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Enhancing Quality Assurance in Teacher Education: Development of a PPEPP-Based Micro Teaching Assessment System

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ABSTRACT

Micro teaching assessment plays a strategic role in preparing prospective teachers to develop professional teaching competencies. However, in many teacher education institutions, the assessment process is still conducted manually, inconsistently, and without adequate integration into institutional quality assurance systems. These limitations reduce the effectiveness of assessment as a tool for educational management and continuous improvement. This study aims to develop and evaluate a Micro Teaching Assessment Information System based on the PPEPP cycle (Planning, Implementation, Evaluation, Control, and Improvement) to support more systematic, transparent, and accountable assessment management. The research employed a Research and Development (R&D) approach consisting of needs analysis, system design, prototype development, expert validation, field testing, and product revision. Data were collected through observations, interviews, questionnaires, and system usability testing, and were analyzed using descriptive and inferential statistics as well as thematic analysis. The results indicate that the developed system achieved high levels of feasibility and usability, improved assessment efficiency, standardized evaluation procedures, enhanced the quality of feedback, and enabled real-time monitoring of student performance. The study concludes that the PPEPP-based assessment information system provides an effective technological solution for strengthening micro teaching management, supporting data-driven decision-making, and promoting sustainable quality improvement in teacher education.

Keywords: Digital Assessment, Educational Management, Information System, Micro Teaching Assessment, PPEPP Cycle, Teacher Education.

INTRODUCTION

The transformation of higher education in the digital era has brought significant changes to the way universities manage academic processes, particularly in teacher education institutions. Educational institutions are no longer evaluated solely based on their ability to deliver learning content, but also on how effectively they manage academic quality, learning assessment, and continuous improvement mechanisms. In this context, educational management plays a fundamental role in ensuring that all instructional activities are planned, implemented, evaluated, and improved systematically. One of the most critical components in teacher education that requires serious managerial attention is micro teaching. Micro teaching is widely recognized as an essential component in preparing prospective teachers to enter real classroom environments. It provides structured opportunities for students to practice teaching skills, apply pedagogical theories, and develop professional competencies in a controlled setting. Through micro teaching, prospective teachers are expected to master various teaching skills, including lesson planning, classroom management, communication, use of instructional media, and learning evaluation. Therefore, micro teaching functions as a bridge between theoretical learning and real teaching practice.

Despite its strategic importance, the implementation of micro teaching in many teacher education institutions often encounters various managerial problems. From the perspective of educational management, micro teaching should not only be viewed as an instructional activity, but also as a comprehensive system that involves planning, organizing, implementing, assessing, and improving learning quality. However, in practice, micro teaching assessment is frequently conducted in a fragmented, subjective, and non-standardized manner. This condition weakens the effectiveness of micro teaching as a tool for developing professional teaching competence. One of the main challenges in micro teaching management is the assessment process. Assessment is a core element in educational management because it provides essential information for decision-making, quality control, and performance improvement. Ideally, micro teaching assessment should be objective, transparent, accountable, and supported by reliable data. Nevertheless, in many institutions, assessment is still carried out manually using paper-based instruments, without integrated documentation and systematic feedback mechanisms. As a result, assessment data are often scattered, difficult to analyze, and rarely used as a basis for continuous improvement.

From the viewpoint of educational management theory, effective assessment must be part of an integrated quality assurance system. Assessment results should not only function as a final evaluation tool but also serve as input for planning and improvement processes. In reality, micro teaching assessment is often limited to giving scores to students without structured follow-up actions. Feedback is commonly delivered verbally and informally, making it difficult for students to conduct meaningful reflection on their teaching performance. Consequently, the potential of assessment as a strategic instrument for educational improvement is not optimally utilized. The rapid advancement of information and communication technology (ICT) offers new opportunities to overcome these

problems. Digital transformation in education has enabled institutions to manage academic processes more efficiently, accurately, and transparently. The integration of information systems into learning assessment has been proven to improve data management, feedback quality, and decision-making processes. In the context of micro teaching, the use of an information system can facilitate standardized assessment, systematic documentation, performance analysis, and continuous monitoring of student progress. The application of ICT in educational management is not merely a technical innovation but also a strategic approach to improving educational quality. Information systems allow educational institutions to transform conventional administrative practices into data-driven management processes. In micro teaching, a technology-based assessment system can provide real-time feedback, ensure consistency in evaluation, and generate analytical reports that support institutional decision-making. Therefore, the development of an information system for micro teaching assessment is highly relevant to the current demands of modern educational management.

