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THE INTERNATIONAL COMPETITION ON SUSTAINABLE EDUCATION

20TH AUGUST 2025

TRANSFORMING EDUCATION, DRIVING INNOVATION AND ADVANCING LIFELONG LEARNING FOR EMPOWERED WORLD

STA BOOST: AN INNOVATIVE DIGITAL SOLUTION TO ENHANCE STUDENT ENGAGEMENT IN INTRODUCTION TO STATISTICS

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ABSTRACT

STA Boost is a digital learning tool designed to enhance student engagement and understanding in the Introduction to Statistics course. Designed using a no-code platform, the app provides structured, topic-based notes and a range of interactive learning games that support both classroom use and self-directed study. This innovation addresses common challenges in statistics education, such as difficulty in understanding abstract concepts, low motivation, and limited access to engaging learning materials. Selected topics from the syllabus are presented in a simplified format, accompanied by interactive single-player and multiplayer games that reinforce learning through quizzes, puzzles, and timed challenges. These features help students actively recall and apply statistical concepts in a fun and meaningful way. STA Boost is accessible on multiple devices through a simple shareable link, with no installation required. It was developed entirely using free digital tools, making it a cost-effective and scalable solution for educational institutions. Feedback from 67 students revealed highly positive responses, with common descriptors including "enjoyable," "educational," and "interactive," indicating strong engagement and satisfaction. By promoting digital literacy, active learning, and flexible access, STA Boost aligns with the goals of 21st-century education. It provides a practical solution to enhance the teaching and learning of introductory statistics.

Keywords: *Digital learning, Gamified education, Statistics education, Student Engagement, No-code platform*

INTRODUCTION

The teaching and learning of statistics at the tertiary level present persistent challenges. Students often struggle with the abstract nature of statistical concepts, which require higher-order reasoning and the application of quantitative techniques (Boitshwarelo & Jayasinghe, 2024). Traditional lecture-based

instruction frequently fails to sustain engagement, accommodate diverse learning preferences, or support independent learning (Al-Haddad et al., 2024; Lee, 2007). Lecturers, in turn, face difficulties in maintaining attention, encouraging interaction, and adapting pedagogical methods to support statistical literacy (Hassad, 2009; Nunes, 2016).

