MERGING LANES: WHERE E-LEARNING DIVERSITY MEETS FUTURE TRENDS

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THE DEVELOPMENT OF MATH E-LEARNING PORTAL FOR PKSK CANDIDATES

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ABSTRACT

This project presents the development of an interactive mathematics e-learning portal designed for Standard 6 students preparing for the Pentaksiran Kemasukan Sekolah Khusus (PKSK). Aligned with the KSSR syllabus and supported by structured assessment components, the portal aims to strengthen students' mathematical understanding and problem-solving skills. It incorporates interactive exercises, automated quizzes, real-time feedback, and gamified learning features to enhance motivation and encourage self-paced learning. Developed using modern web technologies, Bijak Pecahan portal offers a user-friendly interface suitable for primary school learners. Findings from initial usability testing, along with feedback from teachers and students, indicate that the portal significantly improves exam readiness and promotes independent learning. Overall, this project addresses the growing demand for effective digital learning solutions within the Malaysian primary education context.

Keywords: portal, mathematics, e-learning, PKSK, Bijak Pecahan

Introduction

In today's digital era, technology has transformed the way people communicate, access information, and acquire knowledge. The rapid growth of e-learning has enabled students at all levels to learn more flexibly and efficiently through internet-based platforms. E-learning integrates various multimedia elements such as videos, quizzes, and interactive assessments, allowing learners to study at their own pace and according to their individual needs. Its widespread adoption during the COVID-19 pandemic highlighted its importance not only as an alternative mode of instruction but also as an essential component of modern education systems that enhances teaching effectiveness and student engagement (Cataudella et al., 2021).

This project focuses on the topic of fractions in Mathematics for Standard 6 students preparing for the (Pentaksiran Kemasukan Sekolah Khusus (PKSK) examination at Sekolah Kebangsaan Kampung Pasir Puteh (SKKPP). Although the UPSR has been abolished, PKSK remains a key assessment for students seeking admission into institutions under the Ministry of Education (KPM) and MRSM. To ensure the platform meets classroom needs, an interview was conducted with Encik Suhaimi bin Zainol Abidin, a Standard 6 Mathematics teacher at SKKPP. His insights and experience contributed

to shaping the content and design of the e-learning platform, ensuring its relevance, practicality, and effectiveness in supporting both teachers and students in mathematics learning and exam preparation.

Standard 6 students face significant challenges in mastering fractions, particularly in operations such as addition, subtraction, multiplication, and division. The abstract nature of fractions often prevents students from fully understanding fractions as parts of a whole or as numerical relationships. Without concrete representations or engaging learning experiences, many students memorize procedures without grasping underlying concepts, leading to misconceptions and frequent errors. The lack of interactive learning resources further worsens the situation, as traditional materials are often static and less engaging, making it difficult for young learners to maintain interest and develop strong conceptual understanding. Additionally, the structured "Ansur Maju" technique requires continuous practice and guidance and need deeper exploration of concepts and higher-order thinking skills, ultimately affecting students' readiness for demanding assessments such as the PKSK.

To address these issues, this project outlines three key objectives which is to identify the needs of Standard 6 students and teachers in learning fractions for PKSK preparation, to design and develop an interactive e-learning portal on fractions based on Bloom's Digital Taxonomy and to evaluate the functionality and usability of the proposed portal to ensure its effectiveness in supporting learning and exam preparation.

Methodology

Bijak Pecahan e-learning portal adopts Bloom's Digital Taxonomy (BDT) and the ADDIE Model as its core methodology to guide the design and development of the interactive e-learning portal. Bloom's Digital Taxonomy, adapted from Bloom's original cognitive framework, integrates digital tools into six hierarchical levels of thinking: remembering, understanding, applying, analyzing, evaluating, and creating (Husain, 2021; Nava et al., 2022). In this project, BDT ensures that learning activities are structured progressively, from recalling basic fraction concepts through quizzes and flashcards, to understanding through videos and simulations, and applying knowledge via interactive problem-solving tasks.

