PROBIZ: Multimedia E-learning for SPM Students using Gagne's Nine Events Theory

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ABSTRACT

The ProBIZ e-learning courseware was designed to transform the learning experience of SPM students in Business Studies by addressing common challenges such as lack of focus, difficulty in understanding business functions, and poor retention of past lessons. This project identifies the requirements for multimedia applications in the Business Organization subject (Chapter 4), develops an interactive courseware tailored to these needs, and evaluates its usability. Guided by the ADDIE instructional design model and Gagne's Nine Events theory, the courseware integrates text, images, videos, animations, and interactive activities to enhance engagement and knowledge retention. Gagne's instructional events such as gaining attention, informing learners of objectives, stimulating recall, presenting content, providing guidance, eliciting performance, giving feedback, assessing performance, and enhancing retention and transfer are embedded within the courseware to ensure a structured and effective learning experience. The development process included planning, requirement analysis, design, implementation, testing, and documentation. Usability was assessed by three experts in multimedia and e-learning development, focusing on functionality, content accuracy, and design quality. Findings confirmed that the courseware aligned with Gagne's framework, though refinements were suggested to improve feedback for students. Overall, ProBIZ demonstrates the potential of multimedia-based e-learning to support active learning and improve comprehension of business functions. Future enhancements include expanding question banks, broadening topic coverage, and improving navigation and interactivity to further optimize the learning experience.

Keywords: E-learning, SPM, ADDIE Model, Gagne's Nine Events Theory, Multimedia Courseware

INTRODUCTION

E-learning is an advanced approach to education that enhances comprehension and performance through digital platforms (Cabaluna, 2022). With rapid technological advancements, educational institutions are increasingly adopting multimedia applications to support diverse learning styles and improve student engagement (Oltinboyevna & Khahhorova Maftuna Baxtiyorovna, 2025). Augmented reality (AR) and interactive tools have shown promise in enhancing motivation, though their impact on student achievement is still being studied (Kusuma, 2025).

Multimedia-based learning facilitates understanding through visual and interactive elements such as animations and simulations, making complex concepts more accessible (Septiani et al., 2020). In Malaysia, Business Studies is one of the core subjects in the SPM curriculum, equipping students with critical thinking, problem-solving, and entrepreneurial skills. This study focuses on Sekolah Menengah Kebangsaan Kota Masai (SMKKM), rebranded as SKOMAS in 2011 to align with its vision of academic excellence. The adoption of multimedia e-learning aims to enhance student learning outcomes in Business Studies.

Current Process

The learning process for Chapter 4: Core Functions in Business Organizations within the SPM Business subject at SMK Kota Masai (SKOMAS) primarily relies on conventional classroom methods. Educators use government-issued textbooks and PowerPoint presentations, with a focus on memorization and factual knowledge acquisition. This chapter covers 11 core business functions, including administration, human resource management, finance, information, and communication technology (ICT), research and development (R&D), procurement, production, marketing, distribution, customer service, and sales.

The Malaysian government introduced SPM Business textbooks in 2003, which were phased out by 2020. In 2017, the KSSM syllabus was implemented to improve learning methodologies, with Form 1 students transitioning to KSSM textbooks and Form 4 students adopting Specialized Elective Subjects (MPEI), such as economics and accounting. Although these curriculum reforms aimed to modernize teaching and learning, the delivery of Business Studies content has largely remained conventional, relying on textbooks and slide-based presentations. This approach often limits student engagement, comprehension, and long-term retention, especially when dealing with abstract or complex business functions. Hence, the lack of interactivity in traditional teaching methods makes it challenging for students to grasp complex concepts (Jan et al., 2023).

Existing courseware often focuses on multimedia delivery without adopting a structured pedagogical framework, reducing its effectiveness in fostering deeper learning. To address this gap, the present study introduces ProBIZ, a multimedia e-learning courseware specifically designed for SPM Business Studies (Chapter 4: Business Organization). ProBIZ integrates animations, interactive quizzes, drag-and-drop exercises, and video explanations within the ADDIE framework, guided by Gagne's Nine Events theory. The novelty of this courseware lies in its unique combination of interactivity and instructional sequencing, offering a pedagogically sound and engaging learning experience. Furthermore, its design has been validated through expert usability evaluation, ensuring both quality and educational relevance.