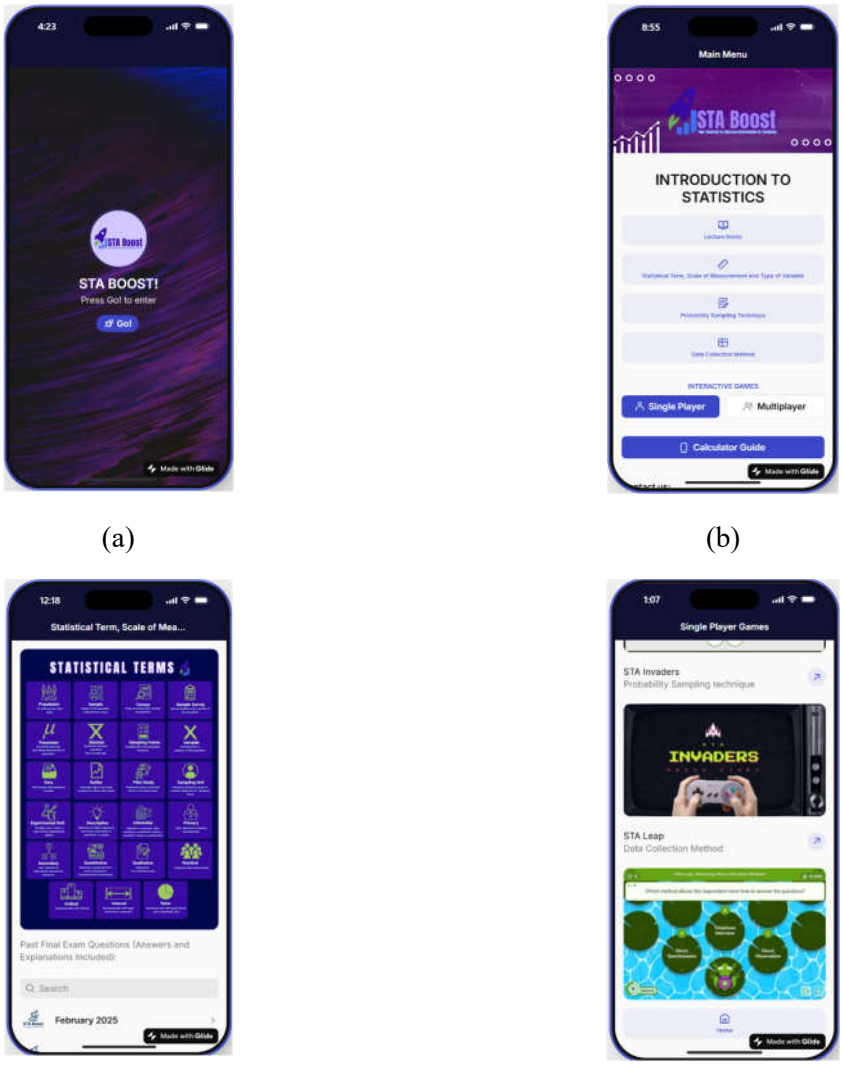
To address these issues, this project introduced STA Boost, a mobile-accessible application that integrates structured instructional content with interactive and gamified learning tools. STA Boost was designed to improve students' understanding of foundational statistical concepts, increase engagement, and promote flexibility in learning. The platform features structured notes, scenario-based exam questions, calculator tutorials, and game modules that cover key topics, including statistical terms, measurement scales, sampling techniques, and data collection methods. STA Boost was developed using the Glide Apps platform. Game activities are hosted on external tools such as Wordwall, Genially, Educaplay, Blooket, and Kahoot, and are accessible through a unified interface.

METHODOLOGY

The development of STA Boost followed a structured and user-focused approach to support teaching and learning for the Introduction to Statistics course. The process involved four main phases: planning, development, implementation, and evaluation. During the planning phase, the Introduction to Statistics course syllabus was reviewed to identify key learning outcomes and commonly challenging topics. Based on student learning needs and lecturer input, a selection of topics was chosen for inclusion in the initial version of STA Boost. These selected topics were considered foundational and essential for building students' understanding of basic statistical concepts.

In the development phase, STA Boost was created using Glide Apps, a no-code platform accessible across mobile phones, tablets, and laptops. The chosen content was organized into clear, topic-based sections to help students easily navigate and review each concept. Each section included concise notes and explanations, paired with interactive activities and games developed using a variety of educational tools. These features were embedded within the app for seamless access and engagement.

The implementation phase involved using STA Boost in actual classroom sessions. Lecturers introduced the platform during lessons, while students were encouraged to explore and interact with the content both during and outside of class. For evaluation, feedback was collected from 67 students using Mentimeter. They were asked to describe their experience with STA Boost in three words. The responses were analyzed and visualized in a word cloud to identify recurring themes and evaluate the platform's impact on student engagement and learning motivation. Figure 1 shows the user interface of STA Boost.



(a) (b)

(c) (d)

Figure 1.: User Interface of STA Boost

As illustrated in Figure 1, the STA Boost application guides students through a structured digital interface to support the learning of statistics. The welcome screen (a) introduces the platform, while the main menu (b) offers access to learning modes and essential tools. The topic selection page (c) presents categorized statistical concepts and revision materials. The game interface (d) showcases interactive activities designed to reinforce learning through gamified assessments, progressively building students' understanding of key statistical topics.

RESULTS AND DISCUSSION

The qualitative feedback provided by students was synthesized to identify key themes regarding their experience with the STA Boost platform. Prominent descriptors were extracted to capture students' perceptions related to engagement, interactivity, and usability. Responses were collected and visually represented through a word cloud as shown in Figure 2.

