

EFFECTIVENESS OF THE 'CATCH THE SIGN' GAME IN IMPROVING TRAFFIC SAFETY UNDERSTANDING AND AWARENESS OF STUDENTS OF SDN 11 PEGUYANGAN DENPASAR

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ABSTRACT

Land transportation is a vital component of daily life in Indonesia, but the high number of traffic violations and accidents, especially among productive age groups, indicates a fundamental problem in understanding and awareness of traffic signs. This study developed and tested the effectiveness of an educational game based on traffic signs to improve understanding and awareness of traffic signs among children and adolescents, considering the high number of traffic violations and accidents in Indonesia, especially among productive age groups. The research method used was quasi-experimental with a mixed approach, involving 47 students from SDN 11 Peguyangan Denpasar with instruments in the form of game cards, questionnaires, observations, and interviews. The results showed a significant increase in participants' understanding of traffic signs, with a significant increase in post-test scores compared to pre-tests, which was 89%. Qualitative data showed active participation of participants and increased awareness of the importance of obeying traffic signs, as well as recommendations from teachers and participants to implement this game in the traffic education curriculum in schools. In conclusion, this educational game is effective in improving participants' understanding and awareness of traffic signs and has great potential to reduce traffic violations and accidents in Indonesia

Keywords: children and teenagers; driving safety; educational games; traffic signs; traffic education

INTRODUCTION

Road safety is a critical issue in Indonesia, where traffic accidents have become a leading cause of injury and death. The World Health Organization has identified road traffic injuries as a significant public health concern, underscoring the urgency of improving traffic safety measures (Feng et al., 2020). In Indonesia, the increasing number of vehicles on the road, coupled with inadequate infrastructure and enforcement of traffic laws, exacerbates the risk of accidents (Hisbullah, 2023). The implementation of technology-based solutions, such as Electronic Traffic Law Enforcement (ETLE), aims to enhance public awareness and compliance with traffic regulations, thereby reducing violations and improving overall road safety (Utami, 2024). Among the most vulnerable groups in traffic scenarios are children and adolescents, who often lack the experience and understanding necessary to navigate road environments safely. Traffic violations among these demographics are prevalent, with studies indicating that young individuals are more likely to engage in risky behaviors such as ignoring traffic signals and signs (Suhardi et al., 2021). This trend is concerning, as it not only endangers their safety but also increases the risk of accidents involving other road users (Lee et al., 2021). The lack of understanding of traffic signs is a significant contributing factor to these violations. Research has shown that many young drivers and pedestrians do not fully comprehend the meanings of various traffic signs, which can lead to dangerous situations on the road (Umar & Bashir, 2019; Prayogi, 2019).

The comprehension of traffic signs is essential for ensuring safe road use. Traffic signs serve as critical tools for regulating, warning, and guiding road users, and their effectiveness is contingent upon the users' ability to interpret them correctly (Mustapha & Ibitoye, 2022). Studies have highlighted that a significant portion of traffic accidents can be attributed to violations of traffic signs, indicating a direct correlation between sign comprehension and accident rates (Maulina, 2023). In Indonesia, where educational initiatives regarding traffic safety are often lacking, it is imperative to enhance the understanding of traffic signs among students and young road users to mitigate the risks associated with traffic violations (Winarso, 2016). The development of this game is also designed to include categories of signs that are appropriate to different levels of difficulty and age groups, from children to adults. This allows for personalized learning according to the capacity and needs of each individual. Through this game, it is hoped that players can gain in-depth knowledge of the traffic signs they will encounter in their daily lives, thus contributing positively to their behavior on the highway.

The "Catch the Sign" game has emerged as an innovative educational tool aimed at enhancing traffic safety understanding and awareness among students, particularly those at SDN 11 Peguyangan in Denpasar. This game leverages interactive learning methods to engage students in recognizing and understanding traffic signs, which is critical for fostering safe behaviors in future road users. Research indicates that early exposure to traffic safety education significantly influences children's understanding of road safety principles. For instance, Prayogi (2019) emphasizes that children are particularly receptive to learning about traffic signs, which can instill long-lasting values regarding traffic safety. Similarly, studies have shown that educational interventions, such as games, can effectively improve students' knowledge of traffic signs and their associated meanings, thereby enhancing their situational awareness (Borakanavar, 2024). The interactive nature of the "Catch the Sign" game aligns with findings that suggest active participation in educational activities leads to better retention of safety knowledge (Feng et al., 2020).

