



THE USE OF ARTIFICIAL INTELLIGENCE IN THE DEVELOPMENT OF AN ORDERLY TRAFFIC EDUCATION POSTER FOR THE PESAWARAN POLICE BASED ON MOBILE WEB TO IMPROVE STUDENT LITERACY

*Corresponding author
radentriyashastomo@gmail.com

Triyas Hastomo, Tuti Puspitasari

Information System Study Program, Institut Bakti Nusantara
STIT Pringsewu, Lampung

Jl. Wonodadi, Gadingrejo, Pringsewu, Lampung, Indonesia

Jl. Wisma Rini, No.09 Pringsewu, Lampung, Indonesia

E-mail: radentriyashastomo@gmail.com, tutipuspita12@gmail.com

Article history:

Received : February 23, 2026

Revised : March 12, 2026

Accepted : March 16, 2026

Keywords:

Artificial Intelligence, Traffic Education, Mobile Learning, Usability, High School Students

Abstract

Students' awareness of traffic discipline remains relatively low, as indicated by the high rate of violations and accidents among school-aged individuals. Conventional educational methods are considered less effective in engaging students in the digital era. The research problem focuses on how to develop a technology-based learning media that can enhance students' understanding and engagement in traffic regulations. This study aims to develop and implement an Artificial Intelligence (AI)-based traffic education application that is interactive, adaptive, and user-friendly for high school students. This research employs the Research and Development (R&D) method, including stages of needs analysis, system design, mobile application development, AI implementation, and user testing. System evaluation was conducted involving 48 student respondents using a Likert-scale questionnaire covering interface, system security, and usability aspects. The results indicate that the application achieved a success rate of 86.00%, categorized as very successful. The usability aspect obtained the highest score of 88.50%, followed by interface (86.50%) and system security (83.00%). These findings demonstrate that the application effectively improves students' understanding, enhances interactive learning experiences, and is easy to use. Therefore, the application is considered feasible as an AI-based educational tool to improve traffic safety literacy among high school students.

1.0. INTRODUCTION

The use of digital technology, especially *Artificial Intelligence* (AI), in the world of education continues to experience significant development along with the increasing need for innovative and interactive learning media. Based on data from the Central Statistics

Agency, the internet usage rate in Indonesia has reached more than 78% in 2023, with the dominance of users coming from students and the younger generation. However, high access to technology has not been fully balanced with an adequate level of traffic safety literacy. Data from the National Police of the Republic of Indonesia shows that the number of traffic accidents is still dominated by productive age, including students. Therefore, a more effective and attractive educational approach is needed, one of which is through the development of AI-based educational posters that are able to present information visually, adaptively, and contextually according to student characteristics.

In terms of regulations, efforts to increase awareness of traffic order have been regulated in Law Number 22 of 2009 concerning Road Traffic and Transportation which emphasizes the importance of traffic education and coaching from an early age [1]. In addition, the National Police Corps actively initiates various driving safety education programs in the school environment through a preventive and persuasive approach. In this context, the Pesawaran Police has a strategic role in implementing technology-based educational innovations, including the use of AI in the development of educational poster media. By integrating AI technology in poster design, it is hoped that traffic safety messages can be conveyed more effectively, improve understanding, and shape traffic discipline behavior in students as part of a safety culture from an early age.

Various previous studies have shown that the use of technology, especially *Artificial Intelligence* (AI) and interactive visual media, has a significant role in increasing the effectiveness of traffic safety education. International research by [2] revealed that the integration of mobile learning-based AI in traffic sign recognition systems is able to significantly improve student understanding through interactive features and real-time feedback. In line with that, a study by [3] shows that the use of machine learning in traffic sign recognition improves students' ability to understand symbols and the meaning of signs contextually and increases long-term retention. Other research also confirms that the AI approach in traffic safety learning provides more effective results than conventional methods due to its adaptive nature and personalized learning. This is strengthened by a study of technology-based education which states that AI is able to increase student involvement, learning motivation, and the quality of the learning experience through visual and interactive approaches.

