Sosioedukasi
JURNAL ILMIAH ILMU PENDIDIKAN DAN SOSIAL
ISSN: 2086-6135 E-ISSN: 2541-612x
Volume 14 No. 4. Desember 2025 https://ejournal.unibabwi.ac.id/index.php/sosioedukasi/index

DESIGN AND IMPLEMENTATION: ADAPTIVE LEARNING MANAGEMENT SYSTEM (LMS) WITH PEER ASSESSMENT FEATURES IN MICROTEACHING COURSES

Imro'atul Husna Afriani[1a*], St. Shabibatul Rohmah[2b], Dian Arief Pradana[3c]

[123]Universitas 17 Agustus 1945 Banyuwangi, Indonesia

[a] imroatul.h.afriani@untag-banyuwangi.ac.id
[b] shabibatul.rohmah@untag-banyuwangi.ac.id
[c] dianarief@untag-banyuwangi.ac.id

(*) Corresponding Author
imroatul.h.afriani@untag-banyuwangi.ac.id

ARTICLE HISTORY
Received : 19-06-2025
Revised : 18-08-2025
Accepted : 29-10-2025

KEYWORDS
Development, Learning Management System, Adaptive, Microteaching, Pre-service Teachers

ABSTRACT
Developing the teaching competence of pre-service teachers requires feedback that is effective, timely, and continuous. Microteaching is a required course where student teachers design and practice lessons, although it often faces problems because feedback from lecturers is limited by time and resources. To solve this, the study created an adaptive Learning Management System (LMS) with peer-assessment features. This research used the ADDIE model, which included assessing needs, designing the system, creating prototypes, implementing the model, and evaluating the results. The results show that the adaptive LMS had a positive impact on student learning. Based on feasibility criteria, most students rated the system "Valid," with an average score of 80.8%. Peer feedback, collaboration, and reflection were the main strengths, while active participation still needed small improvements. Students found the LMS easy to use, though some had difficulties at first with the instructions. Overall, the system was practical, effective, and ready to use, with only minor changes required. This study demonstrates that an adaptive LMS with peer-assessment can enhance feedback, support reflection, and strengthen teaching skills in microteaching courses.

INTRODUCTION

The Microteaching course is a required part of the program for future teachers. It helps student teachers learn how to design and implement lessons by combining theory with practical experience. The course uses teaching materials that show what students will actually do and think when they become teachers (Microteaching helps future teachers develop their classroom skills by providing real-life practice (He C, 2011) This approach enables teacher candidates to identify and address their weaknesses (Özcan Ö, 2019), get a deeper understanding of their teaching and develop practical classroom skills (N. Erdemir and S. Yeşilçınar, 2021). According (Nousheen A (2024), microteaching can boost student teachers' confidence by letting them practice with learning materials and teaching

Sosioedukasi
JURNAL ILMIAH ILMU PENDIDIKAN DAN SOSIAL
ISSN: 2086-6135 E-ISSN: 2541-612x
Volume 14 No. 4. Desember 2025 https://ejournal.unibabwi.ac.id/index.php/sosioedukasi/index

methods. (Maguire, 2023) also notes that teacher preparation is strengthened when candidates reflect on their actions after planning, teaching, and receiving feedback.

Observation and contextual analysis of microteaching at the Faculty of Teacher Training and Education (FKIP), Universitas 17 Agustus 1945 (UNTAG Banyuwangi), reveal that it is conducted through a traditional approach. Feedback is delivered collectively after all students complete their simulation sessions, rather than immediately following each demonstration. This delay diminishes the effectiveness of feedback and restricts opportunities for timely reflection and improvement. The primary causes are limited instructional time and a high number of participating students.

Existing research on microteaching and learning management system (LMS) integration has primarily examined the use of digital tools for general classroom activities. Few studies have addressed real-time or structured peer feedback within microteaching contexts. Research integrating adaptive LMS platforms with peer assessment features specifically designed for microteaching remains limited. To overcome this gap, the present study proposes the development of an adaptive learning management system (LMS) that includes a digital peer assessment feature. The system is designed to provide feedback from lecturers and facilitate immediate, meaningful input from peers. The research is novel in its integration of adaptive learning pathways with structured peer feedback mechanisms tailored for microteaching. This approach is expected to promote active student engagement, foster reflective teaching practices, and enhance collaborative learning among pre-service teachers.