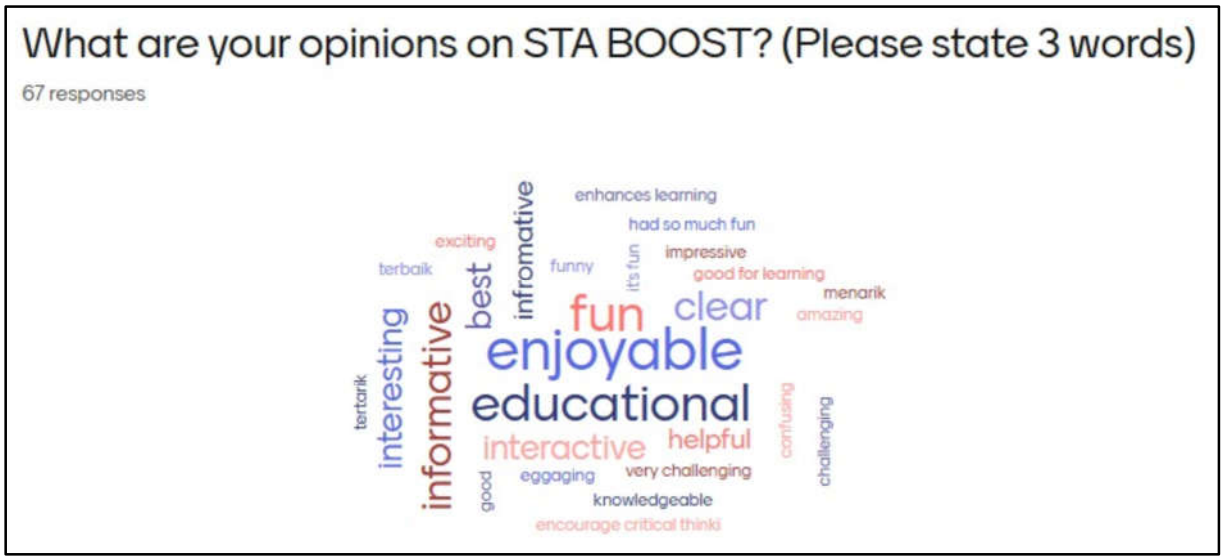


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Figure 2.: Mentimeter Results

Figure 2 illustrates the words most frequently provided by respondents to describe their experience with STA Boost. The larger the word, the more frequently students mentioned it. Among the most frequently mentioned words were "enjoyable," "educational," and "fun," indicating that students found STA Boost to be beneficial and engaging. Other notable words included "interactive," "informative," "interesting," and "clear," reflecting the platform's effectiveness in providing an enjoyable and stimulating learning environment.

These findings suggest that STA Boost successfully fosters an engaging learning environment, making it a valuable educational tool. The overwhelmingly positive student feedback underscores the platform's effectiveness in enhancing student engagement and promoting learning outcomes that align with the objectives of 21st-century education. Continuous improvements and regular feedback will further enhance STA Boost's positive impact on students' learning experiences.

CONCLUSION

The implementation of STA Boost in the Introduction to Statistics course demonstrates significant potential in enhancing students' engagement, motivation, and overall learning experience. By integrating structured educational content with interactive games, STA Boost successfully addresses

common challenges faced by students, including difficulty understanding abstract concepts and low classroom participation.

Student feedback strongly supports the effectiveness of STA Boost, highlighting key benefits such as being enjoyable, educational, fun, and interactive. This feedback suggests that the innovative digital approach of STA Boost has a positive impact on students' perceptions and mastery of statistics, aligning closely with the goals of 21st-century education by promoting digital literacy, creativity, and active learning.

Moving forward, continuous evaluation and refinement based on user feedback will further strengthen STA Boost as an impactful educational innovation. It is recommended that future studies investigate broader implementation across various courses and institutions, examining the long-term effects on student performance and engagement. Ultimately, STA Boost exemplifies how thoughtfully designed digital innovations can significantly enrich the educational landscape, making learning accessible, effective, and enjoyable for all students.

ACKNOWLEDGEMENTS

Special thanks were extended to the Universiti Teknologi MARA (UiTM), Sarawak Branch, Mukah Campus.

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