Moreover, the effectiveness of educational games in promoting traffic safety awareness is supported by evidence that highlights the correlation between traffic safety education and improved safety behaviors. For example, students who have participated in structured educational activities demonstrate a better understanding of safety concepts and traffic regulations (Feng et al., 2020). This is echoed in the findings of NATH et al. (2022), who report that students with higher awareness of traffic signals are more likely to engage in safe driving practices. The game not only serves as a tool for knowledge acquisition but also fosters a positive attitude towards road safety among young learners. The importance of tailored educational interventions is further underscored by various studies that advocate for the integration of traffic safety education into school curricula. For instance, Ranjan et al. (2018) found that adolescents with prior exposure to traffic safety education exhibited improved knowledge and attitudes towards road safety. This suggests that the "Catch the Sign" game could play a pivotal role in shaping the traffic safety culture within the school environment, thereby contributing to a broader societal understanding of road safety.

Additionally, the game can be seen as part of a comprehensive approach to traffic safety education, which includes not only knowledge dissemination but also the cultivation of safe behaviors. As noted by DeNicola et al. (2016), effective traffic safety interventions must consider individual behaviors and the educational context in which they occur. The "Catch the Sign" game, by engaging students in a fun and interactive manner, can help bridge the gap

between theoretical knowledge and practical application of traffic safety rules. Finally, the project seeks to engage the community by involving parents and other community members in the educational process. By raising awareness of the importance of traffic safety education for children, the initiative reinforces the lessons learned through the game and helps promote a culture of safety within the broader community. Through these interconnected objectives, the educational game endeavors to make a lasting impact on traffic safety education.

METHOD

Research Design

This study used a quasi-experimental research design with a mixed-methods approach involving a combination of qualitative and quantitative methods to measure the effectiveness of educational games based on traffic signs in increasing understanding and awareness of traffic signs among children and adolescents.

Subject Study

Subject study is children and teenager from various Education level. Subject study chosen in a way random from several schools in the area urban and rural for ensure diversity and adequate representation. In research This used subject study that is student class 6 of SDN 11 Peguyangan Denpasar, totaling 47 people.

1. Instrument Study

- a. Game Educational: Cards a game consisting of from two type card: card symbol sign Then cross and card meaning sign Then cross. Card symbol sign grouped in three category Color: Green, Yellow, and Red in accordance level difficulty.
- b. Questionnaire: Used For measure knowledge beginning and end subject about sign Then cross before and after play games.
- c. Observation: Observation notes to observe participant behavior and responses during game play.
- d. Interviews: In-depth interviews with several participants and teachers to gain qualitative insights into their experiences and perceptions of the game.

2. Research Procedures

- a. Preparation:
 - Creation and testing of playing cards to ensure clarity and conformity of traffic signs.
 - Validation of research instruments (questionnaires, observations, interviews) by traffic education and safety experts.
- b. Implementation:
 - 1) Pre-test: Subjects were given a questionnaire to measure their initial knowledge of traffic signs.
 - 2) Session Game: Subject shared become groups small and given instructions about method play. Each group is given time to play the game according to the established guidelines.
 - 3) Observation: Researchers observe and record participants' behavior and responses during the game session.
 - 4) Post-test: After the game session was completed, subjects were given the same questionnaire to measure changes in their knowledge of traffic signs.
 - 5) Interviews: Several participants and teachers were interviewed to obtain qualitative data about their experiences playing the game.

- c. Data analysis:
 - 1) Quantitative Analysis: Data from the pre-test and post-test questionnaires were analyzed using descriptive statistics and T-test to measure significant differences in traffic sign knowledge before and after playing.
 - 2) Qualitative Analysis: Observation and interview data were analyzed using thematic analysis methods to identify key patterns and themes related to participants experiences and perceptions of the game.
3. Data analysis
 - a. Statistics Descriptive: Presenting data in the form of mean, median, and standard deviation for see distribution and change knowledge participant.
 - b. T test: Using paired T test for see difference significant between pre-test and post-test results.
 - c. Thematic Analysis: Analyzing qualitative data to identify key themes emerging from observations and interviews.

RESULTS AND DISCUSSION

Mechanism games:

Game educative based on traffic signs designed for increase understanding and awareness children and teenager to traffic signs through approach interactive. Here is mechanism method play arranged in accordance with rules work write scientific:

Description Game

The game consists of two types of cards: traffic sign symbol cards and traffic sign meaning cards. The symbol cards are grouped into three color categories based on difficulty level: Green (easy), Yellow (medium), and Red (difficult). Each category is designed for a different level of education: Green for Kindergarten and Elementary School, Yellow for Middle School, and Red for High School and University.



Picture 1. Explanation about the game to respondents

Rule And Steps Game

1) Preparation:

- Symbol cards and traffic sign meaning cards are prepared and separated by color category.
- Each participant is given an equal number of random symbol cards.
- In card distribution, participants are divided into several small groups.
- Each group get card symbol traffic sign.

