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Evaluation of the Microteaching Course Program Using the CIPP Model: Optimizing Digital Technology to Enhance Prospective Physics Teachers' Teaching Readiness

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Abstract

This study aims to evaluate the Microteaching course program in the Physics Education Study Program using the CIPP (Context, Input, Process, Product) evaluation model and to analyze the role of digital technology in enhancing prospective teachers' teaching readiness. Data were collected through questionnaires, interviews, analysis of the course syllabus (RPS), and video documentation of Microteaching practices. Participants consisted of 19 seventh-semester students, one course instructor, and the Head of the Study Program. The Context evaluation showed that all components of the course syllabus were available and that there was a 100% alignment among Program Learning Outcomes (CPL), Course Learning Outcomes (CPMK), and course content. Regarding Input, students demonstrated good academic prerequisites, as indicated by 90% of them obtaining an A in the Physics Lesson Planning course; however, only 21.1% owned relevant textbooks, and facilities such as a dedicated Microteaching room and documentation equipment still require improvement. The Process evaluation revealed that 100% of students used technology in their Microteaching practices, particularly through presentation media, virtual simulations, and instructional videos, and some of them utilized artificial intelligence (AI) tools to support lesson planning. The Product evaluation indicated that most students achieved high final grades in the Microteaching course and reported positive perceptions of its contribution to their teaching readiness. These findings highlight the importance of strengthening students' digital literacy, providing adequate facilities specifically designed for Microteaching, and systematically training teaching skills that integrate digital technology in order to further optimize the quality of the Microteaching course.

Keywords: *Program Evaluation; CIPP; Microteaching; Digital Technology*

Abstrak

Penelitian ini bertujuan mengevaluasi program perkuliahan *Microteaching* pada Program Studi Pendidikan Fisika menggunakan model CIPP (Context, Input, Process, Product) serta menganalisis peran teknologi digital dalam meningkatkan kesiapan mengajar calon guru. Data dikumpulkan melalui kuesioner, wawancara, analisis dokumen Rencana Pembelajaran Semester (RPS), dan dokumentasi video praktik *Microteaching*. Partisipan penelitian terdiri atas 19 mahasiswa semester 7, satu dosen pengampu, dan satu ketua program studi. Hasil evaluasi *Context* menunjukkan bahwa seluruh komponen RPS tersedia dan kesesuaian antara Capaian Pembelajaran Lulusan (CPL), Capaian Pembelajaran Mata Kuliah (CPMK), dan bahan kajian mencapai 100%. Pada aspek *Input*, mahasiswa memiliki prasyarat akademik yang baik, ditunjukkan oleh 90% mahasiswa yang memperoleh nilai A pada mata kuliah Perencanaan Pembelajaran Fisika, namun kepemilikan buku sumber hanya sebesar 21,1% dan sarana pendukung seperti ruang khusus *Microteaching* serta perangkat dokumentasi masih perlu ditingkatkan. Evaluasi *Process* mengindikasikan bahwa 100% mahasiswa memanfaatkan teknologi dalam praktik *Microteaching*, terutama melalui penggunaan media presentasi, simulasi virtual, dan video pembelajaran, serta sebagian memanfaatkan kecerdasan artifisial (AI) untuk perencanaan pembelajaran. Pada aspek Product, mayoritas mahasiswa memperoleh nilai akhir tinggi pada mata kuliah *Microteaching* dan menyatakan respons positif bahwa perkuliahan ini meningkatkan kesiapan mereka untuk mengajar. Temuan ini menegaskan pentingnya penguatan literasi digital, penyediaan sarana prasarana khusus *Microteaching*, serta pelatihan keterampilan mengajar berbasis teknologi digital sebagai upaya berkelanjutan untuk mengoptimalkan kualitas program *Microteaching*.