According to (Afriani, 2024) Microteaching through LMS makes learning more effective and efficient. Also, (Mansfield, 2023)states that planning microteaching practice helps develop pedagogical knowledge of future teachers by connecting concepts and practice through the integration of technology in learning. (AO., 2024) adds that it gives a wider choice in formulating pedagogical strategies. Using technology in education encourages students' technology literacy and helps stimulate thinking development. (Mansfield, 2023)states that reflective practice enhances learning by providing pedagogical knowledge to student teachers during planning, evaluation, and follow-up activities.

(Phelps, 2020) states that adaptive learning technology solves challenges in the learning process, such as limited time, facilitated feedback, and critical thinking from simple concepts to more complex ones that students can apply to real-world problems. (Sherfinski, 2024) adds that adaptive learning technology is very important to create better opportunities for mentoring, learning, and growth in the learning process of future teachers. Adaptive learning is an effort to make a personalized learning environment by accommodating certain learning styles of students to improve performance, motivation, and learning development (Yeboah, 2014)

The research and development problem statements are:

1. How to design an adaptive LMS with peer assessment features that meet the needs of students in the microteaching course?
2. How can the implementation of adaptive LMS improve the quality of feedback and student reflection in the microteaching course?
3. How effective is the adaptive LMS with peer assessment features in improving the basic teaching skills of students?

RESEARCH METHOD

Previous research related to the use of LMS generally focused on using digital platforms as online learning media. These usually included standard features such as digital materials, quizzes, discussion forums, and assignments. However, there are still a few studies that develop LMS with adaptive features specifically designed to integrate peer assessment elements for microteaching.

The main strength of the solution offered in this R&D is the integration of an adaptive system and peer assessment in a structured and digital way through the LMS. One study (Yükselir, 2020) reported that reflection and reflective practice through microteaching sessions using video recordings helped increase engagement, develop insight, critical thinking, and support changes in future teaching practices.

Sosioedukasi
JURNAL ILMIAH ILMU PENDIDIKAN DAN SOSIAL
ISSN: 2086-6135 E-ISSN: 2541-612x
Volume 14 No. 4. Desember 2025 https://ejournal.unibabwi.ac.id/index.php/sosioedukasi/index

The LMS developed in this study not only adjusts learning content based on each student's needs, but also processes peer assessment results to give personalized learning recommendations. Another study (Asregid, 2023) examined how pre-service teachers use feedback to encourage constructive reflective practice for their learning success (N. Erdemir and S. Yeşilçınar, 2021). This argument shows an advantage compared to previous research, which focused more on managing materials or general learning activities. This study not only produces a technology-based product but also tests the effectiveness of the LMS in improving teaching skills and fostering a culture of reflection and collaboration in contextual, technology-based learning.

This study employed a research and development design based on the ADDIE model, consisting of Analysis, Design, Development, Implementation, and Evaluation. ADDIE is a learning design framework that helps education and training professionals create, organize, and improve effective learning programs. (Vulpen, 2023)

According to (Trust T, 2018) the ADDIE instructional design model is recommended for designing online learning experiences that support teachers' professional growth. It can be used to guide the development of open online courses that meet the diverse needs of learners and create effective online learning experiences for teachers.

The population in this study consisted of students of the Faculty of Teacher Training and Education (FKIP), Universitas 17 Agustus 1945 Banyuwangi, who were enrolled in the microteaching course, totaling 86 students. They were divided into limited trial subjects and an implementation group.