However, ADDIE Model provides a systematic and structured instructional design framework consisting of five phases: Analysis, Design, Development, Implementation, and Evaluation. In the Analysis phase, learners' needs, learning challenges in fractions, and PKSK requirements are identified. During the Design phase, learning objectives, content structure, user interface, and assessment strategies are carefully planned in alignment with Bloom's Digital Taxonomy. The Development phase involves creating the actual e-learning portal, integrating multimedia elements, interactive exercises, and feedback mechanisms. Implementation focuses on deploying the portal for student use, while the Evaluation phase assesses usability, functionality, and learning effectiveness through feedback and

testing.

The integration of Bloom's Digital Taxonomy and the ADDIE Model ensures that the Bijak Pecahan e-learning portal is both pedagogically sound and systematically developed. While BDT guides the cognitive depth and digital engagement of learning activities, ADDIE ensures that each stage of development is organized, learner-centered, and outcome-driven. Together, these methodologies provide a comprehensive framework that enhances conceptual understanding, promotes higher-order thinking skills, and supports effective preparation for the PKSK examination.

Figure 1: Phases in ADDIE Model

Design

The design of the user interface (UI) for the Bijak Pecahan e-learning portal plays a crucial role in ensuring effective learning and meaningful student engagement. In the design stage, clear learning objectives were first established to ensure that the interface layout, instructional strategies, and assessment methods were properly aligned with the intended learning outcomes. A well-structured interface not only presents content clearly but also guides students through interactive activities in a logical and intuitive manner. As highlighted by Raisal et al. (2024), the design phase is essential in transforming analyzed data into purposeful instructional activities, while Lyonni et al. (2023) emphasize the importance of creating innovative and engaging learning environments. Therefore, the user interface of this portal was carefully designed to be visually appealing, age-appropriate, and easy to navigate, enabling Standard 6 students to interact confidently with mathematical content.

Figure 2 illustrates the Home Page of the Bijak Pecahan e-learning portal, which serves as the main user interface and entry point to the system.

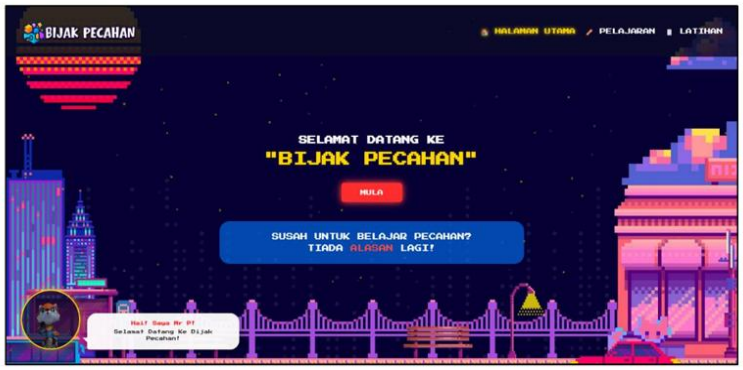

Figure 2: Bijak Pecahan Homepage

Figure 3 shows the Pelajaran Page of the Bijak Pecahan e-learning portal, providing organized access to lesson modules while retaining the same navigation bar for easy site navigation. A heading, “Mari Belajar Bersama!”, motivates learners, and topic-specific buttons allow students to choose lessons based on their preferences.

Figure 3: Bijak Pecahan Pelajaran Page

Additionally, functional icons located at the bottom-right corner include a book icon that opens the digital textbook via the AnyFlip platform as shows at Figure 4. These features collectively support an interactive, well-organized, and learner-centered learning environment for effective reinforcement of fraction concepts.

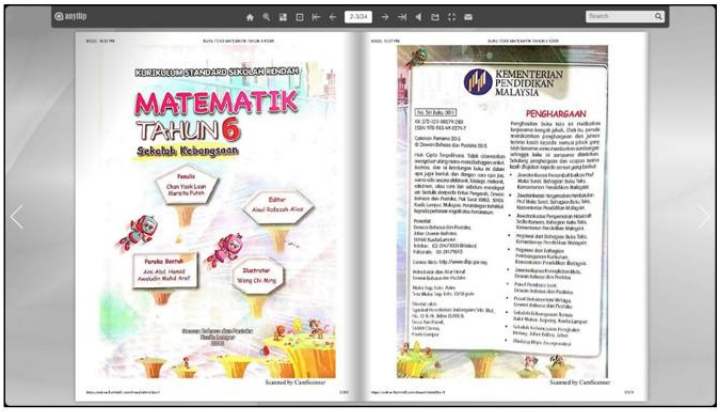

Figure 4: e-Book using AnyFlip

Figure 5 shows the Latihan Page which consists of Latihan, Ujian Sumatif and Main and Cabar. This page was designed to reinforce students' understanding of fractions through interactive practice. Exercises are divided into formative activities such as drag-and-drop, memory, and daily tasks with immediate feedback and summative assessments (ujian PKSK) to evaluate overall performance.

