

LAHATE APP

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ABSTRACT

Mobile technology has initiated radical changes in education as it provides more convenient and less restrictive means of learning particularly via the filtering of digital materials. Following this trend, this project deals with the creation of an Android-based learning app titled LAHATE (Learning About Highway Through Education) that will help learners become better aware of the concepts underlying highway infrastructure by delivering interactive and engaging content to them. The goal of this research is to offer a second learning platform that is related to modern digital trends and supports the interests of the consumers of the current learning environment of the 21st century, who are more inclined to self-paced and mobile learning technologies. The instructional design model of ADDIE was used to create the application, and it has five steps: Analysis, Design, Development, Implementation, and Evaluation. Throughout the course of development, multiple components were incorporated such as lab sheets, notes, calculation of formulas, exercises, and tutorial videos to enhance interactivity and facilitate learning through visual material. The content was meant to be easy to understand and appropriate to students, teachers and any other individual interested in the basics of highways. The initial test and usage feedback showed satisfaction in the area of usability, content clarity and general learning impression. The LAHATE development is an example of modern trends in mobile learning and demonstrates the way technology can be used to empower educational change by providing available, interesting and usable tools.

1. Introduction

With the ever-increasing Internet technology and the increasing speed of educational informatization, learning applications are popular nowadays. It is influential in foretelling the academic achievement of learners in terms of their online studying nature. Mobile devices have

numerous advantages in education (Bajamal,2023). It can streamline educational impact and improve pedagogical practices. Mobile technology in the educational process helps raise the level of knowledge and skills of higher education students (Palshkov,2024). Mobile devices such as smartphones and tablets can transform the way of teaching with innovative practices (AIAli, 2024). Mobile technology is the most frequently used by students, implying that it can be an effective way to increase learning engagement (Alizadeh, 2024). The research revealed that the perceptions of satisfaction, ease of use, and accessibility among undergraduate students played a critical role in their deployment of mobile technology as a learning tool in the context of a public university (Oyewole, 2022).

LAHATE App (Laboratory Highway and Teaching Application) is a mobile education software based on the Android operating system, developed to improve the studies of learners of a diploma in civil engineering education, in highway and traffic engineering laboratories. It discusses such challenges as the inefficiency of access to material and limited time efficiency and offers lab templates, calculation tools, video tutorials, and interactive exercises on a single convenient platform. Created with Canva, Android Studio (Java), and apps such as Cap Cut and Google Forms, the application gained reviews based on its ease of use and operation. Google Drive could solve initial problems concerning access to QR codes. The application enhances online education, matches the objectives of IR 4.0, and closes the gap between theory and practice. Beyond that, the video quality will be improved, navigation will be faster, and offline access.

This research aims to design an education application that can easily access unsynchronized educational content and create a one-stop learning center platform application that can improve learning content on highway engineering.

2. Materials and Methods

The most common models used for designing and developing various learning and teaching software are the ADDIE model (Ahmadigol, 2015; Moradmand, 2014). This model helps instructional designers and teachers create an effective and efficient teaching design by applying the ADDIE model. The LAHATE application was developed efficiently on the basis of the ADDIE model instructional design paradigm, beginning with need analysis, design, development, implementation, and evaluation stages. A needs analysis survey was used to review the present teaching practices of the highway engineering laboratory session. The design phase is a technical process involving coding, testing, and content creation with the goal of having a functional and user-friendly educational tool for highway engineering students. Android Studio was implemented and developed, using Java and XML programming language to program the interface and the functionality. This stage was divided into making creation buttons, changing screens, back-end logic required to move among different parts of the application, and the interface, which is displayed, containing the welcome screen and experimental pages of content display. Implementation step in which the application was installed on Android devices and released to a group of students in the highway engineering. With the help of the app, the Student attended a hands-on session to revise the lab procedure before the physical test. The testing ensured that all functions, such as navigation and displaying content, operated successfully across various screen sizes and emulators. Finally,

there was the evaluation process, whereby the functionality was tested and user feedback was gathered, which enabled the identification of existing bugs and error correction before repackaging the application for the extended market.