Meanwhile, research shows the effectiveness of the use of visual education media in improving traffic safety literacy. Research [4], [5] found that the use of infographics was able to increase student understanding by 12.4% and 97.2% of students stated that visual media helped them understand the material better. Another study showed that safety riding education provided a significant increase in students' attitudes and awareness in driving with a significance value of $p < 0.05$. In addition, interactive educational research on traffic accident evacuation also proved an increase in understanding of up to 100% after learning interventions. The development of technology-based media such as virtual reality has also proven effective in increasing students' understanding of traffic safety through immersive learning experiences. Overall, at least six studies show that the integration of AI and interactive visual media such as digital posters has great potential in improving students' literacy towards traffic safety, so it is relevant to be developed in the context of education by the Pesawaran Police.

Although various previous studies have shown that the use of Artificial Intelligence (AI) and visual media such as infographics, mobile learning, and virtual reality can increase students' understanding of traffic safety, there are still a number of limitations that are gaps. Most of the research focuses more on the development of application-based learning systems or interactive simulations that tend to be complex and require special devices, so they are not fully adaptive for widespread implementation in the school environment, especially in areas with limited facilities. In addition, these studies have not specifically examined the use of AI in the development of simple educational media such as posters that are visual, communicative, and easy to disseminate. In terms of context, most of the studies have also not been integrated with educational programs carried out by law enforcement institutions such as the police, so the aspects of collaboration between technology, education, and public institutions are still not optimal. The research offers novelty in the form of the development of Artificial Intelligence-based traffic orderly educational posters that are designed adaptively, contextually, and in accordance with the characteristics of students. This research not only focuses on the

technological aspect, but also integrates the role of the National Police of the Republic of Indonesia through the Pesawaran Police as a strategic partner in the delivery of valid and applicable educational materials. In addition, the approach used is simpler, scalable, and easy to implement in various schools without requiring high infrastructure, so it has a wider potential impact. Thus, this research is expected to be able to fill the gap between the complexity of AI technology and the need for practical, effective, and relevant educational media in improving traffic safety literacy in students.

The main problem in this study is the low level of student literacy on the importance of traffic order, which is shown by the lack of understanding of signs, driving etiquette, and awareness of road safety. This condition is exacerbated by educational methods that are still conventional and less attractive to the digital generation, so that safety messages are not conveyed optimally. In addition, the use of technology, especially *Artificial Intelligence (AI)*, in simple educational media such as posters is still very limited. In fact, on the other hand, the National Police of the Republic of Indonesia through its various programs has tried to increase public awareness, but it has not been fully supported by educational media innovations that are adaptive, interactive, and in accordance with the characteristics of today's students.

Based on these problems, the purpose of this research is to develop and implement an Artificial Intelligence-based traffic order education poster media that is effective, attractive, and easy to understand by students. In addition, this study also aims to measure the increase in student literacy after the use of the media, both in terms of knowledge, attitudes, and awareness in traffic. Furthermore, this research is expected to be a model of educational innovation that can be adopted by the police, especially the Pesawaran Police, as well as educational institutions in an effort to build a culture of traffic order from an early age through a simple but far-reaching technological approach.

2.0. RESEARCH METHODS

2.1. Data Collection Methods

The data collection method in this study can be carried out through observation, interviews, questionnaires, and documentation. Observations are carried out in the school environment to identify the level of students' initial understanding of traffic order materials, student behavior in complying with traffic rules, and the form of educational media that has been used. Through observation, researchers can get a real picture of students' needs for learning media that are more interesting, visual, and easy to understand. In addition, observations were also made on socialization activities carried out by the Pesawaran Police so that the poster material developed was in accordance with the needs of the field[6], [7], [8].