Kata Kunci*: Evaluasi Program, CIPP. Microteaching, Teknologi Digital*

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INTRODUCTION

Microteaching is a key component of teacher education programs designed to facilitate the practice of basic teaching skills in a structured and controlled environment. Through microteaching, prospective teachers have the opportunity to plan, implement, and reflect on miniature teaching episodes before entering real classroom contexts. Previous studies have shown that microteaching contributes to strengthening pre-service teachers' self-confidence, reflective skills, classroom management ability, and professional readiness (Dayal & Alpana, 2020; Ginting & Hamidah, 2024; Khaksar et al., 2023). Microteaching has also been found to support the development of teachers' professional identity through systematic feedback and self-reflection processes (Erdemir & Yeşilçınar, 2021; Rahmawati et al., 2022).

The rapid development of science and technology in the era of the Fourth Industrial Revolution and Society 5.0 demands significant transformation in teacher education practices, including the design and implementation of microteaching (Setiawan et al., 2023). The integration of digital technologies such as presentation tools, virtual simulations, instructional videos, online learning platforms, and various interactive applications has become an integral part of the professional competence expected from future teachers. Systematic reviews indicate that the use of technology in education needs to be evaluated not only in terms of the presence of digital tools, but also in terms of the quality of their integration with pedagogy and content (Lai & Bower, 2019; Valverde-Berrocoso et al., 2021). In the context of microteaching, digital technology can enrich learning scenarios, facilitate the recording and replaying of teaching practices, and strengthen processes of reflection and feedback (Ledger & Fischetti, 2020; Zalavra & Makri, 2022).

At the same time, the integration of digital technology in microteaching programs still faces a number of challenges. Heterogeneous levels of digital literacy among students and lecturers, limitations in infrastructure, uneven access to high-quality digital learning resources, and the lack of structured pedagogical support for technology use often hinder the optimization of learning (Lai & Bower, 2019; Valverde-Berrocoso et al., 2021). Research on microteaching also indicates that pre-service teachers' teaching readiness is strongly influenced by the combination of content knowledge, pedagogical knowledge, and the ability to integrate technology meaningfully into learning processes (Ledger & Fischetti, 2020; Luo & Li, 2024). Therefore, it is important to examine the extent to which existing microteaching programs have been responsive to the demands of strengthening digital literacy and technology integration, particularly in the context of physics education.

Within the broader framework of educational quality improvement, program evaluation in teacher education is regarded as a strategic step to assess relevance, effectiveness, and sustainability, as well as to provide feedback for continuous improvement (Astuti et al., 2023; Suranto et al., 2022). One of the most widely used models for program evaluation is the CIPP model (Context, Input, Process, Product). This model conceptualizes evaluation as a systematic process to examine the adequacy of program context, the readiness of inputs, the quality of implementation processes, and the outcomes achieved by participants (Fitzpatrick et al., 2012; Meiklejohn et al., 2022). In the field of education, the CIPP model has been applied to evaluate teacher education programs and school-based learning programs (Lestari et al., 2022; Raibowo & Nopiyanto, 2020; Rachayu & Bachri, 2023; Toosi et al., 2021), and has been shown to provide a comprehensive picture of program strengths and weaknesses, along with evidence-based recommendations for improvement.

However, studies that specifically evaluate microteaching courses in Physics Education Study Programs using the CIPP model and focusing on the optimization of digital technology and its implications for pre-service teachers' teaching readiness remain relatively limited. Previous research has largely concentrated on the effectiveness of microteaching in improving teaching competence or reflective experiences of pre-service teachers in general (Dayal & Alpana, 2020; Khaksar et al., 2023; Rahmawati et al., 2022), or on the evaluation of teacher education programs at a more macro level without an in-depth focus on discipline-specific microteaching such as physics (Astuti et al., 2023; Lestari et al., 2022). This gap indicates the need for research that evaluates microteaching in Physics Education Study Programs from a comprehensive program evaluation perspective, with particular attention to the role of digital technology.