Operationally, the ADDIE model in this research and development is shown in Figure 1

Figure 1. Operational Stages of the ADDIE Model

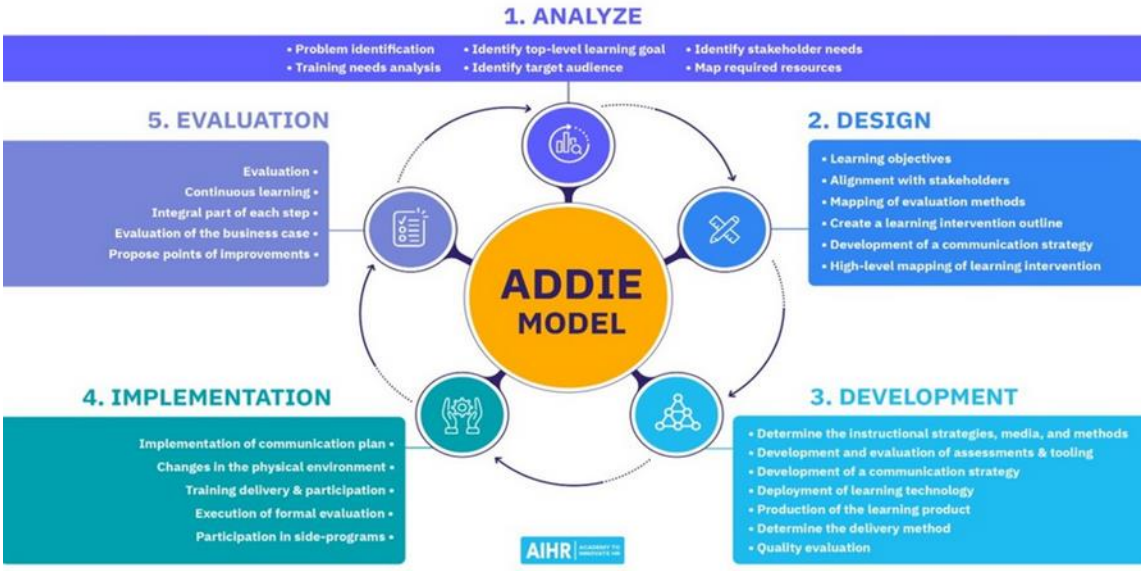

Figure 1 presents the procedures used in this research and development.

Table 1. Procedure of Research and Development

Research Procedures	Activities	Achievement Indicators
Analysis Purpose: To identify the gap between learning objectives and the real conditions in the field through the following analyses: Analysis of policies related to blended learning implementation.	Analyse the learning goals. Analyse the learning materials. Analyse past research about the Adaptive LMS with Peer Assessment features. Check the available technology	Analyze and evaluate the learning materials. Draft the learning needs, including content, Adaptive LMS design with Peer Assessment features, learning

Sosioedukasi
JURNAL ILMIAH ILMU PENDIDIKAN DAN SOSIAL
ISSN: 2086-6135 E-ISSN: 2541-612x
Volume 14 No. 4. Desember 2025 https://ejournal.unibabwi.ac.id/index.php/sosioedukasi/index

Analysis of learning technologies and tools. Analysis of learning objectives and the development goals of the Adaptive Learning Management System (LMS) with Peer-Assessment Features.	Analyse the students: what they know, how they learn, and what they like.	materials, and technology readiness. Draft the achievement indicators for the development of the Adaptive LMS with Peer Assessment features.
Design Purpose: To design how new information will be delivered to students. Several components need to be designed in this stage, including: Learning materials in the form of digital modules Adaptive LMS model Learning syntax (instructional flow) Designing rubrics for digital assessment Research instruments	Designing course content Designing an Adaptive Learning Management System (LMS) model with Peer Assessment Features Designing research instruments, assessment and testing by experts	Digital content of micro learning courses Models and learning materials Digital assessment rubric design draft Research instrument
Development Purpose: To produce the designed materials, which include: Digital content for the Microteaching course Adaptive Learning Management System (LMS) with Peer Assessment features Learning materials Assessment instruments Research instruments	Develop microlearning course content. Develop an Adaptive LMS model with Peer Assessment features and learning strategies. Develop assessment instruments	Learning Management System (LMS) content Adaptive LMS model with Peer Assessment features Learning strategies used in the LMS Assessment instruments for evaluation
Implementation Purpose: To observe the personalization of the Adaptive Learning Management System (LMS) with Peer Assessment features.	Test the product with experts (desk evaluation). Test the product with a small group. Test the product with a large group.	Expert review User review
Evaluation Purpose: To make the product better by learning from the implementation results.	The product is refined based on feedback and observed limitations	Product development results

Population and Sample of the Research and Development

The population of this study consisted of students from the Faculty of Teacher Training and Education at the University of 17 August 1945 Banyuwangi who were enrolled in the microteaching course, with a total of 86 students. These students were divided into groups for limited trials and for the implementation stage.

