Development of a Web-Based Learning Model Based on Outcome-Based Education (OBE) to Improve the Quality of Learning for PGSD Students at FIP-UNIMED

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Abstract. This study aims to develop a web-based learning model integrated with the Outcome-Based Education (OBE) approach to enhance the quality of learning for students in the Elementary School Teacher Education Program (PGSD) at the Faculty of Education, Universitas Negeri Medan (FIP-UNIMED). The model was designed using the Research and Development (R&D) method with the ADDIE framework (Analysis, Design, Development, Implementation, Evaluation). The results indicate that the developed web-based learning model demonstrates high validity based on expert evaluations, strong practicality as evidenced by trials with students, and significant effectiveness in improving learning outcomes. This approach has been proven to assist students in achieving targeted learning outcomes, particularly in cognitive, affective, and psychomotor domains. This research contributes to the development of digital learning systems based on OBE and offers an innovative alternative for improving the quality of higher education learning.

Keywords: Web-Based Learning, Outcome-Based Education, Learning Quality, PGSD.

1 Introduction

The development of information technology has had a significant impact on various sectors, including education. In recent decades, technology-based education has become an integral part of modern learning, with web-based learning being one of the most widely used innovations. Web-based learning allows students to access learning materials flexibly, utilize various online resources, and engage in more intense interactions with instructors and fellow students. The use of technology in education is crucial given the global challenges faced in improving educational quality and human resource competitiveness, especially in the face of the 4.0 industrial revolution era.

Along with this shift, higher education is also moving towards an approach that is more focused on learning outcomes, known as Outcome-Based Education (OBE). OBE focuses on achieving specific competencies that students are expected to have after completing a particular education program. In this context, measurable and targeted learning outcomes become the main focus, and this approach can be integrated with technology, such as web-based learning, to ensure that the learning process is more efficient and effective. With OBE, every component of the curriculum is designed to support the achievement of desired competencies, including

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cognitive abilities, practical skills, and professional attitudes needed by students as prospective educators.

The Elementary School Teacher Education Program (PGSD) at the Faculty of Education, Universitas Negeri Medan (FIP-UNIMED), is one of the programs preparing future teachers to face the challenges of 21st-century education. Graduates of PGSD are expected to have competencies not only in academic knowledge but also in pedagogical skills that can integrate technology into the learning process. As the demand for competent teachers who are ready to face the dynamics of the educational world increases, the implementation of OBE becomes highly relevant.

However, the implementation of OBE in teaching is not without challenges, particularly in terms of delivering content that is easily accessible to students and measuring learning outcomes in a more objective manner. This is where web-based learning plays a crucial role. Web-based learning provides students with easy access to learning materials that are tailored to the learning outcomes that need to be achieved and allows for more transparent and measurable evaluation of their learning. This is essential to ensure that the learning process does not only focus on knowledge transfer but also develops critical, creative, and collaborative skills that are crucial in their profession as future educators.

The development of a web-based learning model integrated with OBE at PGSD FIP-UNIMED is highly relevant in addressing these challenges. By integrating technology into web-based learning that is aligned with OBE, students can gain a more interactive and directed learning experience. They are not only provided with learning materials but also given the opportunity to collaborate, discuss, and reflect on their learning achievements. Therefore, this web-based learning model based on OBE is expected to enhance the quality of education at PGSD FIP-UNIMED and make a significant contribution to preparing qualified, competent, and adaptable future teachers.

This research provides significant benefits from both theoretical and practical perspectives. From a theoretical standpoint, this study contributes to the development of educational research, particularly in the application of Outcome-Based Education (OBE) integrated with technology-based learning, specifically through the web-based learning model. The integration of these two approaches offers a fresh perspective that can enrich the literature in the field of education, especially regarding how technology can enhance the quality of learning and the outcomes achieved by students. The OBE-based learning model developed in this study is expected to serve as a reference for future research that seeks to explore and implement similar combinations in the context of higher education. Additionally, this research contributes to further exploration of the impact of OBE on the development of students' competencies across cognitive, affective, and psychomotor domains, providing empirical evidence that demonstrates the relevance and effectiveness of this approach in teacher education.

From a practical standpoint, the benefits of this research can be directly felt by both instructors and students. For instructors, this research provides a clearer guide on how to implement web-based learning with an OBE approach, which not only enhances teaching effectiveness but also offers opportunities for instructors to innovate in designing and managing a more structured, outcome-based learning process. For students, the implementation of this model offers them opportunities to learn independently by utilizing various online resources, while simultaneously enhancing their collaborative and problem-solving skills, which are essential in 21st-century education. With web-based learning, students can track their learning progress in real-time, access a wider variety of learning materials, and become more actively involved in discussions and other learning activities. Therefore, this research has the potential

to improve the quality of learning in the PGSD program at FIP-UNIMED by offering a more flexible and effective alternative for achieving learning objectives.

Furthermore, this research could have a positive impact on the institution, especially in strengthening PGSD FIP-UNIMED's position as an institution capable of delivering education relevant to the demands of the times. By integrating OBE into technology-based learning, PGSD FIP-UNIMED not only improves educational quality but also introduces students to outcome-based learning that will shape them into competent educators ready to face the challenges of future education. Additionally, this research is expected to serve as a reference for other universities that wish to develop technology-based learning models integrated with the OBE approach.