Problem Statement and Motivation

Students studying Business Studies for the SPM examination face several challenges due to traditional teaching methods that often limit engagement, comprehension, and long-term retention. Lessons are typically delivered using textbooks and slide presentations, resulting in reduced student focus and passive learning. Many students struggle to stay attentive during class, find it difficult to understand step-by-step business processes, and often lose track of previously taught lessons due to insufficient opportunities for review.

To address these challenges, an innovative approach is required. Multimedia e-learning applications can transform the learning experience by integrating interactive slides, audio, video, and text-based activities to capture attention. Complex business functions can be broken down into smaller, manageable segments through puzzles and quizzes, helping students develop a clearer understanding. Additionally, memory-based activities such as flashcards and drag-and-drop games can be incorporated to reinforce prior knowledge and improve retention.

In this context, the ProBIZ courseware was developed to support more engaging and effective learning in Business Studies. Specifically, the project seeks to identify the requirements of multimedia applications for the Business Organization subject (Chapter 4), design and develop an interactive multimedia courseware tailored to these requirements, and evaluate its usability in enhancing students' engagement, comprehension, and retention.

Scope and Significance

This project develops a multimedia e-learning platform, ProBIZ, specifically for SPM Business Studies students and teachers, with a focus on the Business Organization subject (Chapter 4). The platform integrates interactive content such as videos, animations, quizzes, simulations, and case studies to support flexible, self-paced, and engaging learning. For students, these features help improve focus, comprehension, and retention by breaking down complex business functions such as administration, finance, marketing, and customer

service into more accessible and practical learning experiences. Collaborative tools further encourage peer interaction and discussion. For teachers, the platform provides tools for content creation, course management, and assessment, enabling more effective instruction and continuous monitoring of student progress.

The significance of this project lies in its ability to transform traditional classroom learning into a more engaging, interactive, and student-centered experience. By combining multimedia with real-world business applications, the platform enhances student interest, promotes deeper understanding, and strengthens critical thinking skills. Instead of relying solely on passive learning through lectures and textbooks, students actively participate in quizzes, simulations, and problem-solving tasks, which fosters better knowledge retention. Furthermore, the platform supports independent learning, allowing students to explore business concepts at their own pace, thereby preparing them with the skills necessary for academic success and future entrepreneurial endeavours.

LITERATURE REVIEW

Overview of E-learning

E-learning is a digital learning method that provides flexible access to educational content anytime and anywhere (Simangunsong, 2024). It uses web-based systems to create interactive and personalized learning experiences, making education more engaging and accessible (Kiran et al., 2023). By incorporating multimedia, gamification, and adaptive learning, e-learning enhances student engagement compared to traditional lecture-based methods (Kiran et al., 2023). It also supports sustainability by reducing the need for printed materials and physical infrastructure, lowering environmental impact.

However, challenges remain, such as accessibility issues for students with limited internet access and the need for interactive tools to maintain motivation in self-directed learning. Advancements in artificial intelligence and cloud-based platforms continue to improve e-learning by personalizing learning experiences and ensuring seamless access across devices (Govea et al., 2023). As technology evolves, e-learning will play an increasingly vital role in shaping modern education (Yasin et al., 2024).

Multimedia Courseware

The integration of multimedia courseware in education has significantly transformed traditional teaching methodologies by utilizing digital technologies to enhance learning experiences. Multimedia courseware combines various elements such as text, images, audio, video, and interactive components to create a dynamic and engaging learning environment. This approach enhances content delivery and fosters student engagement, making learning more interactive and effective (Teguh Handoyo et al., 2024).

Multimedia courseware is defined as instructional material that incorporates multiple media formats to facilitate knowledge transfer (Agisni et al., 2023). Unlike conventional textbooks and lectures, multimedia-based learning allows students to interact with content through simulations, animations, and scenario-based activities. Research has indicated that multimedia enhances student comprehension by presenting information in visually engaging and contextually meaningful ways (Teguh Handoyo et al., 2024).

Multimedia Elements

Multimedia courseware utilizes a combination of interactive elements (Agisni et al., 2023) to deliver educational content effectively. These elements leverage various media types to engage learners and enhance their understanding of the material, such as:

Text: Textual content provides essential information and explanations within multimedia applications. It can include written instructions, descriptions, labels, or captions to convey concepts and guide learners through the material effectively. Text is versatile and can be customized to match the learning objectives and audience preferences.

Image: Images play a crucial role in multimedia by visualizing concepts, ideas, and information. They can include photographs, illustrations, diagrams, charts, or graphs to enhance understanding and retention. Images provide a visual representation of content, making it easier for learners to grasp complex concepts and relate them to real-world scenarios.