Expected Outcomes of the Research and Development

This research and development is expected to produce an adaptive LMS with peer-assessment features for the microteaching course, support its implementation to enhance the quality of student feedback and reflection, and demonstrate its effectiveness for students of the Faculty of Teacher Training and Education at the University of 17 August 1945 Banyuwangi. The success of this research and development will be determined by the production of an

Sosioedukasi
JURNAL ILMIAH ILMU PENDIDIKAN DAN SOSIAL
ISSN: 2086-6135 E-ISSN: 2541-612x
Volume 14 No. 4. Desember 2025 https://ejournal.unibabwi.ac.id/index.php/sosioedukasi/index

adaptive LMS with peer-assessment features that has been validated by experts and empirically tested with students to ensure its feasibility and effectiveness in the learning process.

Expert Validation Data

Data from material experts, media experts, and instructional design experts were collected using structured instruments. The experts completed these instruments to assess whether the adaptive LMS with its developed features is suitable for use as a learning resource for students or requires further revision.

Empirical Test Data on Student Learning Outcomes

The adaptive LMS with peer assessment features that was developed was tested on students to evaluate its impact on learning outcomes. The goal was to determine whether the adaptive LMS provided a positive effect on student achievement, using the following formula:

The formula for processing data across all items is as follows:

$$P = \frac{\sum X}{\sum Xi} 100\%$$

Description:

P : Percentage (%)

ΣX : The total score of all respondents' answers

ΣXi : The total ideal score for all items

After obtaining the results from the data processed using the formula above, the outcomes were compared against the following feasibility criteria: Table 2. Feasibility level criteria for LMS personalization with adaptive techniques according to (Wiyono dan Sunarni, 2009)

Percentage Range	Validity Level	Description
81% – 100%	Valid	The adaptive LMS is considered valid and can be implemented without major revisions.
61% – 80%	Quite Valid	The adaptive LMS is sufficiently valid, but may require minor improvements.
41% – 60%	Less Valid	The adaptive LMS is less valid and needs significant revisions.
0% – 40%	Not Valid	The adaptive LMS is not valid and cannot be implemented in its current form

RESULTS AND DISCUSSIONS

Table 1. Average Score And Percentage Per Respondent

Responden	Average Score (1–5)	Percentage (%)	Criteria
R1	4.0	80%	Valid
R2	4.1	82%	Valid
R3	4.0	80%	Valid
R4	4.2	84%	Valid
R5	3.9	78%	Quite Valid
R6	2.6	52%	Less Valid

Sosioedukasi
JURNAL ILMIAH ILMU PENDIDIKAN DAN SOSIAL
ISSN: 2086-6135 E-ISSN: 2541-612x
Volume 14 No. 4. Desember 2025 https://ejournal.unibabwi.ac.id/index.php/sosioedukasi/index

R7	4.3	86%	Valid
R8	4.0	80%	Valid
R9	4.4	88%	Valid
R10	4.3	86%	Valid
R11	3.9	78%	Quite Valid
R12	4.8	96%	Valid
R13	4.0	80%	Valid
R14	4.0	80%	Valid
R15	3.6	72%	Quite Valid
R16	4.0	80%	Valid
R17	4.2	84%	Valid
R18	3.5	70%	Quite Valid
R19	4.0	80%	Valid
R20	4.1	82%	Valid
R21	4.0	80%	Valid
R22	5.0	100%	Valid
R23	4.7	94%	Valid
R24	3.9	78%	Quite Valid

Based on the empirical test data, the adaptive LMS with personalization and peer-assessment features shows a generally positive impact on student learning outcomes. According to the feasibility criteria of (Wiyono dan Sunarni, 2009), most respondents rated the system between 70% and 100%, placing it in the categories of "Quite Valid" to "Valid."

