tawe et al., n.d.), with the assistance of SPSS version 25 for Windows. The results are presented in Table 5, 6, and 7.

Table 5 Paired t-Test Results

Variables		t	df	Sig.
Motivation	Pre-motivation & Post-motivation	-8.286	16	.000
Learning outcomes	Pre-test and Post-test	-4.736	16	.000

Based on Table 5, the significance value for learning motivation was 0.000 (< 0.05), indicating that H_0 is rejected and H_a is accepted. This suggests that the use of simulation games as a supplementary learning tool has a significant effect on students' learning motivation (partially). To determine the magnitude of the effect, Cohen's d was calculated, resulting in a value of 0.96, which indicates a very large effect size between the pre- and post-treatment motivation scores.

These findings align with Skinner's theory of reinforcement (Teori & Skinner, n.d.), which states that one of the learning principles capable of changing student behavior is reinforcement, something that strengthens or increases the frequency of behavior. In the context of this study, simulation games serve as reinforcement by promoting student motivation.

The results also corroborate findings by (Awalyah & Quraisy, 2024), who reported increased student motivation following the implementation of interactive game-based media, as indicated by differences in motivation scores before and after the intervention. The positive influence of simulation games as supplementary tools highlights the importance of creating an enjoyable learning environment, which fosters greater student enthusiasm. In contrast to conventional instruction, which tends to be one-directional, simulation games allow students to take an active role in the learning process.

This interactive and engaging learning environment also enhances students' intrinsic motivation, as shown by (Asiah Lubis et al., 2024). Students are encouraged to learn voluntarily through non-monotonous experiences. The challenges and scenarios presented in the game stimulate curiosity and excitement, ultimately deepening student engagement in conceptual understanding (Elisyah, 2024).

Furthermore, based on Table 5, the significance value for learning outcomes was also 0.000 (< 0.05), leading to H_0 being rejected and H_a accepted. This confirms that simulation games significantly affect students' learning outcomes (partially). Cohen's d was computed to be 0.52, indicating a moderate effect size between pre- and post-treatment learning outcomes.

This finding is consistent with (Rahman, n.d.),which posits that learning outcomes are influenced by instrumental factors, a subset of external factors. In this case, simulation games serve as instrumental support that facilitates learning. The result also aligns with (Alianas, 2023), who found a significant difference between students' pre-test and post-test scores following the use of educational games, suggesting their impact on learning outcomes.

The positive effect of simulation games as supplementary learning tools is attributed to their ability to provide virtual practice environments, allowing students to revisit and reinforce learning as needed (Elisyah, 2024).Unlike traditional practical learning, which is often limited in time and frequency, simulation games offer unlimited, self-paced practice opportunities. If previously students only had one chance to practice, they can now engage in repeated exercises at their own convenience. This repetition in an engaging setting enhances conceptual understanding (Maghfirah et al., 2024).

Table 6 MANOVA Result

	Sig	Partial eta squared
Wilk's Lambda	.000	.848

According to Table 5, the MANOVA test yielded a significance value of 0.000 (< 0.05), indicating that H_0 is rejected and H_a is accepted. This implies that simulation games simultaneously affect both learning motivation and outcomes. To measure the magnitude of this simultaneous effect, Partial Eta Squared was calculated, resulting in a value of 0.848 (≥ 0.14), which indicates a large effect size.

This finding confirms that motivation and learning outcomes are interrelated in the learning process. When students have enjoyable learning experiences, their curiosity and engagement increase (Redy Winatha & Made Dedy Setiawan, n.d.) Similarly, (Rifmasari et al., 2022) and (Rahayuningsih et al., 2024) emphasizes that engaging learning environments help reduce boredom and allow students to focus more effectively on the material, which ultimately enhances learning outcomes.

Based on the analysis, this study demonstrates that the implementation of simulation games has a positive impact on improving students' motivation and learning outcomes. However, these findings are context-specific and apply particularly to eleventh-grade Culinary students at SMK Dharma Wanita Gresik in the 2024/2025 academic year. Therefore, the results cannot be directly generalized to all students or educational settings, as each school possesses unique characteristics in terms of student profiles, teaching approaches, and learning environments.

Table 7 Pearson Product-Moment Correlation Test Result

Correlations

		Motivation	Learning outcomes
Motivation	*Pearson Correlation*	1	.452
	Sig.		.068
	N	17	17
Learning outcomes	*Pearson Correlation*	.452	1
	Sig.	.068	
	N	17	17

The results of the Pearson Product-Moment correlation test indicate that although the relationship was not statistically significant (Sig. = 0.068 > 0.050), the correlation coefficient suggests a moderate correlation between motivation and learning outcomes (r = 0.452). This implies a general positive tendency between the two variables; however, the relationship is not strong enough to be considered statistically significant at the 95% confidence level.

In the context of this study, it was found that a high level of learning motivation does not necessarily correlate with an increase in learning outcomes. This may be attributed to several other factors that also influence students' academic achievement, such as their level of understanding of the material, psychological condition, or the overall classroom learning environment (Novianti et al., 2020). On the other hand, (Hendra, 2015) suggests that student motivation is influenced not only by instructional strategies but also by the teacher's personal qualities, such as character and attitude, which contribute to a positive learning atmosphere. When learning is perceived as enjoyable and accessible, students tend to feel more engaged and comfortable. In addition, internal factors like a sense of responsibility, interest in the subject, and external encouragement from teachers or parents also play a role in fostering motivation. Furthermore, students who are well-prepared and put in consistent effort often demonstrate stronger confidence and a greater sense of readiness, indicating that motivation is closely tied to students' aspirations, goals, and perceptions of success.

CONCLUSIONS

Based on the results and discussion of the study, it can be concluded that the implementation of simulation games had a significant effect on improving students' learning motivation, with a very large effect size (Cohen's d = 0.96), indicating a substantial impact on students' willingness to learn. Similarly, simulation games significantly enhanced students' academic performance, as shown by the large effect size on learning outcomes (Cohen's d = 0.52). Moreover, the combined improvement of students' motivation and learning outcomes also demonstrated a strong overall effect, with a large

multivariate effect size ($\eta^2 = 0.848$). However, although the correlation coefficient between motivation and learning outcomes was moderate ($r = 0.452$), the relationship was not statistically significant, suggesting that increases in motivation and learning outcomes do not always occur in parallel.

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