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Develompment of an E-Module For Educational Evaluation Course With a Problem Based Learning Framework

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Abstrak

Di era digital saat ini, mengintegrasikan teknologi ke dalam pendidikan sangatlah penting. Tujuan dari penelitian ini adalah mengembangkan e-modul mata kuliah Evaluasi Pendidikan dengan menggunakan konsep problem-based learning (PBL). Penelitian ini menggunakan model pengembangan ADDIE (analisis, desain, pengembangan, implementasi, dan evaluasi). Subyek penelitian adalah mahasiswa semester IV program studi Manajemen Pendidikan Islam STAI Ki Ageng Pekalongan. Teknik pengumpulan data menggunakan teknik dokumentasi, observasi, angket dan wawancara. Data dianalisis menggunakan pendekatan kuantitatif dan kualitatif (*mix method*). Hasil penelitian ini menunjukkan bahwa pengembangan dan implementasi e-modul yang dikembangkan untuk mata kuliah Evaluasi Pendidikan telah memberikan hasil yang baik, yang menunjukkan tingkat kemandirian belajar mahasiswa yang tinggi, kemampuan berpikir kritis, keterlibatan dalam proses pembelajaran, dan kepuasan terhadap e-modul. Hasil ini menunjukkan bahwa e-modul berfungsi sebagai alat yang efektif untuk meningkatkan pengalaman belajar siswa dan menumbuhkan keterlibatan dalam lingkungan pendidikan, yang pada akhirnya berkontribusi pada peningkatan hasil belajar dan kepuasan siswa. Namun, ruang lingkup penelitian yang berfokus pada mata kuliah tertentu dan demografi siswa dapat membatasi penerapan temuan yang lebih luas pada konteks pendidikan lainnya. Selain itu, ketergantungan utama pada analisis data kuantitatif dapat mengabaikan aspek-aspek yang bernuansa dari pengalaman dan persepsi siswa, menekankan perlunya eksplorasi kualitatif yang lebih komprehensif dalam penyelidikan di masa depan.

Kata Kunci: *Pengembangan e-Modul, Evaluasi Pendidikan, Pembelajaran Berbasis Masalah, Kemampuan Berpikir Kritis, Kemandirian Belajar*

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Abstract
The integration of technology into education is important in the current digital era. The aim of this research is to develop an E-module for Educational Evaluation Course using the concept of problem-based learning (PBL). This research uses the ADDIE development model (analysis, design, development, implementation, and evaluation). The research participants were students in the fourth semester of the STAI Ki Ageng Pekalongan Islamic Education Management Study Program. Data collection techniques included documentation, observations, questionnaires, and interviews. The data were analyzed using quantitative and qualitative approaches (mixed methods). The results showed that the development and implementation of e-modules for Educational Evaluation courses have yielded favourable outcomes, showcasing high levels of student learning independence, critical thinking ability, involvement in the learning process, and satisfaction with the e-modules. These results suggest that e-modules serve as effective tools for enhancing student learning experiences and fostering engagement within educational settings, ultimately contributing to improved learning outcomes and heightened student satisfaction. However, the scope of research focusing on a specific course and student demographics may limit the broader applicability of the findings to other educational contexts. Moreover, the predominant reliance on quantitative data analysis may overlook the nuanced aspects of student experiences and perceptions, emphasizing the necessity for more comprehensive qualitative exploration in future investigations.
Keywords: *e-Module Development, Educational Evaluation, Problem-Based Learning, Critical Thinking, Self-Directed Learning.*

INTRODUCTION

Technology integration has become crucial in today's educational environment for enhancing teaching and learning processes. E-modules, or electronic modules, are key innovations offering learner-centered; interactive curriculum delivery. These digital resources support cooperative problem solving and self-directed learning (Johan, 2018; OECD, 2016; Ruslan & Rauddin, 2022; Sukareni & Sukmana, 2021). They allow learners to engage with materials at their own pace using interactive exercises, multimedia components, and customizable accessibility (Agustina & Efendi, 2021; Maksum & Purwanto, 2022; Sintawati & Margunayasa, 2021). E-modules align with frameworks such as problem-based learning (PBL), which emphasizes active learning, critical thinking, and real-world applications (Susanti & Rachmajanti, 2023; Wahyuningrum & Hartutik, 2023; Wijayanto et al., 2023; Yuningtyas et al., 2023). This research and prior research emphasize the shift towards learner-centered education. However, some prior research focus more on