In response to this gap, the present study aims to evaluate the Microteaching course program in a Physics Education Study Program using the CIPP model, and to analyze how digital technology is utilized and to what extent it contributes to pre-service physics teachers' teaching readiness. Specifically, this study seeks to answer the following research questions: (1) How adequate is the context of the Microteaching program in terms of the completeness and alignment of course planning documents with the needs of prospective physics teachers? (2) How ready are the program inputs, including student characteristics, the course instructor, learning resources, and facilities and infrastructure? (3) How is the Microteaching course implemented, particularly with respect to the use of digital technology in students' teaching practices? and (4) What are the outcomes of the Microteaching program for pre-service physics teachers' teaching readiness, as reflected in achievement scores, learning experiences, and students' perceptions of the course? The findings of this study are expected to inform decision-making and continuous improvement of the Microteaching program, and to contribute to the development of physics teacher education practices that are aligned with the demands of the digital era.

METHODS

This study employs a mixed methods approach with a convergent design (Creswell & Clark, 2017). Quantitative and qualitative data are collected relatively simultaneously, then analyzed and integrated to obtain a comprehensive understanding of the Microteaching course program. A mixed approach is chosen because program evaluation requires both numerical information and narrative data to describe the context, readiness, process, and outcomes of the program in greater depth.

The program evaluation is carried out using the CIPP model (Context, Input, Process, Product). This model emphasizes that the main purpose of evaluation is not only to prove the success or failure of a program, but to provide a strong basis for continuous improvement. The Context component is used to analyze the alignment between the objectives and formulation of the Microteaching course and the needs of prospective teachers as well as the study program curriculum. The Input component examines the readiness of resources, including students, the course instructor, learning resources, and supporting facilities and infrastructure. The Process component reviews the implementation of the course, including instructional strategies, Microteaching activities, and the use of digital technology. The Product component assesses the outcomes achieved by students, both in terms of their grades and their perceptions of teaching readiness.

The participants in this study consist of 19 seventh-semester students of the Physics Education Study Program who were enrolled in the Microteaching course in the 2023/2024 academic year, one course instructor, and the Head of the Study Program. The student participants had passed the prerequisite course on Physics Lesson Planning, so they already had initial experience in developing lesson plans.

Data are collected using several instruments. First, a document analysis sheet is used to evaluate the Microteaching Course Syllabus (Rencana Pembelajaran Semester/RPS), which includes components such as course identity, Program Learning Outcomes (CPL), Course Learning Outcomes (CPMK), course content, teaching methods, learning experiences, as well as assessment systems and criteria. Second, a questionnaire is administered to students to obtain information regarding academic readiness and lesson planning, ownership and use of learning resources, perceptions of facilities and infrastructure, and the extent of digital technology use in Microteaching practice. The questionnaire uses a rating scale that allows analysis in the form of percentages. Third, semi-structured interviews are conducted with selected students, the course instructor, and the Head of the Study Program to explore more deeply their experiences, challenges, and expectations regarding the Microteaching course. Fourth, video documentation of Microteaching practice is analyzed to identify the forms of digital technology use and the teaching skills demonstrated by students.

Quantitative data obtained from the questionnaires and students' final grades are analyzed using descriptive statistics in the form of percentages, means, and distributions of grade categories to describe general trends for each CIPP component. Meanwhile, qualitative data from interviews, document analysis, and video documentation are analyzed thematically through processes of coding, grouping themes, and interpreting meanings. The results of the quantitative and qualitative analyses are then integrated at the interpretation stage to construct a comprehensive picture of the strengths and weaknesses of the Microteaching program and to formulate evidence-based recommendations for its improvement.

RESULTS AND DISCUSSION

Based on the data collected, which included document analysis, video documentation of Teaching Practice, interviews, and questionnaires in the Physics Education Study Program, the results are presented as follows.

Evaluation of the Microteaching Course Program in Terms of the Context Aspect

Based on the results of the syllabus (RPS) analysis for the Microteaching course, the findings are obtained as shown in Table 1.