Audio: Audio elements, such as narration, background music, or sound effects, add auditory dimensions to multimedia applications. Audio enhances engagement and immersion, providing additional context, emphasis, or explanation to complement visual content. Narration can guide learners through the material, while background music sets the tone and mood, enhancing the overall learning experience.

Video: Video content brings dynamic visuals to multimedia applications, offering motion, action, and real-life demonstrations. Videos can include recorded lectures, demonstrations, simulations, or interviews, providing learners with compelling visuals and real-world examples. Video enhances engagement and retention by capturing attention and conveying information in a memorable and impactful way.

Animation: Animation adds movement and interactivity to multimedia applications, making concepts come to life in dynamic ways. Animated elements, such as transitions, characters, or interactive simulations, engage learners by providing visual stimulation and interactive experiences.

Gagne's Nine Events Theory

Gagne's Nine Events Theory is grounded in the concept of the Nine Events of Instruction, which provide a structured framework for designing effective e-learning experiences by guiding learners through a logical and engaging instructional process (PC et al., 2022). This approach enhances comprehension, retention, and application of knowledge, making it highly suitable for e-learning environments (Muhammad Syihabul Ihsan Al Haqiqy et al., 2024).

Gain Attention: E-learning begins by capturing learners' attention through multimedia elements such as animations, videos, or problem-based scenarios. This step stimulates curiosity and prepares students for learning.

Inform Learners of Objectives: Clearly stating learning objectives helps students understand what they will achieve by the end of the lesson, keeping them focused and motivated.

Stimulate Recall of Prior Learning: Connecting new content with learners' existing knowledge enhances understanding. This can be done through pre-assessments, discussion prompts, or review questions.

Present the Content: Information is delivered through various multimedia formats such as videos, infographics, interactive simulations, or text-based materials, catering to different learning styles.

Provide Learning Guidance: Additional support, such as hints, explanations, or examples, helps learners process information effectively. In e-learning, this may include guided exercises, tooltips, or real-world applications.

Elicit Performance (Practice): Learners reinforce their understanding through interactive activities like quizzes, drag-and-drop exercises, or problem-solving tasks that promote active engagement.

Provide Feedback: Immediate feedback is crucial in e-learning. Corrective responses, explanations, or adaptive feedback ensure that learners understand mistakes and refine their knowledge.

Assess Performance: Formal assessments, such as graded quizzes, assignments, or simulations, evaluate learners' understanding and measure their achievement of learning objectives.

Enhance Retention and Transfer: Encouraging learners to apply knowledge in real-world situations ensures long-term retention. Case studies, discussion forums, and collaborative projects help students transfer skills to practical contexts.

Gagne's Nine Events of Instruction serves as the theoretical framework for this project, providing a structured approach to lesson design that guides learners through sequential steps to enhance comprehension and retention. The framework emphasizes processes such as capturing learners' attention, stimulating recall of prior knowledge, presenting new content, supporting practice, and delivering feedback to reinforce learning. For this project, five key events are emphasized: recalling prior knowledge, presenting content, providing guidance, practicing, and receiving feedback, as they are most relevant to the development of interactive e-learning courseware. These elements are integrated into ProBIZ Web through multimedia features such as text, images, audio, video, and animation, ensuring that SPM Business students engage actively with the material while strengthening their understanding of business concepts.

METHODOLOGY

The ProBIZ e-learning courseware was developed using the ADDIE model, as shown in Figure 1, a structured instructional design framework comprising five phases: Analysis, Design, Development, Implementation, and Evaluation. This model was chosen to ensure a systematic process that aligns the courseware with educational objectives and learner needs (Hasanah Dewi Lestari, 2023). Through this framework, engaging content was designed, interactive activities were implemented, and learning effectiveness was evaluated. To support development, tools such as Powtoon, Canva, CapCut, Visual Studio Code, and XAMPP were employed to create multimedia elements including videos, animations, quizzes, and drag-and-drop activities ensuring that the platform delivers an engaging and interactive learning experience.