3. Results

The application was tried on various Android devices. A total of 126 Diploma in Civil Engineering students who had learned the Highway Laboratory course subject at Ungku Omar Polytechnic gave their perceptions and evaluations of the use of this application. All buttons in the application work smoothly. Figure 1 and Figure 2 show the results from student feedback. Feedback from 126 students showed that the LAHATE app was well received, with all aspects scoring above 4.50 on a 5-point scale. The highest score was for "Helps Understand Procedures" (4.71), followed by Ease of Use, Mobile Learning Suitability, and Overall Satisfaction. Comparing the average result in Pre-Test and Post-Test shows a mean score increase of 23.4%, a significant improvement in performance after using the LAHATE application. These results indicate that the app is user-friendly, effective for revision, and supports independent learning in highway engineering.

3.1 Figures and Tables

All figures and tables should be cited in the main text as Figure 1, Table 1, etc.

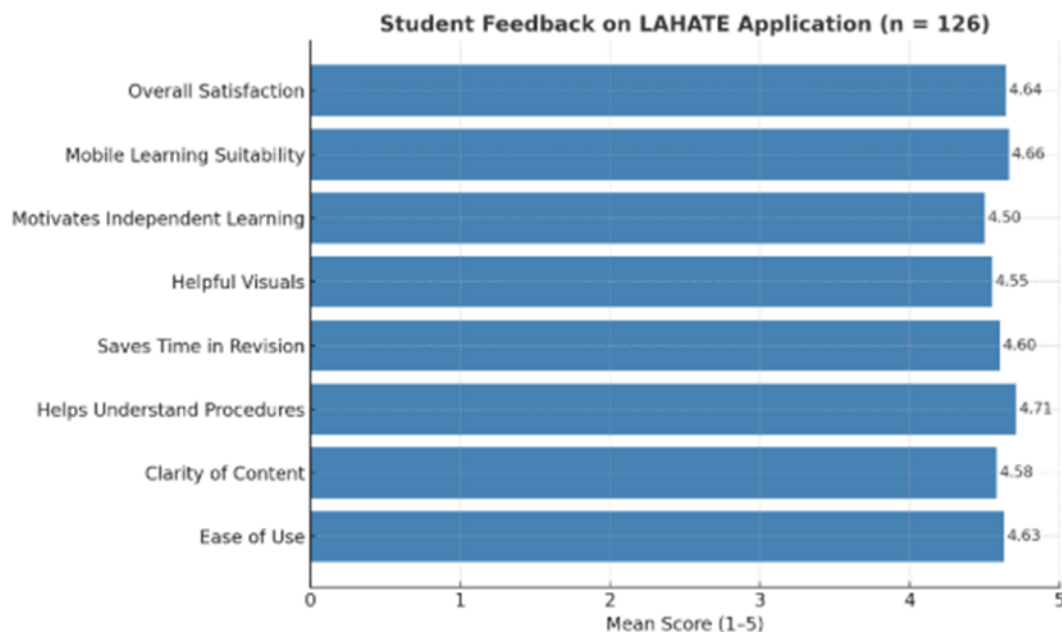


Figure 1. Student perceptions of the LAHATE Application.

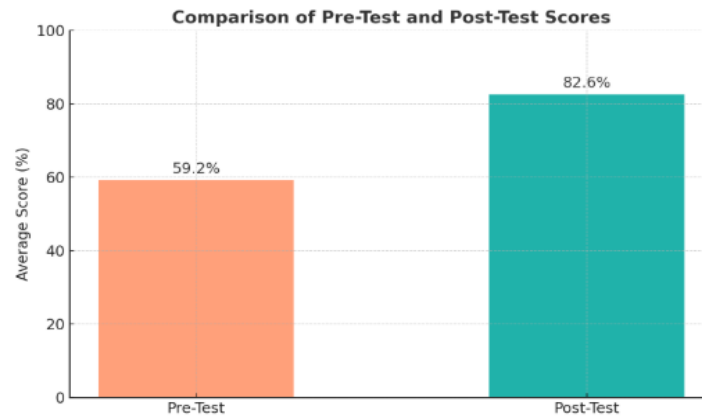


Figure 2. Student perceptions of the LAHATE Application.