Table 1. Availability of Syllabus (RPS) Components for the Microteaching Course

No.	Planning Document Components	Availability	
		Yes	No
1.	Study Program Name	√	

2.	Course Name and Code	√
3.	Semester	√
4.	Credit Units (SKS)	√
5.	Lecturer's Name	√
6.	Program Learning Outcomes (PLO)	√
7.	Course Learning Outcomes (CLO)	√
8.	Course Content / Subject Matter	√
9.	Learning Methods	√
10.	Learning Experiences	√
11.	Assessment Criteria	√
12.	Assessment Indicators	√
13.	Assessment Weighting	√
14.	List of References Used	√

The analysis of the RPS in Table 1 shows that all components are available in the syllabus document. The alignment between the Program Learning Outcomes (CPL) and the Course Learning Outcomes (CPMK) has reached 100%. The course content is consistent with the references stated in the Study Program Curriculum document. Based on these findings, it can be concluded that the RPS has been well-designed; even the students' assignments are described in detail and clearly articulated in the syllabus.

Based on the questionnaire results, it was found that the lecturer presented the syllabus (RPS) at the beginning of the course.

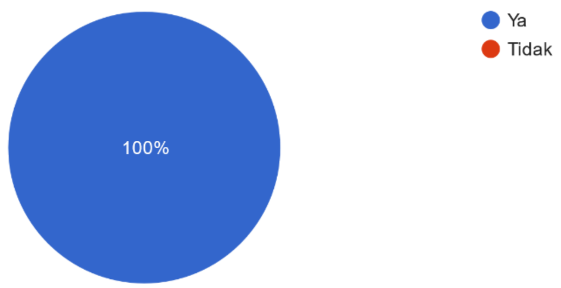


Figure 1. Questionnaire Results on the Lecturer's Presentation of the Course Plan at the Beginning of the Semester

The questionnaire results indicate that at the beginning of the semester the lecturer presents the Course Plan for the entire term. This shows that students already gain an overview of the course to be implemented, including learning objectives, course content, assessment, planned assignments, and other related aspects. The Clarity of the course plan at the outset supports transparency and help students prepare for the learning process throughout the semester.

Evaluation of the Microteaching Course Program in Terms of the Input Aspect

The evaluation of the Input aspect is based on the prerequisite course, lecturer profile, learning resources, and facilities and infrastructure.For the Physics Lesson Planning course, the data show that 90% of students obtained an A, 5% obtained a B+, and 5% obtained an A–. Based on these results, it can be concluded that overall the students possess good prerequisites for attending the Microteaching course. This is in line with the questionnaire results presented in Figure 2.

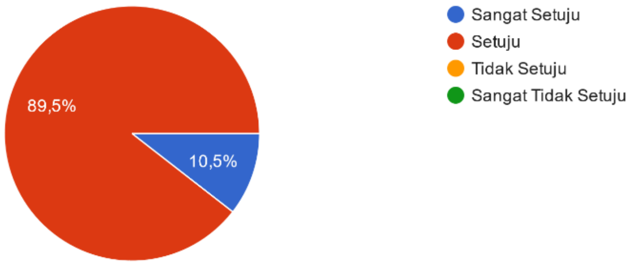


Figure 2. Students' Responses Regarding Their Ability to Develop Lesson Plans (RPP) and Teaching Modules

Based on Figure 2, it can be seen that students responded positively regarding their readiness in lesson planning, which would be further implemented in the Micro-teaching course. In the Physics Lesson Planning course, students had already been equipped with the skills to develop Lesson Plans (RPP) and Teaching Modules. Lesson planning is a crucial component in carrying out the teaching and learning process (Widi-yanto & Wahyuni, 2020). Therefore, students must have sufficient preparation to develop Lesson Plans or Teaching Modules for the implementation of Microteaching practice.

The questionnaire results related to the ownership of learning resources in the form of reference books show that 78.9% of students do not have source books. This indicates that students' book-based references are still inadequate. Source books play an important role in supporting the learning process (Suranto et al., 2022). The interview results further reveal that students tend to search for Microteaching-related materials by browsing the internet for relevant content. This pattern suggests that, despite strong ac-ademic, prerequisites, students' access to high-quality written references is limited and heavily dependent on online resources, which may vary in credibility.

The profile of the course instructor for the Microteaching course shows that they hold a Master's degree in Physics Education. The Microteaching course itself is a new course introduced as a result of curriculum evaluation. This course is being offered for the first time, and likewise, the lecturer is also teaching the Microteaching course for the first time.This situation indicates that, while the instructor's academic background is rel-evant, experience in implementing the course is still in the early stages of the develop-ment.