2 Research Method

This study uses the Research and Development (R&D) method aimed at developing a web-based learning model that can be effectively implemented to improve the quality of education in the Elementary School Teacher Education (PGSD) Program at the Faculty of Education, Universitas Negeri Medan (FIP-UNIMED). This research also adopts the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) as the framework for developing the web-based learning model integrated with Outcome-Based Education (OBE). This method allows the researcher to design, develop, test, and evaluate the educational product systematically and thoroughly.

Fig. 1. Model Pengembangan ADDIE

2.1 The ADDIE Model in This Research

2.1.1 Analysis Phase

In the initial phase, the researcher conducts a needs analysis to understand the current state of learning in the PGSD program at FIP-UNIMED. This analysis includes data collection through observations, interviews with faculty and students, as well as a literature review on the application of OBE and web-based learning. The results of this analysis help identify the problems or challenges faced in the existing learning process and provide insights into the learning needs that must be addressed. The goal of this phase is to establish clear learning objectives, which align with the principles of OBE that focus on measurable learning outcomes.

2.1.2 Design Phase

In the design phase, the researcher develops the web-based learning model in line with the results of the needs analysis. This model integrates Outcome-Based Education (OBE), which prioritizes student competency across cognitive, affective, and psychomotor domains. The researcher designs learning materials, web-based media, and evaluation tools that align with the established learning objectives. During this phase, the researcher also plans the interaction flow between students and the learning content, as well as student-to-student interactions, to create a collaborative and interactive learning environment.

2.1.3 Development Phase

During the development phase, the researcher implements the design developed in the previous phase. The web-based learning model is developed into an accessible learning platform for PGSD students. This development involves creating materials in various forms, such as learning videos, online quizzes, discussion forums, and other features that support OBE-based learning. Once the model is developed, it is tested with a small group of 10-12 students in an initial trial. This trial aims to identify strengths and weaknesses in the model and gather feedback from students on its effectiveness.

2.1.4 Implementation Phase

After the development phase, the web-based learning model that has been tested with a small group of students is implemented with a larger group of students at PGSD FIP-UNIMED. This phase involves monitoring and evaluating the implementation process to ensure that the model is applied effectively and according to the set objectives. The implementation phase provides the researcher with opportunities to observe student interactions, technology usage, and student and teacher acceptance of the model.

2.1.5 Evaluation Phase

The final phase in the ADDIE model is evaluation, which takes place throughout the entire research process—from design to implementation. Evaluation is conducted to assess the extent to which the web-based learning model improves the quality of learning and achieves the desired learning outcomes. Both quantitative and qualitative data are collected, including test results, student competency assessments, and feedback from students and faculty regarding their experiences with the model. The evaluation results will serve as a basis for revising and improving the learning model, making it more suitable for broader implementation at PGSD FIP-UNIMED and potentially at other institutions with similar needs.

2.2 Use of R&D Method with ADDIE Model

By using the R&D method with the ADDIE model as the main approach, this study aims to create a web-based learning product that is not only technology-based but also focused on achieving measurable student competencies. Each phase in the ADDIE model provides a systematic framework for designing, developing, and evaluating the web-based learning model integrated with Outcome-Based Education (OBE).

2.3 Data Types and Research Instruments

This research collects both quantitative and qualitative data. Quantitative data is gathered through learning assessments and competency evaluation tools used to measure students' progress toward achieving the set learning objectives. Qualitative data is collected through interviews, questionnaires, and observations to capture students' and faculty's experiences with the web-based learning model and to identify areas for improvement. The research instruments used include student satisfaction surveys, learning outcome tests, and interviews with faculty and students regarding the implementation of the model

This research adopts the Research and Development (R&D) method using the ADDIE model and Plomp (1997) as a combined framework for designing, developing, and evaluating a web-based learning model integrated with Outcome-Based Education (OBE). The structured phases of the ADDIE model allow the study to produce an effective and relevant learning product tailored to the needs of PGSD FIP-UNIMED students, with the potential for broader implementation to improve educational quality. This approach is expected to significantly contribute to the development of higher education in teacher education and provide students with a more interactive, outcome-oriented learning experience.

2.4 Instrument Validation Results

In this study, the instruments used for web-based learning were first validated by two experts to ensure the appropriateness and quality of the instruments. The first validation was calculated using the following formula:

$$P = \frac{\sqrt{x}}{\sqrt{x_1}} \times 100\%$$

Where x is the score given by the expert, and x1 is the maximum score that can be achieved. The result of the first validation showed a score of 86.67%, indicating that the material presented is highly valid for use in web-based learning. This score reflects that the instrument meets the validation and feasibility criteria adapted from Navrida (2017).

After receiving feedback from the first expert, the instrument was revised and revalidated by two additional experts. The second validation results were calculated using the same formula and showed a score of 90.67%, indicating that the material presented in the instrument is highly valid and well-accepted for use in Outcome-Based Education (OBE) settings. This score confirms that the instrument is very relevant and aligns with the established learning objectives.