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theoretical frameworks and pedagogical strategies, while this research emphasize practical applications and benefits of e-modules

The integration of e-modules in educational evaluations offers a significant opportunity to enhance student learning outcomes and engagement (Ann Tomlinson & Moon, n.d.; Chang-Tik, 2022). Educational evaluation assesses the impact and effectiveness of educational interventions and play a critical role in curriculum development and instructional design (Stufflebeam & Shinkfield, 1985) By incorporating e-modules, educators can provide dynamic, interactive learning experiences that cater to diverse learner needs (Stufflebeam & Coryn, 2014). Additionally, the problem-based learning framework in e-modules fosters critical thinking, problem-solving, and collaborative inquiry, aligning with the goals of educational evaluation courses (Chen, 2015; Holden & Zimmerman, 2009; Royse et al., 2010)

Empirical research on e-modules, while not yet extensive, has demonstrated their efficacy in educational settings through several studies conducted between 2019 and 2024. For instance, (Erlina et al., 2022) found that students using e-modules in flipped classrooms outperformed traditional methods and reported higher engagement. Similarly, (Maksum & Purwanto, 2022) observed better performance in online environments using e-modules compared to face-to-face instruction. These findings highlight the adaptability, scalability, and effectiveness of the e-modules. Additionally, incorporating problem-based learning (PBL) frameworks into e-modules enhances critical thinking and problem-solving skills, fostering deeper understanding and application of knowledge (Prasetya & Prihandono, 2022). These studies collectively suggest that e-modules are valuable tools for improving learning outcomes across diverse educational contexts

Despite the potential benefits of e-modules in education,research on their development and use is limited. This project attempts to close this gap by creating an e-module for an Educational Evaluation course that employs the ADDIE paradigm and problem-based learning framework. Using a mixed-approach, this study evaluates the influence of e-modules on student engagement, critical thinking, and independent learning using quantitative and qualitative methods. This research aims

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to provide insights into educational technology and instructional design, which will influence best practices for incorporating e-modules into evaluation courses.

METHODOLOGY

This study employed the ADDIE development model Analysis, Design, Development, Implementation, and Evaluation (Allen, 2012; Branch, 2009). Initially, a comprehensive analysis identified the needs and context of the Educational Evaluation course for the fourth-semester students at STAI Ki Ageng Pekalongan. The design stage outlined the e-module's structure and content, aligned with problem-based learning (PBL) principles (de Jong et al., 1994). In the development phase, an e-module was created using various authoring tools for multi-device compatibility. It was then implemented in the course curriculum, with training sessions and technical support. The evaluation stage used documentation, observation, questionnaires, and interviews to assess the e-module's validity and effectiveness (Flick, 2018; Phillips & Stawarski, 2008). Quantitative and qualitative data analyzed the e-module's impact on students' critical thinking and learning independence to guide future revisions (Creswell, 2012).

Descriptive statistics offer an objective summary of student performance and feedback; using means, medians, standard deviations, and percentages to depict learning progress and user engagement before and after utilizing the e-module. Frequency distributions and graphical representations aid in identifying trends and user perceptions, thereby enhancing the understanding of e-module's effectiveness. Thematic analysis strengthens quantitative results by systematically examining qualitative data, obtained through interviews, observations, and document reviews, to reveal user experiences and insights. This comprehensive approach ensures a thorough understanding of educational evaluation and blending theoretical knowledge with practical application through problem-based learning (PBL). The e-module encompasses an overview, learning objectives, content delivery, and technology accessibility, fostering a holistic learning experience and guiding future enhancements

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RESULTS AND DISCUSSION

E-modules developed using the Canva application provide an accessible and versatile platform for educators to create engaging and visually appealing digital learning materials. With its intuitive design interface and customizable templates, graphics, and multimedia elements, Canva caters to users of all levels of design expertise. Educators can effortlessly design interactive e-modules by integrating text, images, videos, and interactive elements to enhance their learning experience. The drag-and-drop interface enables seamless content organization, whereas the collaboration feature fosters real-time teamwork and creativity.

The e-module developed in this research can be accessed via https://staikap.ac.id/e-modul/, and is still in the process of continuous development. Furthermore, we describe the findings of this study as follows.

1. Validity and effectiveness of e-modules

The validity and effectiveness of the e-module for the Educational Evaluation course were rigorously assessed using both quantitative and qualitative measures. During development, the e-module underwent comprehensive validation, with content, activities, and assessments meticulously reviewed by subject matter experts to ensure alignment with the learning objectives and curriculum standards. The obtained validity coefficient of 0.83 indicates a very high level of content validity, surpassing the threshold considered satisfactory by Cronbach (Gunawan, 2015). This meticulous validation process underscores the commitment to excellence and quality assurance of e-module development.