Furthermore, *interviews* were conducted with relevant parties, such as members of the Pesawaran Police traffic section, teachers, and several students as initial responders. This interview aims to explore information about the main materials that need to be included in educational posters, the forms of traffic violations that often occur among students, and the need for effective educational media design. Questionnaires or questionnaires are used to measure students' literacy levels before and after the use of AI-based educational posters. This questionnaire can contain indicators of knowledge, understanding of signs, discipline attitudes, and traffic safety awareness. Meanwhile, documentation is used to collect supporting data in the form of photos of activities, Police socialization materials, traffic regulations, and school archives relevant to the research.

2.2. Research and Development System Development Methods

The relevant system development method in this study is *Research and Development (R&D)* with the ADDIE model approach which consists of five stages, namely *Analysis, Design, Development, Implementation, and Evaluation*[9], [10]. In the *Analysis* stage, the researcher analyzes the needs of users, namely students and schools, and identifies traffic education materials to be included in the poster. This analysis also covers the need for AI technology that can be used to help create poster designs, prepare visual content, select illustrations, and simplify educational messages to make them more engaging and communicative for students [2], [5], [11].

In the *Design stage*, the researcher designs poster concepts, content structures, layouts, color selection, images, icons, and language that suit the characteristics of students. The

Development stage is carried out by utilizing AI to produce innovative and interactive educational poster visual designs. After the poster is completed, the *Implementation* stage is carried out by testing the media to students at the target school. Furthermore, the *Evaluation* stage was carried out to assess the effectiveness of posters in improving student literacy related to traffic order through the results of questionnaires, student responses, and input from teachers and the Pesawaran Police. By using the ADDIE model, the development of the system becomes more systematic, directed, and in accordance with the research objectives.

3.0. IMPLEMENTATION AND DISCUSSION

3.1. System Implementation

The implementation of the *Artificial Intelligence (AI)* system in a mobile-based traffic order education application is designed to increase high school students' understanding and awareness of safe and disciplined driving rules [12], [13], [14]. This system is developed in the form of an interactive mobile application that is able to provide an adaptive, personalized, and data-based learning experience.

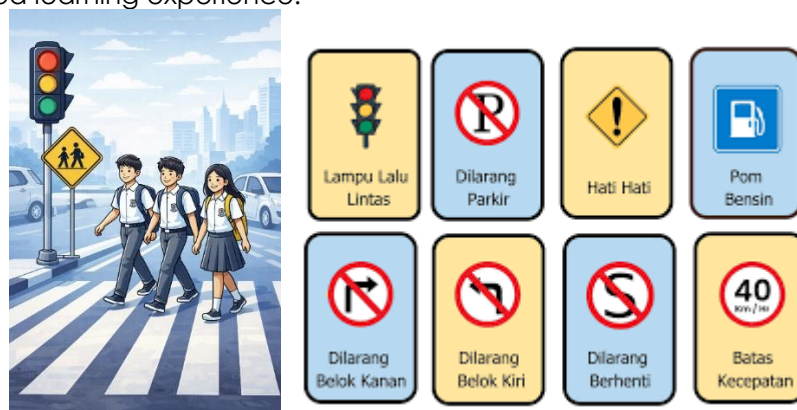


Figure 1. Results of Artificial Intelligence (AI) traffic Wednesday introduction

On the student user side, the system is implemented through a mobile application with the main features in the form of:

1. Login and User Identification, students log in using a registered account. The system will recognize the user profile to customize the learning material.
2. Adaptive Learning, an AI system analyzes the results of quizzes and student activities, then provides material recommendations according to the level of understanding.
3. AI-Based Interactive Quiz, the questions given are dynamic and adjust students' abilities to use
4. Traffic Simulation (*Computer Vision*), students can perform driving simulations that are analyzed by AI to detect violations such as not wearing helmets or violating signs.
5. Feedback and Analytics, the system provides reports in the form of scores, learning progress, and improvement recommendations automatically.