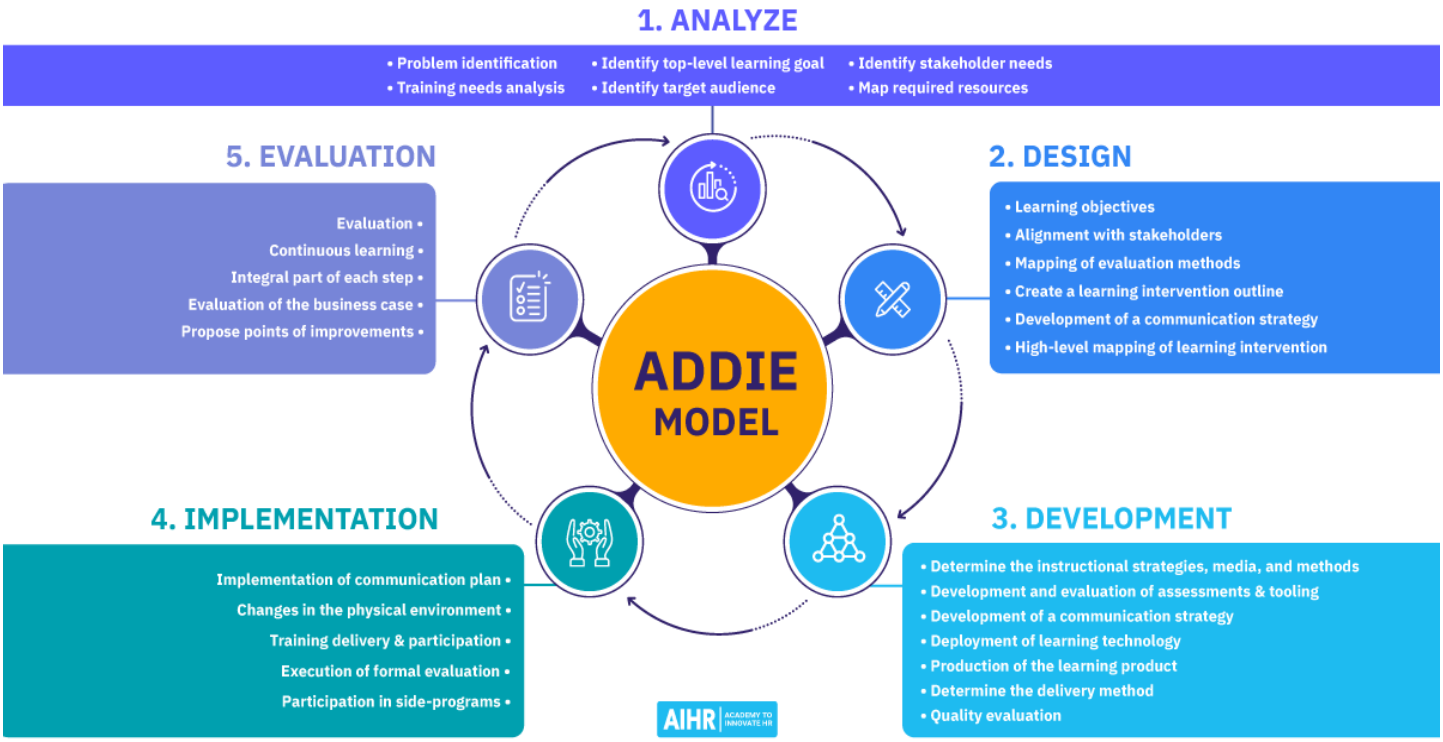

Figure 1 ADDIE Model of Instructional Design

In the Analysis and Design phases, the project team identified the learning challenges faced by the students, particularly in the Business Organization subject (Chapter 4). These challenges included low engagement, difficulty understanding complex business processes, and poor retention of prior lessons. To address these issues, content flow was storyboarded and structured around Gagne's Nine Events of Instruction. Each event such as stimulating recall, presenting new content, providing guidance, eliciting practice, and delivering feedback was strategically embedded in the courseware through interactive activities, multimedia presentations, and scaffolded learning tasks.

The Development, Implementation, and Evaluation phases involved producing and testing the courseware to ensure quality and usability. Multimedia content was created and integrated, followed by deployment for

expert review. Three evaluators with experience in multimedia and e-learning assessed the platform's functionality, accuracy, and instructional design quality. Their feedback confirmed the effectiveness of the courseware in supporting learning objectives, though refinements were recommended to enhance feedback mechanisms and interactivity. This evaluation process not only validated the instructional design but also provided insights for continuous improvement, ensuring ProBIZ remains a relevant and impactful learning tool.