The majority of respondents (80% and above) considered the LMS valid, indicating that it can be implemented without major revisions. Several students even gave very high ratings (above 85%–100%), reinforcing that the system is ready for practical use. Meanwhile, a smaller group (around 70%–78%) classified the LMS as "Quite Valid", suggesting that only minor improvements may be required. One respondent, however, provided a much lower score of 52%, highlighting specific areas where the system could be further refined to ensure a consistent learning experience for all users.

Overall, the adaptive LMS is valid to use for supporting personalized learning. The system is ready to be implemented, but small improvements from lower scores can help make it more effective and give all learners a more consistent experience.

Table2 : Average, Percentage, Per Category, and criteria

Category	Average Score (1-5)	Percentage (%)	Criteria
K1 – Content Usability & Clarity	3.96	79%	Quite Valid
K2 – Feedback & Peer Reflection	4.13	83%	Valid
K3 – Practical Skill Development	3.96	79%	Quite Valid
K4 – Learning Motivation & Engagement	4.00	80%	Valid
K5 – Collaboration & Group Work	4.08	82%	Valid
K6 – Teamwork & Respect in the LMS Environment	4.13	83%	Valid
K7 – Active Participation & LMS Use	3.83	77%	Quite Valid
K8 – Initiative & Interactive Learning	3.83	77%	Quite Valid

Sosioedukasi
JURNAL ILMIAH ILMU PENDIDIKAN DAN SOSIAL
ISSN: 2086-6135 E-ISSN: 2541-612x
Volume 14 No. 4. Desember 2025 https://ejournal.unibabwi.ac.id/index.php/sosioedukasi/index

K9 – Reflection & Professional Growth	4.04	81%	Valid
K10 – Conceptual Understanding in Microteaching	3.92	78%	Valid

Feedback from 24 participants shows that the LMS-based microteaching system gives a positive experience. The validity test results are summarized in Table X. Overall, the product demonstrated a good level of validity across the ten categories. The highest scores were obtained in Feedback & Peer Reflection (M = 4.13; 83%) and Teamwork & Respect in the LMS Environment (M = 4.13; 83%), both categorized as Valid. Other aspects such as Collaboration & Group Work (M = 4.08; 82%), Reflection & Professional Growth (M = 4.04; 81%), and Learning Motivation & Engagement (M = 4.00; 80%) also reached the Valid category. From ten evaluation categories, the system reached an average score of 4.04 out of 5 (81,8%). Based on the criteria of (Wiyono dan Sunarni, 2009), this score puts the system in the "Valid" category.

Most aspects, such as feedback, peer reflection, collaboration, teamwork, and professional growth, scored above 80%. This means the LMS supports learning well and can be used without major changes. Some categories, like active participation and interactive learning, scored a bit lower (77%–79%). These are still "Quite Valid" but show that small improvements are needed. the LMS-based microteaching system is valid and ready to use. Small refinements will make it even better for usability, engagement, and participation.

Based on Group Responses into Categories. Research identified the themes and grouped the individual comments into those categories. Theme Example Responses LMS Usability "Easy to use?" "Sometimes it was slow," "Helped me stay organised", "At first, the instructions were a bit confusing". "I really enjoyed working and sharing ideas with my classmates". Instructions? "I was confused at first," "Could use clearer explanations" Collaboration? "Peer feedback was really helpful," "I learned a lot from group discussions". The response, it shows that using the LMS was generally helpful in organizing and managing learning, although some users found initial difficulties with the instructions. Collaboration among peers was also seen as valuable for understanding the material better.

DISCUSSION

This research shows that using an adaptive Learning Management System (LMS) with peer assessment features significantly enhances the microteaching experience for pre-service teachers. The overall positive ratings from participants indicate that the LMS effectively supports the organization and delivery of learning materials, provides timely and structured feedback, and fosters collaborative learning. This aligns with earlier studies that highlight the importance of reflection and peer interaction in developing teaching skills (Yükselir, 2020).

One notable insight is how the adaptive nature of the LMS personalizes learning pathways according to each student's needs, which contributes to more meaningful engagement and reflection. Unlike traditional microteaching methods, where feedback is delayed and less individualized, this system allows immediate peer and lecturer feedback, leading to faster self-correction and improvement. This supports (Phelps, 2020) , who argued that adaptive learning technologies overcome challenges related to limited instructional time and enhance critical thinking by offering tailored support.