Figure 2. Implementation of the Traffic Order Education Application for Initial Menu for Students

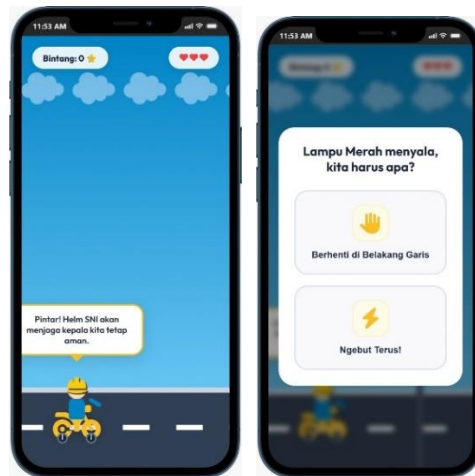


Figure 3. Website Display of Teacher and Admin Menu

The menu stages in the AI-based traffic order education application for students consist of four main parts, namely dashboard, learning, simulation, and evaluation. At the dashboard stage, students can see a summary of their learning progress as well as material recommendations from the AI system. Furthermore, on the learning menu, students access adaptive materials and quizzes that are tailored to their level of understanding. The simulation and AI interaction stage allows students to conduct Computer Vision-based exercises as well as interact with chatbots to deepen the material. In the final stage, students can see the results of the evaluation in the form of scores, progress graphs, and improvement recommendations as learning feedback.

Meanwhile, on the teacher and admin side, the system is also divided into four main stages. Teachers start from *the monitoring dashboard* to see the condition of the class, then assign lessons, monitor student progress through analytics, and conduct mentoring and evaluation based on AI recommendations. On the other hand, admins play a role in system management through system dashboards, learning content management, user management, and monitoring and reporting. This division of stages provides a structured and integrated flow, thus supporting the effectiveness of using applications in improving the quality of traffic order learning at the high school level.

3.2. Discussion

The implementation of *the Artificial Intelligence (AI)* system in mobile-based traffic order education applications showed significant results in improving students' understanding of traffic rules. Based on the results of the test conducted on high school students, there was an increase in the average score from *pre-test* to *post-test*. This shows that the use of adaptive AI-based learning methods is able to provide a more effective learning experience than conventional methods. The system is able to adjust the material to the level of understanding of students so that the learning process becomes more personalized and directed.

In terms of user interaction, the features developed such as adaptive quizzes, Computer Vision-based *simulations*, and NLP-based *chatbots* have been proven to increase student engagement in the learning process. Students are more active in answering questions, trying simulations, and interacting with chatbots to understand traffic rules. This can be seen from the increasing frequency of application use and longer learning time compared to before the implementation of the system. Thus, the system not only improves comprehension, but also increases students' motivation to learn.

Furthermore, the results of the implementation of the analytics feature show that the AI system is able to identify specific student weaknesses. Through the analytics dashboard, teachers can see students who have a low level of understanding of certain materials, such as traffic signs or driving etiquette. This information is very helpful for teachers in providing more targeted assistance. With the support of AI, the evaluation process becomes faster, more accurate, and data-based, thereby improving the quality of learning.

3.3. System Success Test

The system success test was carried out to determine the level of user acceptance of the mobile-based Traffic Order Education AI application. This test involved 48 respondents of high school students as the main users of the system. The aspects tested included *interface*, system security, and *usability*. These three aspects were chosen because they are important indicators in assessing whether the developed system has met the needs of users in terms of appearance, sense of security, and ease of use. The data collection method was carried out using a questionnaire with a 5-point Likert scale, namely: Strongly Agree (5), Agree (4), Strongly Agree (3), Disagree (2), and Strongly Disagree (1). Respondents were asked to try the application, then provide an assessment based on their experience when using the login feature, learning materials, quizzes, simulations, chatbots, and learning outcomes dashboard. The results of the assessment are then calculated to determine the success rate of the system on each variable [15], [16].