Qualitative data from observations, interviews, and documentation further corroborated the effectiveness of the e-module, revealing that while students generally did not encounter significant difficulties accessing the modules, challenges such as slow networks and dense content hindered navigation and comprehension . Providing scaffolding support and clear navigation instructions can enhance students' navigation proficiency and independence, thus fostering a more effective learning experience.

The effectiveness of the e-module was evaluated through quantitative analysis of student learning outcomes, engagement, and satisfaction. The pre-post assessment of critical thinking skills, usage statistics, and satisfaction surveys indicated high levels

of learning independence, critical thinking skills, student involvement, and satisfaction with the e-module. These findings demonstrate the e-module's efficacy in promoting student learning and satisfaction, further validating its role as an effective educational resource in the context of Educational Evaluation. As shown in Figure 1 below

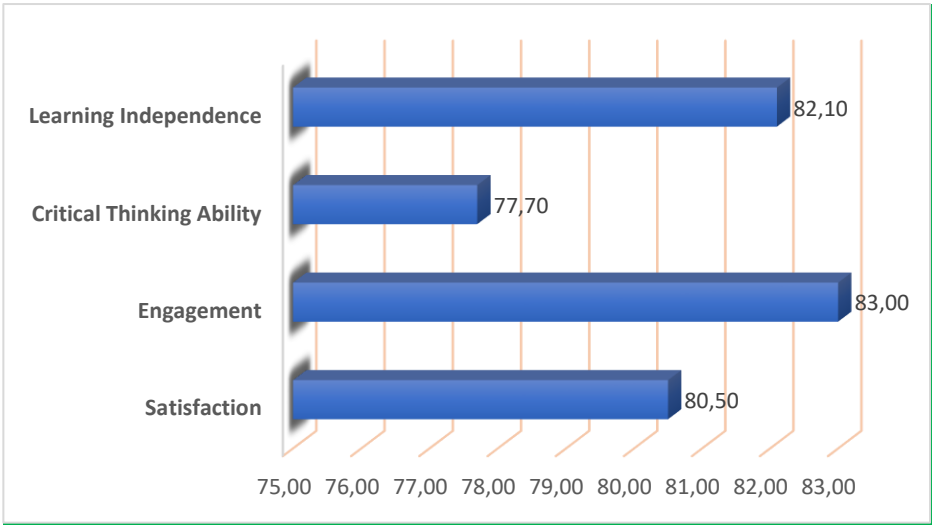

Figure 1. Average score of e-module effectiveness based on the components measured

Evaluation of the e-module revealed promising outcomes across various aspects of student learning and satisfaction. A high level of student learning independence, as indicated by the score of 82.10, underscores the effectiveness of e-modules in promoting autonomy and self-directed learning among students. This finding aligns with similar studies that have emphasized the importance of learner autonomy facilitated by technology-enhanced learning environments (Laurillard et al., 2009). Additionally, the substantial improvement in students' critical thinking ability, with a score of 77.70, suggests A positive impact of e-modules on fostering analytical and problem-solving skills. While variations in critical thinking scores across studies may exist due to methodological differences, the overall trend highlights the potential of e-modules to promote higher-order thinking skills (Due et al., 2023).

Moreover, the high level of student involvement in the learning process (83.00) reflected the effectiveness of e-modules in fostering active engagement and participation among students. This finding is consistent with research that highlights

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the role of interactive learning environments in promoting student engagement and collaboration (Yulando et al., 2019). The collaborative and interactive nature of e-modules, coupled with opportunities for peer collaboration and instructor facilitation, contributes to creating a dynamic learning environment that enhances student involvement and participation.

Furthermore, a high level of student satisfaction (80.50) underscores the positive impact of e-modules on students' overall learning experiences. Although satisfaction levels may vary depending on factors such as usability and content relevance, the overall positive perceptions and experiences reported by students highlight the effectiveness of e-modules in meeting their learning preferences and needs. This finding underscores the importance of designing e-modules that are user-friendly, accessible, and aligned with learners' expectations to enhance satisfaction and engagement (Munzil et al., 2022)

According to the thematic analysis, the students thought the e-module was dynamic and interesting. Many participants mentioned the interactive quizzes and video components were the main sources of continued engagement. They valued a range of educational resources that accommodated various learning preferences because of the increased accessibility and enjoyment of the material. The real-world relevance of problem-based learning (PBL) exercises was especially appreciated because they enabled students to actively apply abstract ideas to real-world situations, which improved their comprehension and memorization of the subject matter.