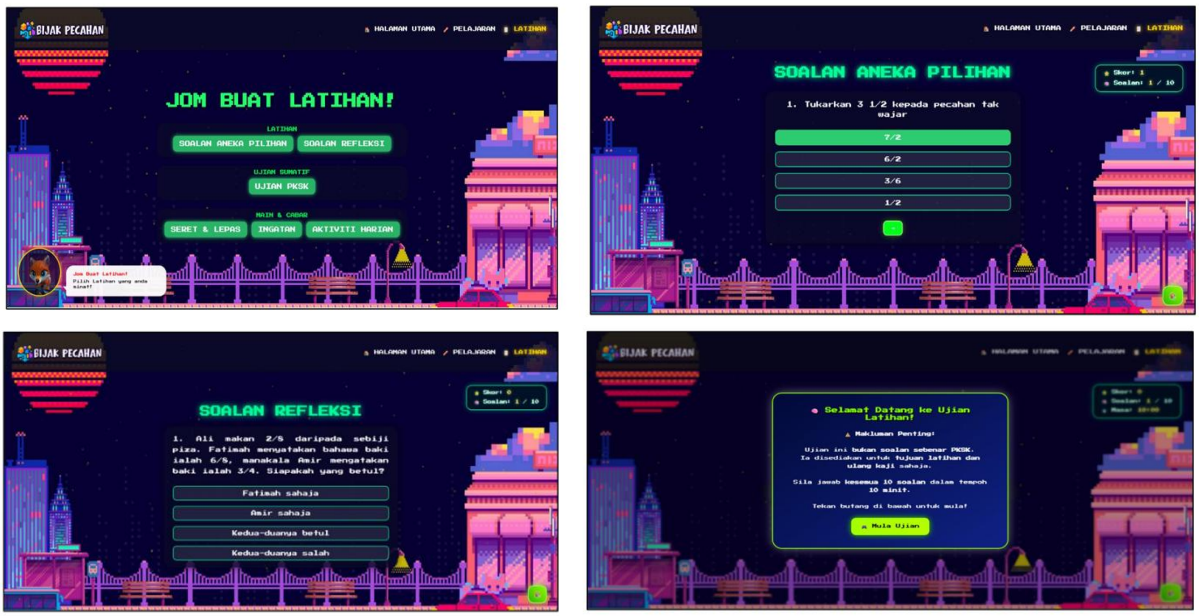

Figure 5: Latihan Page

Figure 6 illustrates the Permainan Page which consists of Seret & Lepas Page, Permainan Ingatan Page and Reka Menu Tengah Hari Page.