RESULTS AND DISCUSSION

PROBIZ: Multimedia E-learning for SPM students

The ProBIZ e-learning platform was developed to enhance students' understanding of the Business Organization subject. It integrates multimedia elements such as animations, videos, sound, images, and interactive text to create an engaging learning experience. Guided by Gagne's Nine Events of Instruction, the platform implements structured steps such as gaining attention through animated introductions, presenting content with multimedia explanations, eliciting performance via interactive quizzes, and providing feedback through instant responses. These features make learning more interactive and meaningful, ensuring that students remain engaged while strengthening comprehension and long-term retention.

Homepage Features:

The homepage incorporates a section-based navigation design, as illustrated in Figure 2. Before accessing the main content, users can scroll down to explore different sections. This feature is powered by JavaScript, which creates smooth zoom-in and zoom-out transitions for an enhanced browsing experience. Clicking "Mula" directs users to the main content sections, covering key topics with structured learning materials and interactive multimedia elements.

Figure 2 Interface of Homepage Page

Interactive Content Section:

Figure 3 shows Content 1, which introduces the 11 core functions in business through interactive elements,

including animated moving objects and talking animations. When users click on "Bahagian Fungsian Utama dalam Perniagaan", a sound plays to explain the definitions, enhancing engagement and understanding.

Figure 3 Interface of Content 1

Content 2 in Figure 4 explores business strategies for innovation and growth, focusing on product development and market expansion. It outlines key steps in creating and improving products to meet market demands, using multimedia elements to enhance learning.

Figure 4 Interface of Content 2

Meanwhile, Content 3 in Figure 5 highlights the role of Information Technology (IT) in business operations, demonstrating how IT improves productivity, efficiency, and decision-making. It incorporates multimedia to showcase real-world applications, helping students understand the impact of technology in modern businesses.

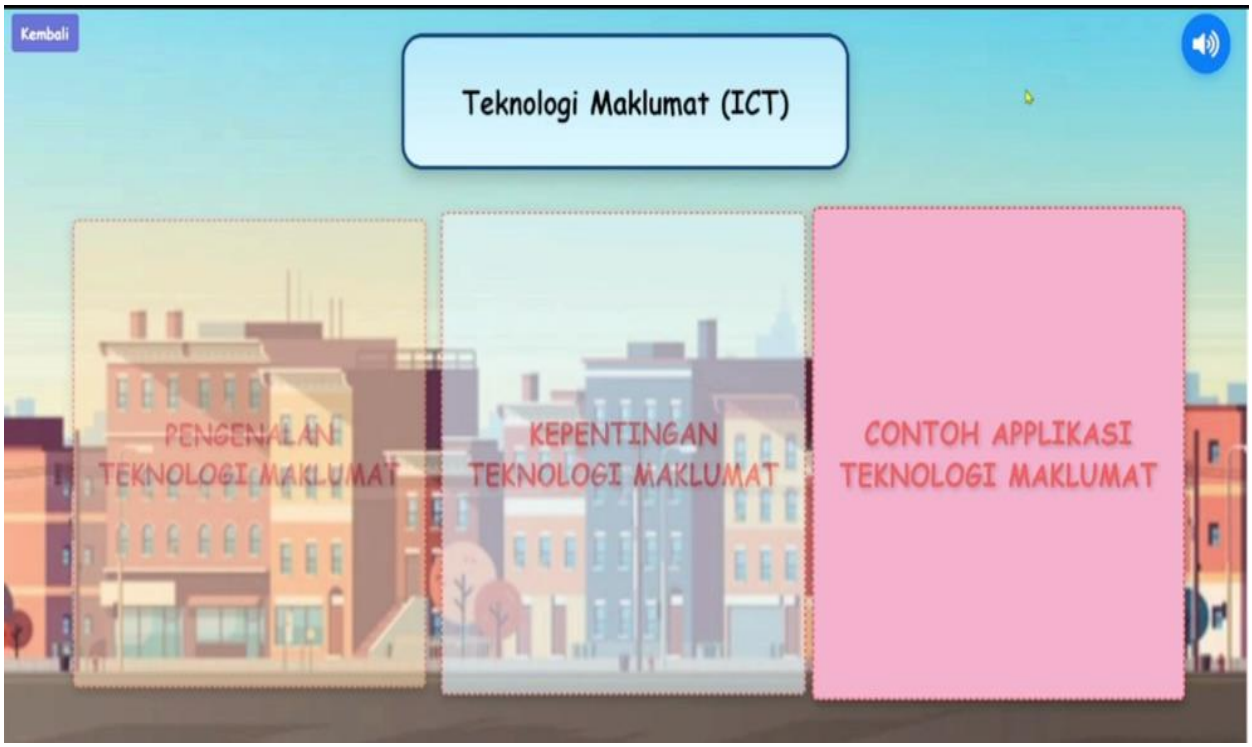

Figure 5 Interface of Content 3

Interactive Video Section:

This section integrates multimedia elements as shown in Figure 6 to enhance learning through engaging video content. It includes animations, explanations, and real-world examples to help students visualize key business concepts effectively.