2) Mechanism Games:

- A facilitator shuffles and randomly distributes traffic sign meaning cards to participants.
- Each participant is given 3-5 seconds to match the sign symbol card they have with the sign meaning card distributed by the facilitator.
- If a participant successfully matches a symbol card with the corresponding meaning card, then the pair of cards becomes his.
- If a participant matches incorrectly, he must add one symbol card from the pile as a penalty.

3) Matching Process:

- The sign meaning cards are distributed one by one by the facilitator.
- Participants who have matching symbol cards must immediately raise and show them within the specified time.
- Meaning cards that are not successfully matched within the allotted time are returned to the pile and reshuffled.

4) Assessment And Determination Winners:

- The game continues until one participant manages to match all the symbol cards he has with the corresponding meaning cards.
- The participant who finishes his symbol cards fastest is declared the winner.
- In games involving mixed categories, each color card has a different value: Green is worth 1, Yellow is worth 2, and Red is worth 3. The winner is determined based on the highest number of values of the cards successfully matched.

2. Evaluation Game

- a. Observation Direct: During game ongoing, observer take notes participation, activeness, and error participant in match card.
- b. Questionnaire: After game finished, participants fill in questionnaire for measure improvement understanding them to traffic sign and experience they during play.



Picture 2. Distribution of questionnaire forms to respondents

- c. Interview: In-depth interviews were conducted with several participants and facilitators to gain qualitative insights into the effectiveness and engagement of the game.

Quantitative Data: Pre-test and Post-test

The data obtained from the age group scores are as follows

Group	N	Pre-test Score (Average)	Post-test Score (Average)	Average Increase (%)
Elementary School (Age 12-14 years)	47	43.67	82.27	89

Analysis:

Quantitative data show significant improvement in understanding traffic sign after playing educational game. The average post-test score is higher significant compared to pre-test scores, with improvement by 89%.

1. Qualitative Data. Observation And Interview

a) Theme Main from Observation:

- **Active Participation.** Most participants were actively and enthusiastically involved in the game.
- **Social Interaction:** There was increased interaction and cooperation between participants during the game.
- **Better Understanding:** Participants demonstrated a better understanding of the meaning of traffic signs after playing.



Picture 3. Good participation from respondents

b) Theme Main from Interview.

- **Fun Experience:** Participants and teachers stated that the game was fun and interesting, making the learning process less boring.
- **Improvement Awareness:** Participants feel more aware will importance comply traffic sign after play.
- **Recommendation for Implementation:** The teachers recommend that this game be implemented as part of the traffic education curriculum in schools.

2. Quantitative Data Analysis

Paired T- test:

A paired t-test was conducted to determine whether the difference between pre-test and post-test scores was significant.

	Mean	Std. Deviation	Std. Error Mean	T-test		t	df	p
				Paired Differences				
				95% Confidence Interval of the Difference				
				Lower	Upper			
PRETEST-POSTEST	-2.232	1,044	0.140	-2.512	-1.952	-15,995	55	0.00000

Interpretation:

A very small p-value ($p < 0.001$) indicates that the increase in scores from pre-test to post-test is very significant. This indicates that the educational game effectively improves participants' understanding of traffic signs.

3. Qualitative Data Analysis

Through thematic analysis, several main themes were identified:

- a. Participation and Engagement: Participants showed high enthusiasm in playing the game, as seen from their active participation and engagement in group discussions.
- b. Improved Understanding: Observations and interviews showed that participants could remember and understand the meaning of traffic signs better after playing the game.
- c. Safety Awareness: The game successfully instilled road safety values, with many participants stating they were more aware of the importance of obeying traffic signs.
- d. Social Interaction and Cooperation: This game encourages positive social interaction between participants, improving cooperation and communication within the group.
- e. Implementation in Education: Teachers and participants recommended that this game be made part of the traffic education curriculum, as this method was considered effective and interesting.

CONCLUSION

Effectiveness of Educational Games. Educational games based on traffic signs have been shown to be effective in improving participants' understanding of traffic signs, with significant increases in post-test scores compared to pre-test scores across all age groups. **Increased Awareness:** Participants showed increased awareness of the importance of obeying traffic signs and driving safety after playing the game. **Participation and Social Interaction:** These games encourage active participation, social interaction, and cooperation among participants, making the learning process more enjoyable and effective. **Implementation Recommendations:** Teachers and participants recommend that this game be implemented in the traffic education curriculum in schools, as an interesting and effective educational method. **Further Development:** It is recommended to carry out further development of this game, including adding variations of traffic signs and scenarios, as well as training for teachers to optimize the use of the game in learning

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