The integration of peer assessment within the LMS also encourages active participation and accountability among students. This collaborative feature appears to deepen understanding through shared reflections and peer support, which is consistent with the findings of (Mansfield, 2023) and (Nousheen A, 2024) regarding the role of reflective practice in strengthening pedagogical knowledge.

However, the data also revealed some initial difficulties with instructions, suggesting that while the system is generally user-friendly, clearer guidance during the onboarding process could enhance the overall user experience. This feedback echoes previous research on LMS usability challenges and highlights the ongoing need for user-centred design improvements.

The empirical test showed that the LMS-based microteaching system scored 80.8%, which is in the "Valid" category. This means the system is valid and ready to use. Still, small improvements, especially in usability, engagement, and active participation, make it even better and give students a more consistent learning experience.

Sosioedukasi
JURNAL ILMIAH ILMU PENDIDIKAN DAN SOSIAL
ISSN: 2086-6135 E-ISSN: 2541-612x
Volume 14 No. 4. Desember 2025 https://ejournal.unibabwi.ac.id/index.php/sosioedukasi/index

Furthermore, this study contributes a new understanding by demonstrating the feasibility and effectiveness of combining adaptive learning paths with structured peer feedback, specifically in the microteaching context, a relatively underexplored area. It suggests that adaptive LMS platforms can not only support content delivery but also foster a reflective and collaborative culture among future teachers, making it easier to connect theory with real practice in teacher education

In conclusion, the results affirm that an adaptive LMS with peer assessment is a promising tool to improve the quality and impact of microteaching courses. Future research could explore the integration of advanced AI analytics to further personalize learning and expand these findings across diverse educational settings.

CONCLUSION

This study shows that an adaptive learning management system (LMS) with peer assessment features can effectively transform the way microteaching is conducted. By making feedback more immediate and structured, it helps student teachers reflect more effectively on their practice and adjust their teaching in meaningful ways. The system not only supports personalised learning but also builds confidence, strengthens teaching skills, and encourages collaboration among peers. The adaptive LMS proves to be a powerful innovation that improves the quality of microteaching courses and better prepares future teachers for their professional journey.

Based on the findings, future research is encouraged to examine the implementation of adaptive LMS with peer assessment features in a broader range of courses to evaluate its adaptability and scalability in different learning contexts. Further studies may also integrate AI-driven analytics to enrich adaptive pathways and provide more targeted recommendations, offering new opportunities for personalization in teaching and learning. In addition, this research highlights the importance of institutional support in the form of training programs for both lecturers and students. These recommendations support the effective adoption of the system, while providing insights to improve microteaching and advance technology-enhanced learning.

REFERENCES

Afriani H, Hidayanti FA. (2019) Peran Pendidikan dan Pengguna Internet untuk Mendorong Pertumbuhan Ekonomi Indonesia di Era Digital. 1945;11 6

Afriani, I. A. H., & Pradana, D. A. (2024). Development Of Personalized Learning Management System With Adaptive Features Of Microteaching And Reflective Practice Courses For Preservice Teachers: Pengembangan Sistem Manajemen Pembelajaran Personalisasi Dengan Fitur Adaptif Mikroteaching Dan Kursus Praktik Reflektif Bagi Guru Prajabat. Santhet (Jurnal Sejarah Pendidikan Dan Humaniora), 8(2), 12726-12734. https://ejournal.unibabwi.ac.id/index.php/santhet/article/view/4394/2572

Ali Karakaş & Ceyhun Yükselir (2020): Engaging pre-service EFL teachers in reflection through video-mediated team micro-teaching and guided discussions, Reflective Practice, DOI:10.1080/14623943.2020.1860927. https://www.researchgate.net/publication/346715233_Engaging_preservice_EFL_teachers_in_reflection_through_video-mediated_team_micro-teaching_and_guided_discussions