The questionnaire results indicate that the facilities and infrastructure for the Mi-croteaching course are already adequate. This is illustrated in Figure 3.

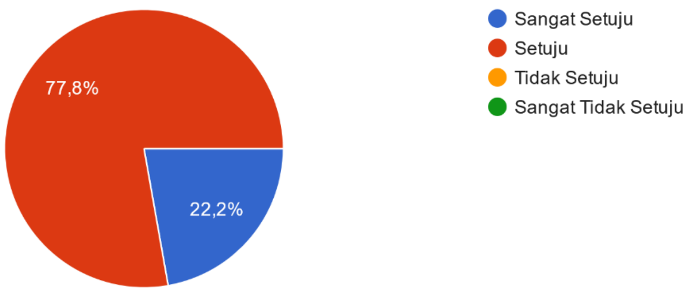


Figure 3. Students' Responses Regarding Facilities and Infrastructure for the Microteaching Course

Based on the students' questionnaire responses, the facilities and infrastructure for the Microteaching course are generally considered adequate. However, the interview results indicate that students complained about slow internet access. Furthermore, according to information from the course instructor, the Microteaching course would be more optimally implemented if there were a dedicated classroom and equipment such as cameras to better support the documentation process. These findings show that, although the basic facilities are sufficient to conduct the course, there are still important limitations that may affect the quality of technology use and the documentation of teaching practice.

Evaluation of the Microteaching Course Program in Terms of the Process Aspect

The evaluation of the program in terms of the Process aspect was obtained from questionnaire and interview data with students, interviews with the lecturer, and video documentation of Microteaching practice. The students' responses regarding the use of technology in their teaching practice during the Microteaching course are presented in Figure 4.

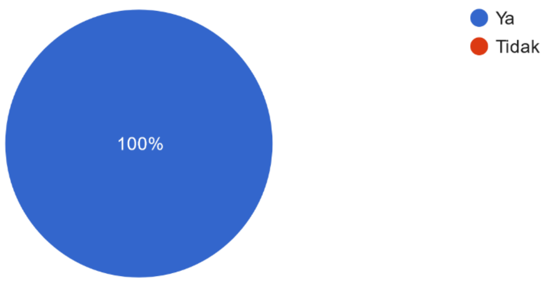


Figure 4. Students' Responses Regarding the Use of Technology in the Microteaching Course

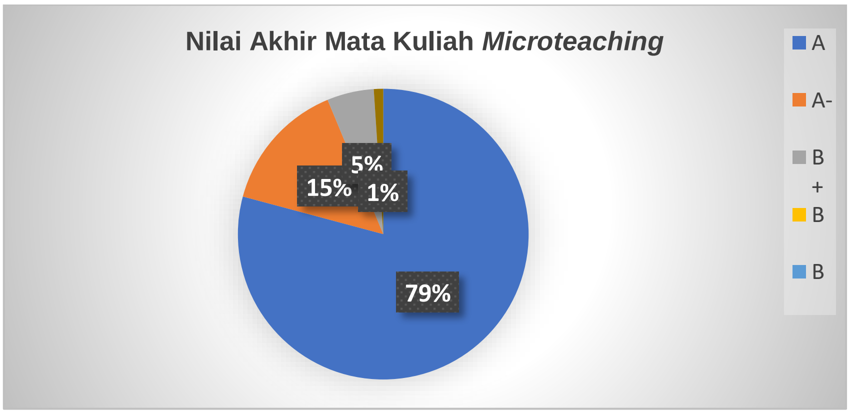
The questionnaire results show that 100% of students used technology in their Microteaching practice. The analysis of video documentation indicates that students employed various forms of digital technology in their teaching practice, such as PowerPoint presentations, physics simulations, interactive quizzes, and instructional videos. This is consistent with the questionnaire findings, which show that 100% of students used PowerPoint in their Microteaching practice, 73.7% used virtual simulations, and 84.2% displayed instructional videos. Furthermore, interview results reveal that students also used AI-based tools to support their lesson planning for Microteaching practice, for example to generate ideas for formulating Learning Objectives and designing simple experiments. Various research findings have shown that technology contributes to enhancing students' readiness for teaching practice (Rahmawati et al., 2022).

