The Impact of AR Flashcards on Elementary Students' English Learning Motivation

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Abstract – English proficiency is important in the globalization era, yet elementary students often show low motivation. Observations at SDN 101/II Muara Bungo reveal that learning feels monotonous because teaching is still teacher-centered. AR Flashcards, which combine visual, audio, and 3D elements, are expected to improve motivation. This study examines the influence of AR Flashcards on the English learning motivation of sixth-grade students using a quantitative One-Group Pretest-Posttest design. The subjects were 31 students with a 30-item motivation questionnaire. Data were analyzed using validity, reliability, Shapiro-Wilk, and Wilcoxon tests. The results show that AR Flashcards did not significantly affect motivation ($p = 0.024 > 0.05$). Other factors, such as limited teaching variation and minimal play strategies, contributed to low motivation, indicating that technology must be supported by creative teaching approaches.

Keywords – Augmented Reality, Flashcards, Learning Motivation, English, Elementary School Students

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I. Introduction

In the era of globalization, English has become an important skill because it functions as an international language used in the fields of education, technology, business, and communication (Maduwu, 2016; Diah, 2018). Mastery of English is not just an additional skill, but an important investment for the future (Harlina & Yusuf, 2020). Therefore, the Indonesian government has included English in the curriculum, initially taught only in junior high and high schools, then expanded to elementary schools (Faridatuunnisa, 2020; Kaltsum, 2016).

However, English language learning in elementary schools still faces the obstacle of low student motivation. Observations at SDN 101/II Muara Bungo show that some students lack enthusiasm, tend to be passive, and have difficulty understanding the material. This is in line with Suharni's (2021) findings that motivation is an important factor that determines learning success. Without motivation, students are unable to follow the learning process optimally (Amalia & Yahya, 2025).

Teachers play an important role in motivating students through creativity, strategies, and learning media (Oktiani, 2017; Jainiyah et al., 2023). In the digital age, the use of technology needs to be optimized to create an interactive, enjoyable, and non-monotonous learning atmosphere (Khoirunisa et al., 2024). One potential medium is Augmented Reality (AR) Flashcards, a technology that combines 2D/3D virtual objects with the real environment to produce an immersive learning experience (Aditama, Adnyana, & Ariningsih, 2019; Indahsari & Sumirat, 2023).

Previous studies have shown that AR can increase student engagement and facilitate concept understanding (Karisman & Wulandari, 2019; Mantasia & Jaya, 2016). In fact, when combined with flashcards, AR has been shown to increase learning interest and facilitate material delivery (Ismail et al., 2019; Budhi et al., 2019; Yaacob et al., 2019). Thus, the use of AR Flashcards is considered relevant to overcome low motivation in learning English in elementary schools.

Based on the problem of low student motivation in learning English and the potential of AR Flashcards, researchers conducted a study entitled "The Impact of AR Flashcards On Elementary Students' English Learning Motivation" The purpose of this study was to determine the effect of using AR Flashcards on the English learning motivation of sixth-grade students at SDN 101/II Muara Bungo.

II. Methodology Section

This study used a quantitative approach with a Pre-Experimental One-Group Pretest-Posttest design (Sugiyono, 2021). This design was chosen because the study focused on comparing the conditions of students before and after treatment, without a control class. The research population consisted of all 92 sixth-grade students at SDN 101/II Muara Bungo, while the research sample was selected using cluster sampling, namely class VI.2 with 31 students. This sample was selected to obtain a group that was representative of the entire population.

The research instrument was a learning motivation questionnaire based on Uno's (2017) motivation indicators, consisting of 30 items with a five-point Likert scale (ranging from "strongly agree" to "strongly disagree"). This questionnaire was used to measure students' learning motivation levels before and after the treatment.

Data collection was carried out in three stages, namely pretest, treatment, and posttest. The pretest was given to determine the initial condition of student motivation, then the treatment was carried out using Augmented Reality Flashcards media in English learning, and after that, the posttest was given to see if there were any changes.

III. Results

3.1 Pretest

Pre-test data were obtained from 31 sixth-grade students of SDN 101/II Muara Bungo. The students' learning motivation scores in the pre-test were high, as seen from the average showing that of the 31 respondents, the average score was 74.45%, which is included in the high category. The lowest percentage obtained was 76 (low category), while the highest score was 89.33% (very high category). This shows that before being given augmented reality flashcards, students remained motivated to learn English, and only two students were in the low category.