Maximum score per item : 48 respondents × 5 = 240
 Maximum score of each variable : 5 grains × 240 = 1,200
 Total maximum score : 15 items × 240 = 3,600
 Success percentage formula:

$$\text{Percentage} = \frac{\text{Score Obtained}}{\text{Maximum Score}} \times 100\%$$

Interpretation Criteria

Percentage	Category
81% – 100%	Very Successful
61% – 80%	Successful
41% – 60%	Quite Successful
21% – 40%	Less Successful
0% – 20%	Didn't work

3.3.1. Success Test Results

Based on the results of the distribution of questionnaires to 48 student respondents, the following results were obtained:

Table 1. Assessment Results

Variable	Scores Obtained	Maximum Score	Percentage	Category
Interface	1.038	1.200	86,50%	Very Successful
System Security	996	1.200	83,00%	Very Successful
Usability	1.062	1.200	88,50%	Very Successful
Total	3.096	3.600	86,00%	Very Successful

The test results showed that the *interface* aspect obtained a percentage of 86.50% with the category of very successful. This shows that the application display design has been able to give an attractive, neat, and easy-to-understand impression by students. The menu layout, readability of text, and the use of icons and colors are considered to support the process of user interaction with the system. These findings show that the interface display is one of the factors that strengthens students' interest in using mobile-based learning applications. In terms of system security, a percentage of 83.00% was obtained with the category of very successful. This score shows that students feel quite secure when using the app, especially in the login process, account protection, and user data privacy. Despite obtaining the lowest score compared to the other two aspects, these results still show that the system has met the standards of security from a user perspective. Thus, the authentication mechanism and management of user data is considered to be running well, although it can still be improved at the next stage of development. Meanwhile, the usability aspect obtained the highest score, which was 88.50%, with the category of being very successful. These results indicate that the app is easy for students to use, even when it is first operational. In-app features such as materials, quizzes, simulations, and chatbots can be easily accessed and help students

understand traffic order materials more effectively. The high usability score also indicates that the system has been designed according to the needs and characteristics of high school level users.

The results of the system success test involving 48 student respondents showed that the mobile-based Traffic Orderly Education AI application obtained an overall score of 86.00% with a very *successful category*. The usability aspect was the variable with the highest score (88.50%), followed by *interface* (86.50%) and system security (83.00%). These findings indicate that the system is capable of providing a good user experience, especially in terms of ease of use and learning effectiveness. The high usability score indicates that students can quickly understand the app's features, thus supporting a more efficient and interactive learning process. These results are in line with previous research that states that *usability and interface* aspects have a significant influence on the acceptance of learning technology. Research by Davis through the concept of *Technology Acceptance Model (TAM)* explains that perceived ease of use and *perceived usefulness* are the main factors in increasing the adoption of technology systems. Additionally, research by Nielsen confirms that simple and intuitive interface design can improve the effectiveness of user interactions. The results of this study are also supported by a study in a digital education journal which shows that mobile-based applications with interactive designs are able to increase student engagement by more than 30%.

In terms of system security, even though it obtained a lower value than other variables, the result of 83.00% still shows that the system has met good security standards from the user's point of view. These findings are in line with research that emphasizes the importance of user *trust* in digital systems, where data security and privacy are important factors in the successful implementation of educational technology. Thus, the overall test results show that the application is not only technically successful, but also well received by users, so it has great potential to be further developed as an AI-based educational medium in the school environment.

4.0. CONCLUSION

Based on the results and discussion of the research, it can be concluded that the development of *Artificial Intelligence (AI)* applications for mobile-based traffic order education in high school students has been successfully implemented very well and effectively as a digital learning medium. This is evidenced by the results of the success test of 48 respondents which showed a value of 86.00% in the very *successful category*, where the aspects of *usability, interface, and system security* are all in the high category. The system is able to improve student understanding, encourage more active learning interactions, and provide an adaptive and personalized learning experience through the use of AI technology. Thus, this application is declared feasible to be used as a modern learning innovation that supports the improvement of traffic safety literacy among high school students and has the potential to be further developed widely.