Although the quantitative data show that all students used digital technology in their Microteaching practice, the qualitative evidence indicates that this use is still largely concentrated on basic presentation tools and teacher centred demonstrations. Students primarily relied on PowerPoint, virtual simulations, and pre-existing instructional videos, while interactive applications such as Kahoot or Quizizz were almost never utilized. This pattern suggests that technology integration remains at a relatively surface level, functioning mainly to deliver content rather than to promote higher levels of student interaction, formative assessment, or inquiry based learning. The fact that students reported feeling more confident and better prepared to teach after the course, yet simultaneously acknowledged their limited familiarity with interactive tools, illustrates a tension between perceived readiness and the depth of their digital pedagogical competence.

From a critical perspective, the limited use of interactive platforms and learning analytics tools points to an important constraint in students' digital literacy. While the Microteaching course successfully encouraged the use of technology in a general sense, it did not yet systematically scaffold students to move beyond basic substitution of traditional media towards more transformative uses of digital tools. The absence of structured activities that explicitly require students to design technology-rich, student-centred lessons may explain why many of them reported being inspired to use applications such as Kahoot or Quizizz only in future school placements, rather than already experimenting with them during Microteaching. This finding highlights the need for the course to more intentionally target the development of technological–pedagogical integration, not only technological familiarity.

Evaluation of the Microteaching Course Program in Terms of the Product Aspect

The evaluation of the Product aspect refers to learning outcomes, including skills, attitudes, and knowledge. The course instructor assesses the final results of the learning process, covering both teaching practice and the development of lesson designs. The final grades in the Microteaching course are presented in Figure 6.



Based on the interview results with the course instructor, the Microteaching course places emphasis on students' lesson planning and their performance during

Microteaching practice. The lecturer also provides opportunities for students to engage in reflection and peer assessment. Furthermore, in general, the students are able to follow the Microteaching course well.

Information regarding students' responses on how the Microteaching course helps improve their teaching readiness is presented in Figure 6.

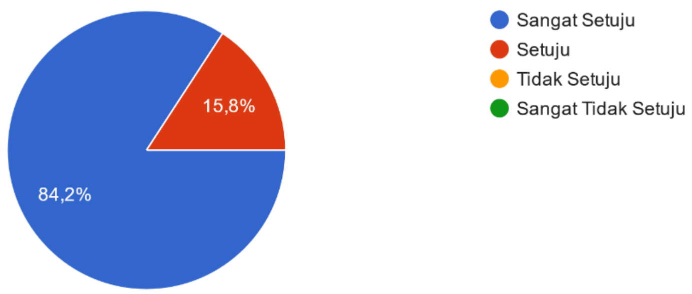


Figure 6. Students' Responses on How the Microteaching Course Enhances Teaching Readiness

The questionnaire results show that students responded positively to the Microteaching course in relation to their teaching readiness. Furthermore, based on the interview findings, students reported feeling more prepared and having a clearer picture of what needs to be done when teaching. They also stated that the Microteaching course broadened their insights. The interview results indicate that students did not use applications such as Kahoot or Quizizz in their Microteaching practice due to limited digital literacy. However, they expressed that they became inspired to use such applications when teaching during Teaching Practice (Pengenalan Lapangan Persekolahan/PLP).

The positive learning outcomes and students' self-reported gains in teaching readiness therefore need to be interpreted with some nuance. On the one hand, high final grades and favourable perceptions indicate that the Microteaching course has achieved its basic objectives in familiarising students with lesson planning, teaching practice, and reflective activities. On the other hand, the current level of technology use suggests that there is still considerable room for enhancing the sophistication of their teaching repertoires. Without more systematic attention to the design of interactive, technology enhanced learning experiences, there is a risk that students' readiness remains confined to relatively traditional forms of teaching, albeit supported by digital presentation tools. In future iterations of the course, aligning assessment criteria more explicitly with higher order digital pedagogical skills could help bridge this gap.