3.2 Post-test

Meanwhile, posttest results showed students' learning motivation after being given the augmented reality flashcards. The average score decreased from 74.45 to 70.23, which is still in the high category. The lowest score recorded was 74 (low category), while the highest score reached 141 (very high category). This indicates that students were more motivated before being given the augmented reality flashcards than after being given them.

3.3 Students' Improvement Data

The pretest results showed a minimum score of 76, a maximum score of 134, and a mean score of 111.68, indicating that students' English learning motivation before the treatment was relatively high. In contrast, the posttest results showed a minimum score of 74, a maximum score of 141, and a mean score of 105.35. These findings indicate a slight decrease in the overall average motivation score after the use of augmented reality flashcards, although the maximum score achieved by each student increased.

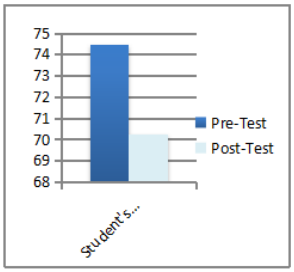

Table 3.1 Students' Improvement Data

3.4 Validity and Reliability Test

Validity testing was conducted using **Pearson's Product-Moment Correlation** to determine whether the questionnaire items measured students' English learning motivation appropriately. The results showed that all 30 items had an **r-count greater than the r-table** at the 5% significance level, indicating that all items were valid.

Reliability Statistics

Cronbach's Alpha	N of Items
.763	31

Table 3.2 Reliability Test

Reliability testing was carried out using the **Cronbach's Alpha coefficient**. The analysis produced a value of **0.763**, which is higher than the minimum threshold of 0.6. This result confirms that the questionnaire was reliable and consistent in measuring students' learning motivation.

3.5 Normality Test

Normality testing was conducted using the **Shapiro-Wilk test** with the help of SPSS. The results showed that both the pretest (p = 0.401) and posttest (p = 0.238) had significance values less than 0.05, indicating that the data were not normally distributed. Therefore, the appropriate statistical analysis for this study was a non-parametric test, specifically the **Wilcoxon Signed Rank Test**

Tests of Normality

	Group	Kolmogorov-Smirnov[a] Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Motivasi Belajar	Pretest	.113	31	.200*	.965	31	.401
	Postest	.133	31	.176	.957	31	.238

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 3.3 Normality Test

3.6 Hypothesis Test

The Wilcoxon Signed Rank Test was conducted to determine whether there were significant differences in students' motivation before and after using Augmented Reality Flashcards. The analysis showed that **19 students experienced a decrease in scores**, **8 students showed an increase**, and **4 students obtained the same score** on both the pretest and posttest.

These results suggest that although some students benefited from the treatment, a larger proportion experienced a decline in their motivation scores. The test produced a significance value of **0.024**, which is greater than the 0.05 threshold. Thus, **H_0 was accepted and H_1 was rejected**, meaning that there was **no statistically significant effect** of using AR Flashcards on students' English learning motivation.

Ranks

		N	Mean Rank	Sum of Ranks
Postest - Pretest	Negative Ranks	19[a]	14.89	283.00
	Positive Ranks	8[b]	11.88	95.00
	Ties	4[c]		
	Total	31		

a. Postest < Pretest

b. Postest > Pretest

c. Postest = Pretest

Table 3.4 Wilcoxon Signed Rank Test

This finding indicates that while AR Flashcards have the potential to make learning more engaging, their impact on motivation may depend on other factors such as

Test Statistics[a]

	Postest - Pretest
Z	-2.259[b]
Asymp. Sig. (2-tailed)	.024

a. Wilcoxon Signed Ranks Test

b. Based on positive ranks.

instructional strategies, classroom management, and students' individual learning preferences.

Table 3.5 Test Statistics Wilcoxon Signed Rank

The Wilcoxon Signed Rank test showed an Asymp. Sig. (2-tailed) value of 0.024 (> 0.05), indicating no significant difference between the pretest and posttest scores. The results showed that 19 students experienced a decrease in scores, 8 students experienced an increase in scores, and 4 students showed no change. The average posttest score was lower than the pretest score. This indicates that the use of Augmented Reality Flashcards did not increase, and instead tended to decrease, the motivation to learn English of Grade VI students at SDN 101/II Muara Bungo.