Figure 6 Interface of Video Section

Interactive Quiz Section:

Figures 7, 8, and 9 exhibit the interactive quizzes designed to reinforce learning, allowing students to test their understanding of key business concepts. These quizzes include multiple-choice questions, memory-based activities, and drag-and-drop exercises, which provide instant feedback to enhance engagement and retention.

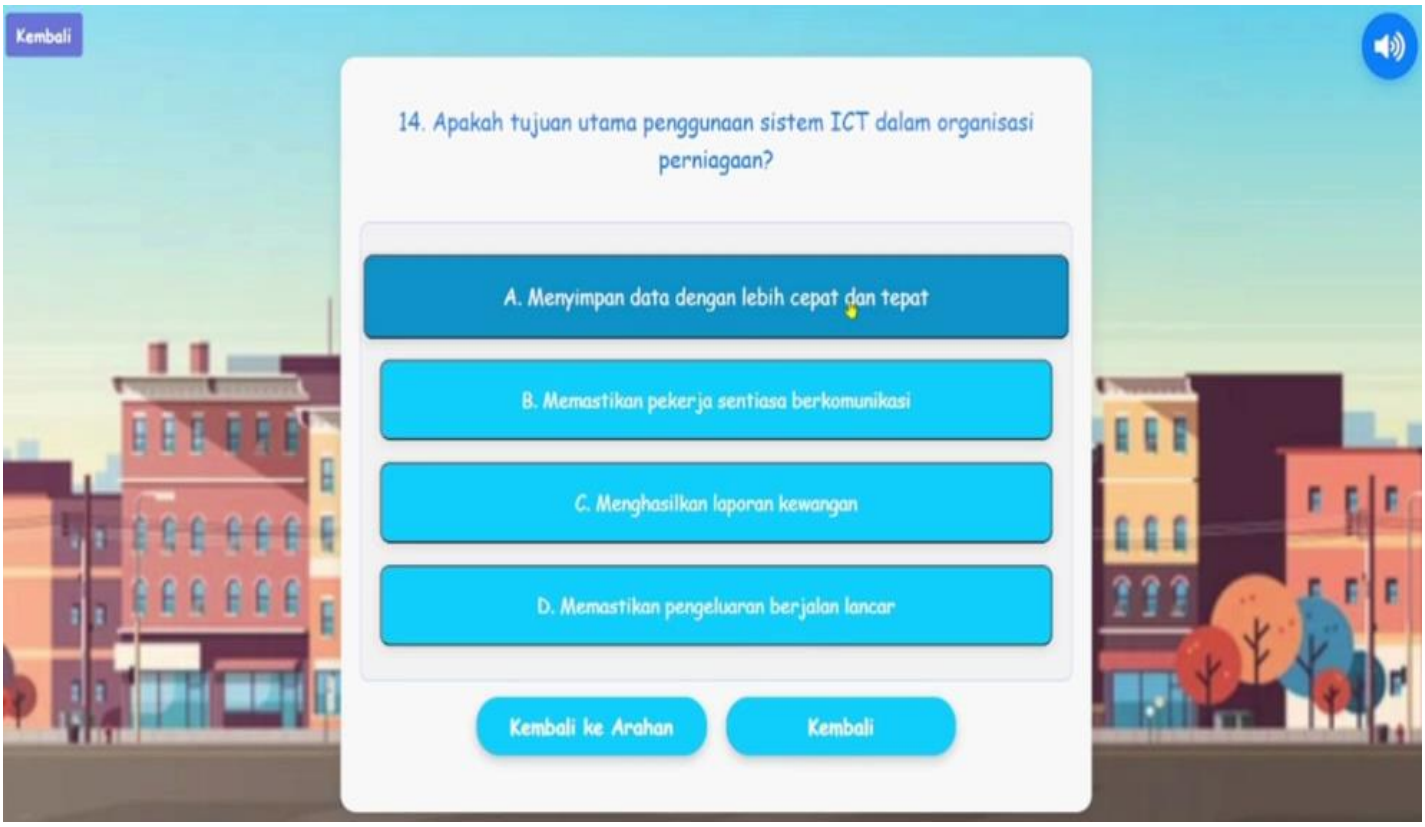

Figure 7 Interface of Quiz 1 Section (multiple choice question)