2.5 Interpretation and Relevance of Validation

The results of both the first and second validations demonstrate that the instrument developed for this study is highly valid and can be effectively applied in web-based learning. With validity scores of 86.67% in the first validation and 90.67% in the second validation, it can be concluded that the instrument meets the established feasibility standards outlined in the validation criteria table adapted from Navrida (2017).

The expert evaluations provide strong support for the quality of the instrument, indicating that it is highly suitable for use in the context of OBE-based learning, which prioritizes measurable learning outcomes.

2.6 Recommendations Based on Validation Results

Based on these strong validation results, the instrument is ready to proceed to the field trial phase. This phase will test the effectiveness of the instrument in supporting the learning process and improving the quality of education at PGSD FIP-UNIMED. Furthermore, these validation results provide a solid foundation for further refinements to the instrument, if necessary, to ensure it remains aligned with future technological advancements and evolving educational needs.

3 Results and Discussion

Based on these strong validation results, the instrument is ready to proceed to the field trial phase. This phase will test the effectiveness of the instrument in supporting the learning process and improving the quality of education at PGSD FIP-UNIMED. Furthermore, these validation results provide a solid foundation for further refinements to the instrument, if necessary, to ensure it remains aligned with future technological advancements and evolving educational needs.

3.1 Field Trial Results with 40 Students

After the web-based learning instrument was validated in the previous stages, a field trial was conducted to test its effectiveness in improving the learning quality of PGSD FIP-UNIMED students. This field trial involved a sample of 40 students and aimed to determine whether the developed instrument could enhance learning quality according to the principles of Outcome-Based Education (OBE).

3.2 Field Trial Method

In this stage, the validated instrument was used for several learning sessions. Students were given access to web-based learning materials that were designed according to the competencies

required by the PGSD curriculum. The instrument included not only instructional content but also tasks, quizzes, and online discussion forums that allowed students to interact and engage more deeply with the material.

During the trial, students were asked to participate in a series of activities on the web-based learning platform, with formative evaluations conducted to assess their understanding of the material. These evaluations included online quizzes and assignments that tested their critical thinking skills as well as their ability to apply what they had learned.

3.3 Trial Results

Based on the data obtained during the field trial, the results were very positive. Of the 40 students who participated in the trial, most showed a significant improvement in their learning outcomes, both in terms of knowledge and skills. The use of the web-based learning instrument contributed to better comprehension of the material being taught.

3.4 Calculation of Results

To analyze the trial results, the same formula used in the validation stage was applied:

$$P = \frac{\sqrt{x}}{\sqrt{x_1}} \times 100\%$$

Where x is the score obtained by the students from the evaluation, and x1 is the maximum score achievable. The calculation of the trial results showed a very high score, indicating that the instrument was highly effective in improving learning quality.

3.5 Analysis of Results

After applying the formula to calculate the trial results, it was found that the average score of the students was 90%, which shows a significant improvement compared to the pre-test evaluation. 85% of the students reported that they found it easier to understand the material and felt more motivated to learn independently after using the web-based learning platform.

Moreover, the majority of students showed improved ability to apply the concepts learned in practical situations, which indicates the instrument's effectiveness in achieving the learning objectives set in line with Outcome-Based Education (OBE).

3.6 Student Feedback

As part of the trial, students were asked to fill out a questionnaire to provide feedback on the instrument used. The results of the questionnaire revealed that the majority of students gave positive feedback on the success of the instrument in supporting their learning process. They

appreciated the easy access to materials, the interactivity provided by the platform, and the flexibility of learning at their own pace.

3.7 Conclusion of Trial Results

Overall, the results of the field trial with 40 students show that the web-based learning instrument is highly effective in improving the quality of learning. With an average score increase of 90%, this instrument was proven to enhance students' understanding, skills, and motivation in line with the Outcome-Based Education (OBE) standards.

4 Conclusion

This study aimed to develop a web-based learning model focused on the principles of Outcome-Based Education (OBE) to enhance the learning quality for students of the PGSD FIP-UNIMED program. Based on the results obtained from the instrument validation, field trials, and data analysis, it can be concluded that the developed learning model is proven to be valid and effective.

The instrument validation process by two experts showed excellent validity scores, with 86.67% in the first validation and 90.67% in the second validation, indicating that the presented learning material meets high feasibility and relevance criteria. The field trial with 40 students also yielded very positive results, with 85% of students reporting improved understanding and motivation after using the web-based learning model.

The evaluation results calculated with the same formula used in the validation stage showed an average score of 90% in the field trial, reflecting the instrument's effectiveness in improving student learning outcomes according to the Outcome-Based Education (OBE) standards. Moreover, the positive feedback from students regarding the accessibility of materials, interactivity, and learning flexibility underscores the success of this model in enhancing the quality of learning.

Thus, this study proves that the use of a web-based learning model based on OBE principles not only improves the quality of learning but also motivates students to engage in independent learning and become more involved in the educational process. This model is expected to be widely applied at PGSD FIP-UNIMED and contribute positively to the improvement of higher education quality in Indonesia.

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