2. Enhancement of critical thinking skills

The research highlights a significant enhancement in students' critical thinking skills after e-module implementation, consistent with problem-based learning (PBL) objectives, which emphasize active inquiry and analysis. By exposing students to real-world challenges, the e-module stimulated analytical thinking and encouraged the evaluation of diverse perspectives, aligning with prior studies that demonstrated effectiveness of PBL in fostering critical thinking (Fitarahmawati & Suhartini, 2021; Marnita et al., 2021; Rahayu et al., 2022; Rahmat et al., 2020; Samani et al., 2019). These findings underscore the importance of integrating problem-based approaches into educational technology to bolster cognitive development and equip students with complex problem-solving tasks in the academic and professional domains.

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Students reported significant improvements in their understanding of educational evaluation concepts, attributing this progress to the structured approach of the e-module, which systematically introduced fundamental and advanced topics. Clear explanations and illustrations within the module aided comprehension, facilitating the synthesis and application of knowledge in diverse scenarios, including evaluation of learning outcomes and instructor effectiveness. Emphasis on the problem-based learning (PBL) framework was evident in the theme analysis, with students highlighting its role in fostering critical thinking and problem-solving skills. PBL exercises encouraged careful reflection on assessment procedures and the practical application of learned concepts, while the collaborative nature of peer reviews and group discussions promoted cooperation and diverse perspectives, enhancing overall learning experiences.

3. Promotion of learning independence

The research also revealed that the e-module plays a pivotal role in promoting learning independence among students. Through self-directed learning opportunities, flexible learning pathways, and reflective practice, students were empowered to take ownership of their learning processes and actively engage in their educational journey. This finding resonates with the broader literature on self-regulated learning and learner autonomy (Kolb, 2015; Langer, 2024; Osborne et al., n.d.; Žogla, 2019), emphasizing the importance of fostering learners' ability to set goals, monitor their progress, and adapt their strategies accordingly. By providing a supportive yet autonomous learning environment, the e-module nurtured students' confidence, initiative, and self-efficacy, equipping them with essential skills for lifelong learning and professional development (Osborne et al., n.d.).

While the overall feedback on the e-module for the Educational Evaluation course was positive, the study identified the challenges faced by some students, particularly those who were not technologically proficient. Difficulties with the interactive features and navigation of the e-module were highlighted, along with reports of technical issues such as internet connectivity problems and software bugs. These findings underscore the importance of providing adequate technical support and user training to ensure that all students can effectively use e-modules. Additionally, the theme analysis revealed constructive suggestions for improvement,

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including incorporating more intricate problem-based learning scenarios and real-time case studies from diverse educational contexts, as well as offering comprehensive troubleshooting materials and user guides to address technological difficulties. These recommendations reflect a commitment to continuously enhance the e-module to better meet learners' needs and preferences.

CONCLUSION

The development and implementation of e-modules for Educational Evaluation courses have yielded favourable outcomes, showcasing high levels of student learning independence, critical thinking ability, involvement in the learning process, and satisfaction with the e-modules. These results suggest that e-modules serve as effective tools for enhancing student learning experiences and fostering engagement within educational settings, ultimately contributing to improved learning outcomes and heightened student satisfaction. However, the scope of research focusing on a specific course and student demographics may limit the broader applicability of the findings to other educational contexts. Moreover, the predominant reliance on quantitative data analysis may overlook the nuanced aspects of student experiences and perceptions, emphasizing the necessity for more comprehensive qualitative exploration in future investigations.

To address these limitations, future research endeavours could delve into the long-term effects of e-module utilization on various facets of student learning, such as retention rates and practical application of acquired knowledge. Comparative studies should be conducted to discern the efficacy of different e-module designs, interactive features, and multimedia elements in optimizing student engagement and enhancing learning outcomes. Qualitative research methodologies can be prioritized to gain deeper insights into students' experiences, preferences, and challenges related to e-module usage, while also exploring the influence of instructor support, feedback mechanisms, and peer collaboration on enhancing e-module effectiveness. Furthermore, the ongoing exploration of emerging trends and technologies in educational technology can guide continuous improvement efforts and inform the development of e-modules tailored to diverse educational contexts.

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