Asregid, D., Mihiretie, D. M., and Kassa, S. A. (2023). Teacher educators use of feedback to facilitate reflective practice among pre-service teachers during microteaching. Cogent Education, 10(2), 2257121.
https://www.researchgate.net/publication/373826559_Teacher_educators_use_of_feedback_to_facilitate_reflective_practice_among_pre-service_teachers_during_microteaching

Harnani, S., Irawan, C. B., Afriani, H., & Asia, P. (2022). Investigasi sistem psikologi pendidikan, self-efficacy, dan kinerja siswa: Analisis konten tematik. Jurnal Pendidikan, 2, 41-9

He C, Yan C. Exploring authenticity of microteaching in pre-service teacher education programmes. Teach Educ. 2011;22(3):291 302.
https://www.researchgate.net/publication/233428207_Exploring_authenticity_of_microteaching_in_pre-service_teacher_education_programmes

Sosioedukasi
JURNAL ILMIAH ILMU PENDIDIKAN DAN SOSIAL
ISSN: 2086-6135 E-ISSN: 2541-612x
Volume 14 No. 4. Desember 2025 https://ejournal.unibabwi.ac.id/index.php/sosioedukasi/index

Özcan Ö, Gerçek C. Multidimensional analyzing of the microteaching applications in teacher education via videograph. Eur J Teach Educ [Internet]. 2019;42(1):82 97. Available from: https://doi.org/10.1080/02619768.2018.1546285

Kelly R. Maguire (2023) Pre-service teachers' reflections on content knowledge through microteaching, Reflective Practice, 24:2, 153-167, DOI: 10.1080/14623943.2022.2146082. https://www.tandfonline.com/doi/full/10.1080/14623943.2022.2146082?needAccess=true

Mansfield J. Supporting the Development of Pre- Pedagogical Knowledge about Planning for Practical Work. Vol. 34, Journal of Science Teacher Education. 2023. p. 225 47.

N. Erdemir and S. Yeşilçınar, "Reflective practices in micro teaching from the perspective of preservice teachers: Teacher feedback, peer feedback and self-reflection," Reflective Practice, vol. 22, no. 6, pp. 766-781, 2021. https://doi.org/10.1080/14623943.2021.1968818

Nousheen A, Zia MA, Waseem M. Exploring pre-efficacy, content knowledge, and pedagogical knowledge concerning education for sustainable development. Environ Educ Res [Internet]. 2024;30(3):321 33. Available from: https://doi.org/10.1080/13504622.2022.2128055

Phelps LE. Adapting to Adaptive Learning. Peabody J Educ [Internet]. 2020;95(2):160 72. Available from: https://doi.org/10.1080/0161956X.2020.1745615

Sherfinski, M., & Mo, W. J. (2024). Preservice teachers' experiences navigating "adaptive learning" technology. Journal of Early Childhood Teacher Education, 45(3), https://www.tandfonline.com/doi/abs/10.1080/10901027.2024.2333521

Theodorio AO. (2024). Examining the support required by educators for successful technology integration in teacher professional development program. Vol. 11, Cogent Education. https://www.researchgate.net/publication/377534527_Examining_the_support_required_by_educators_for_successful_technology_integration_in_teacher_professional_development_program

Trust T, Pektas E. (2018) Using the ADDIE Model and Universal Design for Learning Principles to Develop an Open Online Course for Teacher Professional Development. Vol. 34, Journal of Digital Learning in Teacher Education.. p. 219 33. https://eric.ed.gov/?id=EJ1204003

Van Vulpen E. (2023) Understanding the ADDIE Model: All You Need to Know [Internet]. Aihr. p. 1 22.Available from:
https://www.aihr.com/blog/addiemodel/?utm_source=linkedin&utm_medium=social&utm_campaign=blog&utm_term=e-addie-model&utm_content=e-addie-model

Wiyono, B. B. & Sunarni. (2009). Evaluasi Program Pendidikan dan Pembelajaran. Malang: Fakultas Ilmu Pendidikan Universitas Negeri Malang.

Yeboah T. Implementation of an Adaptive Learning Environment (ALE) to address individual learning styles: A Case study Christian Service University. IjictmOrg [Internet]. 2014;II(1):19 24. Available from: http://www.ijictm.org/admin/html/mail/attach/2014-08-06-03-32-15.pdf