IV. Discussion

This study investigates the impact of Augmented Reality (AR) Flashcards on the English learning motivation of sixth-grade students at SDN 101/II Muara Bungo using a quantitative pre-experimental design. AR is a technology that integrates digital objects into the real world through devices such as smartphones, enabling interactive experiences that can capture students' attention (Soflianti et al., 2021).

The descriptive statistical analysis showed that the students' English learning motivation before the treatment was relatively high. The average pretest score reached **74.45%**, while the posttest average slightly decreased to **70.23%**. The pretest scores ranged from **76 to 134**, whereas the posttest scores ranged from **74 to 141**. Validity testing using **Pearson's Product-Moment Correlation** confirmed that all 30 questionnaire items were valid (r-count > r-table). Reliability analysis using **Cronbach's Alpha** resulted in a coefficient of **0.763**, indicating that the instrument was reliable.

The **Shapiro-Wilk test** revealed that both pretest ($p = 0.401$) and posttest ($p = 0.238$) data were not normally distributed. Therefore, hypothesis testing employed the **Wilcoxon Signed Rank Test**. The results showed that **19 students' scores decreased, 8 students' scores increased, and 4 students remained unchanged**. The test produced an **Asymp. Sig. (2-tailed) value of 0.024 (> 0.05)**, which indicates no significant difference between pretest and posttest scores.

The findings indicate that the use of Augmented Reality Flashcards did not lead to a statistically significant increase in students' English learning motivation. In fact, the majority of students experienced a decline in their posttest scores compared to the pretest. Although students initially showed excitement when introduced to AR Flashcards, their enthusiasm waned in subsequent sessions due to limited pedagogical variation and the absence of game-based strategies.

According to Uno (2021), learning motivation is shaped by both intrinsic and extrinsic factors. While AR Flashcards provide extrinsic stimulation through interactive visuals, the lack of internal drive and meaningful classroom engagement may explain the decrease in students' motivation. Sardiman (2018) also highlights that motivation is closely related to the needs, expectations, and meaningfulness of learning activities. This suggests that innovative media must be supported by effective teaching strategies and student-centered approaches.

The results of this study differ from those of Yaacob et al. (2019) and Akmal & Nurjanah (2024), who found that AR media improved students' motivation and engagement. Similarly, Indahsari & Sumirat (2023) argue that AR-based media can enhance motivation through interactive, multisensory experiences, but its success depends on implementation. This difference in results is likely due to several factors, such as the lack researchers' of teaching methods that integrated lessons into games, the researcher's limited effort in creating a lively classroom atmosphere, the short treatment period of only three meetings, and students' adjustment to AR technology.

Although students initially appeared enthusiastic and curious when introduced to the AR Flashcards, their motivation declined in subsequent sessions because the researcher relied mainly on group work and worksheets without incorporating more enjoyable game-based methods. Overall, the findings suggest that AR Flashcards

alone are insufficient to sustain motivation. Their effectiveness depends on careful integration into broader pedagogical strategies, longer exposure, and alignment with students' intrinsic motivation.

V. Conclusion

This study aimed to determine the impact of Augmented Reality (AR) Flashcards on the English learning motivation of sixth-grade students at SDN 101/II Muara Bungo using a pre-experimental one-group pretest–posttest design. The descriptive analysis showed that students' average pretest motivation score was relatively high, but the posttest results indicated a slight decrease. Statistical analysis using the Wilcoxon Signed Rank Test produced a significance value of 0.024 (> 0.05), meaning there was no significant difference between pretest and posttest scores. The distribution further revealed that most students experienced a decrease in scores, while only a few improved or remained the same.

These findings suggest that AR Flashcards, while innovative and engaging at first, were not sufficient to consistently increase student motivation. Several factors contributed to this outcome, including limited teaching variations, a classroom atmosphere that was less lively, the short intervention period of three sessions, and the need for students to adapt to AR technology. Although many students were enthusiastic during the first exposure to AR Flashcards, their motivation declined in subsequent meetings due to the absence of more interactive, game-based learning strategies.

Therefore, it can be concluded that AR Flashcards alone are not enough to sustain students' motivation. To maximize their potential, they need to be integrated into more creative, interactive, and student-centered teaching approaches. Teachers should combine AR Flashcards with engaging methods such as collaborative learning or game-based activities, while future research is recommended to extend the duration of treatment and explore students' intrinsic motivation to better support long-term learning outcomes.

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