Figure 8 Interface of Quiz 2 Section (memory quiz)

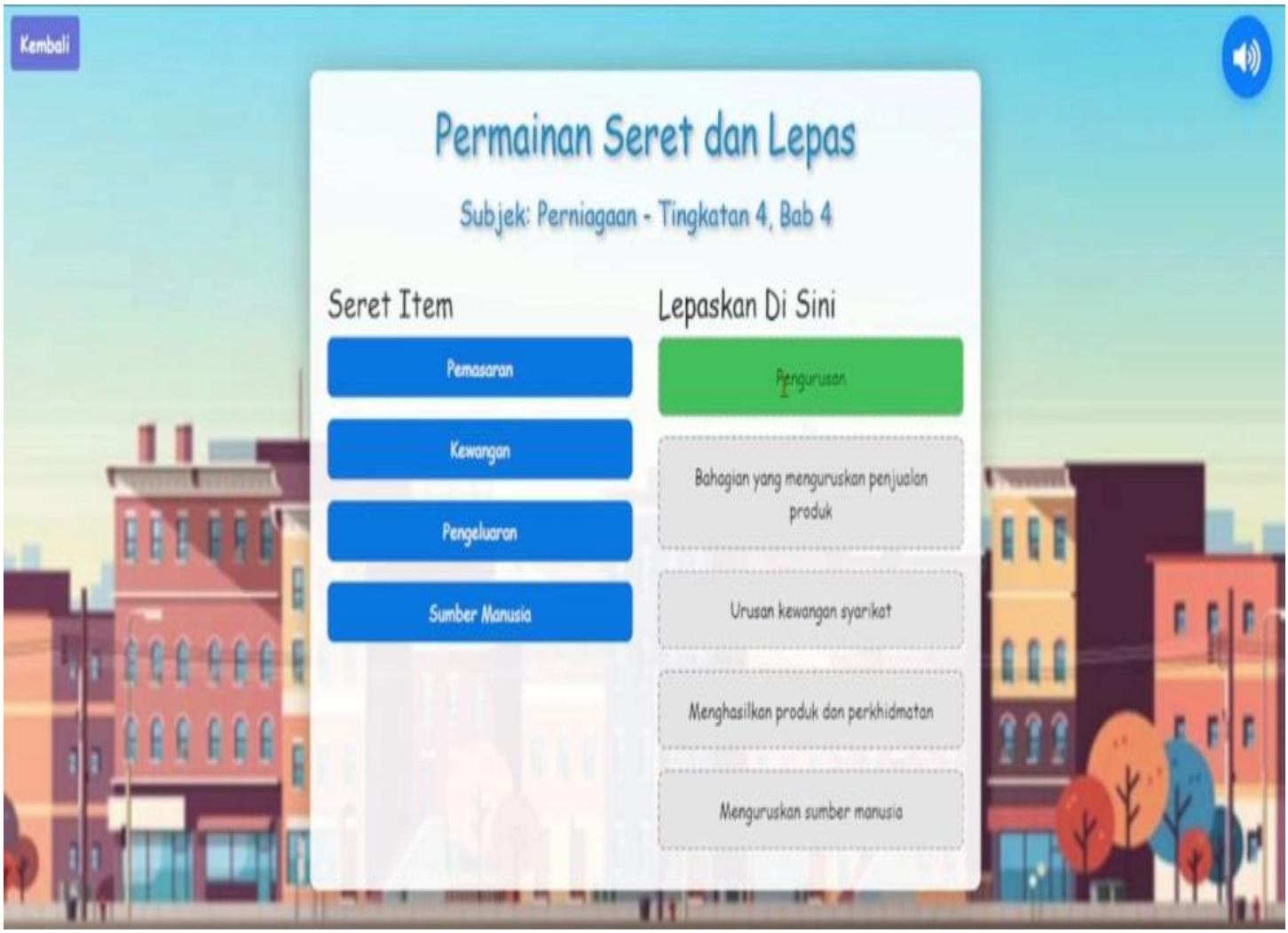

Figure 9 Interface of Quiz 3 Section (drag and drop exercise)