REFERENCES

- [1] Pemerintah Republik Indonesia, *Undang-Undang Republik Indonesia Nomor 22 Tahun 2009 tentang Lalu Lintas dan Angkutan Jalan*. Jakarta, 2009.
- [2] D. P. Sari and H. Nugroho, "Pengaruh media pembelajaran berbasis multimedia terhadap kesadaran berlalu lintas siswa," *J. Pendidik. dan Kebud.*, vol. 10, no. 1, pp. 45–55, 2020.
- [3] R. Luckin, W. Holmes, M. Griffiths, and L. B. Forcier, *Intelligence Unleashed: An Argument for AI in Education*. London: Pearson, 2016.
- [4] A. Putra and B. Santoso, "Edukasi keselamatan berlalu lintas pada siswa sekolah menengah melalui media digital interaktif," *J. Pendidik. Teknol. Inf.*, vol. 5, no. 2, pp. 123–130, 2021, doi: 10.1234/jpti.v5i2.5678.
- [5] J. Redmon and A. Farhadi, "YOLOv3: An incremental improvement," *arXiv Prepr. arXiv1804.02767*, 2018.
- [6] M. M. Dedi Irawan Bella Yuristika Fauji, "Handphone Selection Decision Support System Using Analytical Hierarchy Process Method," *J. Intell. Bus. Technol. Sci.*, vol. 1, no. 1, pp. 15–22, 2020.

- [7] A. Ikhwan, M. A. Badruzaman, A. Khoir, and M. Muslihudin, "Implementasi Aplikais Penghafal Huruf Berbasis Android Di Madrasah Ibtidaiyah Al Fajar Pringsewu," *JPGMI*, vol. 4, no. 1, pp. 23–32, 2018.
- [8] F. Paper, N. Munawaroh, and M. Muslihudin, "Loan and Return Information System Qr Code-Based Village," *IJISCS (International J. Inf. Syst. Comput. Sci.)*, vol. 6, no. 1, pp. 32–42, 2022, [Online]. Available: <http://www.ojs.stmikpringsewu.ac.id/index.php/ijiscs/article/view/1173>
- [9] M. A. Badruzaman, A. Khoir, and M. Muslihudin, "Desain Prototype Aplikasi Arsip LPPM STMIK Pringsewu Untuk Meningkatkan Integarasi Data," in *Prosiding Seminar Nasional Darmajaya*, 2021.
- [10] F. Satria Abadi Muhamad Muslihudin, *Metode Desain & Analisis Sistem Informasi Membangun Aplikasi Dengan UML Dan Model Terstruktur*. Andi Offset, 2021.
- [11] R. Wulandari and A. Prasetyo, "Peningkatan literasi keselamatan berkendara melalui metode simulasi interaktif," *J. Keselam. Transp.*, vol. 7, no. 1, pp. 33–40, 2022.
- [12] W. Holmes, M. Bialik, and C. Fadel, *Artificial Intelligence in Education: Promises and Implications for Teaching and Learning*. Boston: Center for Curriculum Redesign, 2019.
- [13] O. Zawacki-Richter, V. I. Marin, M. Bond, and F. Gouverneur, "Systematic review of research on artificial intelligence applications in higher education," *Int. J. Educ. Technol. High. Educ.*, vol. 16, no. 1, pp. 1–27, 2019.
- [14] World Health Organization, *Global Status Report on Road Safety 2023*. Geneva: WHO, 2023.
- [15] A. Suharsimi, *Prosedur Penelitian Suatu Pensekatan Praktek*. Rineka Cipta, 1998.
- [16] A. Suharsimi, *Prosedur Penelitian Suatu Pensekatan Praktek*. Jakarta: Rineka Cipta, 1998.