4. Discussion

The LAHATE app has a functional testing procedure where the app focuses on its core functionality and how someone would interact with it. As depicted in the screenshots, the app has several critical elements in Figure 3. A primary menu that has a navigation-friendly interface branded with the name of the institution. The actual Android devices were used to test the application with designated groups of users comprising both students and lecturers. The images show that the apps were used by users in real-time learning. They could access diverse features, which include the lab sheets, notes, formula calculations, exercises, and tutorial videos via a responsive interface. The results of the testing also proved that the app works fine without any debugging issues in the start-up process or navigation between sections. Reading of experiment instructions, entry into calculation tools, and the exercises were carried out by users with ease. This round of testing has shown that the LAHATE application is not just useful, but also reliable and affordable. It will help it achieve its intended purpose of aiding in the activities of the laboratory courses on Highway and Traffic Engineering subject matter in an effective and virtual learning system.

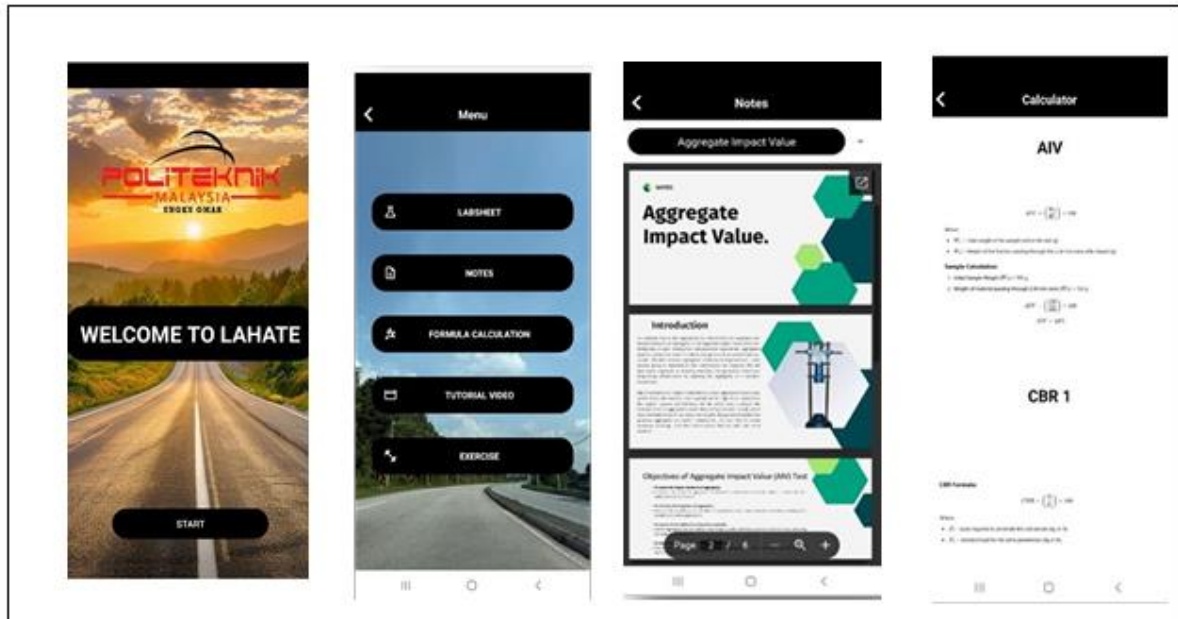


Figure 3: Features and user interaction of the LAHATE application

5. Conclusion

The LAHATE mobile application is a handy and effective tool to improve highway engineering education. Making use of accessible, user-friendly, and Organized Digital Content. The app will allow self-paced and flexible learning that is helpful in an asynchronous or hybrid setting. Its effectiveness is confirmed by the positive student feedback, which increases learning outcomes. The development of this application is in line with Sustainable Development Goal (SDG) 4: Quality Education, in the sense that it provides inclusive and quality access to technical knowledge and use of digital technologies, especially to empower students to achieve better learning experiences.

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