Taken together, the findings across the four CIPP components suggest that a strong program context and favourable academic input conditions are necessary but not sufficient to fully optimize students' teaching readiness. The well aligned syllabus, clear communication of course expectations at the beginning of the semester, and students' solid prerequisite performance in the Physics Lesson Planning course create a supportive foundation for the Microteaching program. However, limitations in learning resources, such as the low ownership of textbooks, and constraints in facilities, such as the absence of a dedicated Microteaching room and specialised documentation equipment, potentially constrain the depth and quality of students' learning experiences. These contextual and input conditions appear to shape how technology is actually used in the classroom and, in turn, the kinds of teaching competencies that are developed.

Overall, the results show that the Microteaching course program has been implemented effectively in terms of achieving good student outcomes and fostering a sense of teaching readiness. At the same time, the evaluative analysis highlights specific areas particularly digital literacy, the pedagogical integration of technology, and the strengthening of basic teaching skills that need to be prioritised in future course improvements in order to move from basic technology use toward more transformative, student centred teaching practices.

CONCLUSION

Based on the evaluation of the Microteaching course program in the Physics Education Study Program using the CIPP model, several conclusions can be drawn as follows.

1. The Course Syllabus (RPS) for the Microteaching course has been very well developed. All main components course identity, Program Learning Outcomes (CPL), Course Learning Outcomes (CPMK), course content, learning experiences, instructional methods, as well as assessment systems and criteria are completely available, with a 100% alignment among CPL, CPMK, and course content. This indicates that the context of the Microteaching program is well aligned with the needs of prospective physics teachers and the Study Program curriculum.
2. In terms of academic prerequisites, students demonstrate good readiness; 90% obtained an A in the Physics Lesson Planning course and responded positively regarding their ability to develop lesson plans (RPP) and teaching modules. However, the ownership of learning resources in the form of reference books is still limited (78.9% of students do not own source books), so the written references used by students are not yet sufficient and are largely replaced by materials searched from the internet. The course instructor's profile, with a Master's degree in Physics Education, supports the relevance of subject-matter expertise, but the Microteaching course itself is newly introduced and is being taught for the first time, implying that further strengthening of experience in course implementation is needed in subsequent years. Facilities and infrastructure are perceived as generally adequate by students, although improvements are still required, particularly in the form of a dedicated classroom and documentation equipment (e.g., cameras) to better support Microteaching practice.
3. The implementation of the Microteaching course has facilitated extensive use of digital technology; 100% of students used technology in their teaching practice, especially through PowerPoint presentations, virtual simulations, and instructional videos, and some also used AI tools to support lesson planning and the design of simple experiments. Nevertheless, students' digital literacy is not yet optimal, as reflected in the fact that interactive applications such as Kahoot or Quizizz have not yet been utilized in Microteaching practice. Video documentation of teaching practice is also still limited, both in terms of coverage (not all teaching practices are documented) and recording quality. This indicates that the teaching–learning process is moving toward technology integration but still requires reinforcement in the meaningful use of interactive technologies and in developing a more robust documentation system.
4. Students' learning outcomes in the Microteaching course are generally in the good category, as evidenced by high final grades and positive responses regarding the contribution of the course to their teaching readiness. Students reported feeling more prepared to teach, having a clearer picture of the steps they need to take when teaching, and gaining new insights from the Microteaching experience. However, there remains room for improvement in the more structured training of basic teaching

skills, such as questioning skills, explaining skills, skills in opening and closing lessons, skills in using variation, and reinforcement skills.

Overall, the Microteaching course program in the Physics Education Study Program has been implemented well and has made a positive contribution to the teaching readiness of prospective physics teachers. However, several aspects require attention in future implementations, namely: strengthening digital literacy and the use of interactive technologies, improving the quality and coverage of video documentation, providing dedicated facilities and infrastructure for Microteaching, and offering more comprehensive and systematic training in basic teaching skills.

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