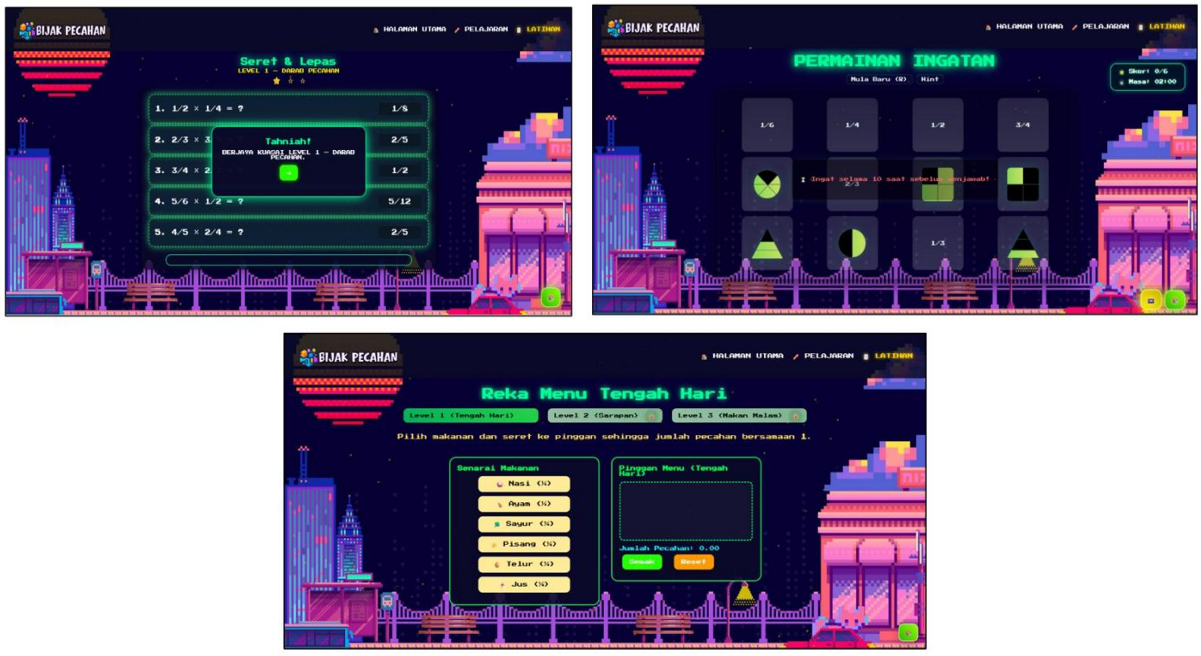

Figure 6: Permainan Page

Conclusion

The Bijak Pecahan e-learning portal successfully demonstrates the effectiveness of combining interactive multimedia with Bloom's Digital Taxonomy and ADDIE Model to support Standard 6 students in learning fractions and preparing for the PKSK examination. The portal's design incorporates animations, visual tools, interactive activities, and step-by-step explanations that make abstract fraction concepts more accessible and engaging. Expert reviews and usability assessments confirmed that the portal effectively enhances conceptual understanding and supports independent learning, achieving all project objectives.

The Bijak Pecahan e-learning portal contributes significantly to the field of educational technology by providing a structured, interactive, and student-centered learning environment. Features such as immediate, detailed feedback allow students to reflect on errors, strengthen problem-solving skills, and progress at their own pace, reducing reliance on continuous teacher support. The portal serves not only as a practical tool for PKSK preparation but also as a model for future interactive mathematics e-learning applications. Overall, this project lays a strong foundation for the development of effective digital learning resources in primary education and highlights the potential of technology-enhanced instruction to improve engagement, motivation, and understanding in mathematics.

References:

Cataudella, S., Carta, S., Mascia, M. L., Masala, C., Petretto, D. R., & Penna, M. P. (2021). Psychological Aspects of Students With Learning Disabilities in E-Environments: A Mini Review and Future Research Directions. *Frontiers in Psychology*, 11. https://doi.org/10.3389/FPSYG.2020.611818.

Husain, F. N. (2021). Use of Digital Assessments how to Utilize Digital Bloom to Accommodate Online Learning and Assessments? *Asian Journal of Education and Training,* 7(1), 30–35. https://doi.org/10.20448/JOURNAL.522.2021.71.30.35.

Lyonni, G., Ikhsanudin, I., & Rahmani, E. F. (2023). Developing a Dayak Folk Storybook as Supplementary Material for Teaching Narrative Text. Acitya: *Journal of Teaching and Education,* 5(1), 98–116. https://doi.org/10.30650/AJTE.V5I1.3488

Nava, C. M. E., Cortezano, G. P., Yazon, A. D., Manaig, K. A., & Tesoro, J. F. B. (2022). Lived Experiences of English Teachers in Integrating Bloom's Digital Taxonomy on Their Differentiated Instruction Practices: A Phenomenological Study. *Journal of English as a Foreign Language Teaching and Research*, 2(2), 30–43. https://doi.org/10.31098/JEFLTR.V2I2.1109

Raisal, A. Y., Rakhmadi, A. J., & Hidayat, M. (2024). The Development of Android-Based Interactive

Learning Media on the Topic of Discussing the Atmosphere. *Journal of Physics: Conference Series,* 2773(1). https://doi.org/10.1088/1742-6596/2773/1/012023

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