Expert Evaluation

The expert evaluation of the ProBIZ courseware, assessed using Gagne's Nine Events of Instruction in Figure 10, revealed generally positive outcomes across key instructional elements. Experts agreed that the platform successfully stimulated recall of prior learning through activities such as memory quizzes, while content was presented in a clear and logical sequence using multimedia elements like animations, audio explanations, and interactive visuals. The courseware also provided sufficient guidance through scaffolded explanations and interactive modules, and students were given opportunities to practice and reinforce understanding through quizzes and drag-and-drop activities, aligning with Gagne's eliciting performance event. These strengths highlight the courseware's ability to support comprehension and maintain learner engagement in line with established instructional design principles.

However, some limitations were identified, particularly in the areas of clarity and feedback. Two experts recommended stronger visual cues to better distinguish between main and subtopics, suggesting improvements such as colour coding or hierarchical formatting for clearer navigation. More critically, the feedback component was rated as only moderate by two evaluators, as it primarily indicated correct or incorrect responses without offering detailed explanations or corrective guidance. This is limited alignment with Gagne's providing feedback event, which emphasizes formative, constructive input. While ProBIZ was recognized as an effective platform for content delivery and practice, enhancing the interactivity and depth of feedback will be essential to maximize its instructional impact and ensure closer adherence to Gagne's framework.

GAGNE'S NINE EVENT OF THEORY	
Does the multimedia courseware effectively include activities that prompt users to recall previously learned information? **(Aligns with 1: Stimulate recall of prior learning)** Expert 1: Yes Expert 2: Yes Expert 3: No	
Is the new content presented in a clear, engaging, and logical manner? **(Aligns with 2: Present the content)** Expert 1: Yes Expert 2: Yes Expert 3: Moderate	
Are the buttons and instructions labelled appropriately to provide effective learning guidance? **(Aligns with 3: Provide learning guidance)** Expert 1: Yes Expert 2: Yes Expert 3: Yes, but need some effect or unique colour to identify main or submain content (guideline).	
Does the courseware provide sufficient interactive activities to allow users to practice what they have learned? **(Aligns with 4: Elicit performance (practice))** Expert 1: Yes Expert 2: Yes Expert 3: Yes	
Is immediate and constructive feedback provided after user responses, with clear corrective information or hints? **(Aligns with 5: Provide feedback)** Expert 1: Moderate Expert 2: Yes Expert 3: Moderate, because it to less interactive.	
Comments	Suggestions
Expert 1: No comment Expert 2: No comment Expert 3: No comment	Expert 1: No Expert 2: No Expert 3: No

Figure 10 Result of the expert's evaluation

CONCLUSION AND RECOMMENDATION

ProBIZ e-learning successfully meets its objectives by supporting SPM students in understanding business concepts through interactive and engaging multimedia elements. By integrating text, images, audio, video, and activities, the platform creates a dynamic learning environment that enhances engagement, comprehension, and retention. Although certain limitations exist, such as limited topic coverage and the need for improved feedback mechanisms, ProBIZ demonstrates its potential as an innovative educational tool that transforms traditional learning into a more student-centered experience.

A number of enhancements are suggested to further improve its effectiveness and usability in measuring learning gains. These enhancements fall into two categories: courseware and evaluation. Regarding the courseware material itself, several enhancements should be prioritized, such as expanding the question sets for each task to offer a greater range of assessments covering various degrees of business processes and complexity. The course material will be expanded by the addition of new business topics, giving students a more thorough grasp of organizational operations. Adding more relatable and captivating animations can also improve the learning experience and promote more engagement. Additionally, improvements to navigation and interactivity such as more easily accessible buttons and sound-based instructions would boost usability and guarantee a more seamless learning process. Next, adaptive learning technologies driven by AI have the potential to further personalize education. Furthermore, it might also be more consistent with Gagne's ideas to enhance the feedback system by providing comprehensive and useful responses. Finally, in terms of evaluation, stronger quantitative evidence such as surveys, performance metrics, or statistical analyses should be done together with expert evaluation so that it would provide more convincing proof of the platform's educational impact. It could also be more accurate if it incorporates student-based usability testing with pre- and post-evaluation. These suggestions will aid in improving ProBIZ so that it becomes a more efficient and long-lasting online learning environment for students in the future.

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