In Indonesia, the implementation of educational quality assurance in higher education is guided by the PPEPP cycle, which stands for Planning (Perencanaan), Implementation (Pelaksanaan), Evaluation (Evaluasi), Control (Pengendalian), and Improvement (Peningkatan). The PPEPP cycle represents a continuous quality improvement framework that must be applied in all academic activities. From the perspective of educational management, this cycle ensures that every educational process is systematically managed, evaluated, and improved based on valid and reliable data. However, in the current practice of micro teaching management, the PPEPP cycle has not been fully integrated. Planning is often conducted without adequate reference to previous assessment data. Implementation is carried out without standardized monitoring mechanisms. Evaluation results are rarely documented properly, and control as well as improvement processes are not systematically performed. This situation indicates that micro teaching management still operates in a partial and non-cyclical manner, which contradicts the principles of effective educational management. Universitas Negeri Manado, as one of the leading teacher education institutions in Indonesia, faces similar challenges in managing micro teaching activities. Based on preliminary observations, the assessment of micro teaching at the university is still largely conducted manually. Lecturers use different assessment formats, feedback is not well documented, and assessment results are not integrated into an institutional database. These conditions create several problems, including inconsistency in evaluation, lack of transparency, limited access to assessment results, and difficulties in monitoring student development over time. From the educational management perspective, such conditions reflect weak governance in micro teaching assessment. Good educational management requires the availability of accurate information, standardized procedures, and systematic quality control mechanisms. Without an integrated system, micro teaching assessment cannot effectively support institutional quality assurance. Furthermore, the absence of structured data makes it difficult for faculty leaders to evaluate the effectiveness of micro teaching programs and to design appropriate improvement strategies.

Another important aspect that needs to be considered is the concept of meaningful learning. In teacher education, micro teaching should not only focus on technical teaching skills but also on reflective and meaningful learning experiences. Meaningful learning emphasizes active engagement, reflection, collaboration, and authentic problem-solving. These principles can only be realized when students receive constructive, detailed, and timely feedback based on objective assessment. Therefore,

an assessment system that supports meaningful learning is crucial for the professional development of prospective teachers. The integration of meaningful learning principles into micro teaching assessment requires a system that enables continuous interaction between lecturers and students. Feedback should be delivered in a structured manner, supported by clear evidence such as teaching performance videos and digital rubrics. In this regard, an information system can play a significant role in facilitating reflective learning processes. Through digital platforms, students can review their teaching performance, analyze their strengths and weaknesses, and plan further improvement based on concrete data. Several previous studies have emphasized the importance of technology-based assessment in teacher education. Digital assessment systems have been shown to increase efficiency, reduce subjectivity, and enhance transparency. Nevertheless, most existing systems focus only on technical aspects of assessment and have not yet incorporated comprehensive educational management frameworks. There is still a lack of systems that integrate assessment processes with institutional quality assurance cycles such as PPEPP. This gap highlights the need for a more holistic approach that combines technological innovation with educational management principles.

Based on these considerations, this study proposes the development of a Micro Teaching Assessment Information System based on the PPEPP cycle. The system is designed to integrate all stages of micro teaching management, including planning, implementation, evaluation, control, and improvement. By utilizing a web-based platform, the system enables lecturers to conduct standardized digital assessments, provide structured feedback, monitor student progress, and generate analytical reports for managerial decision-making. From the standpoint of educational management, the development of such a system offers several strategic advantages. First, it supports data-driven planning by providing comprehensive information about student performance. Second, it enhances the objectivity and consistency of assessment through standardized digital rubrics. Third, it facilitates systematic control by enabling continuous monitoring of micro teaching implementation. Fourth, it promotes sustainable improvement by linking assessment results with follow-up actions. Moreover, the integration of the PPEPP cycle into the information system ensures that micro teaching management is conducted in a structured and cyclical manner. Planning can be based on previous evaluation data, implementation can be monitored effectively, evaluation results can be documented comprehensively, and improvement programs can be designed more accurately. In this way, micro teaching will no longer be treated as a routine academic activity but as a strategic process for developing professional teacher competence. The urgency of this research is further strengthened by the increasing demand for accountability and transparency in higher education governance. Universities are required to demonstrate that their academic processes are managed professionally and supported by reliable data. An integrated micro teaching assessment system can serve as an important instrument for institutional quality assurance and accreditation purposes. It can provide valid evidence of how prospective teachers are trained, assessed, and developed in a systematic manner.

Therefore, this study aims to design, develop, and evaluate an integrated Micro Teaching Assessment Information System based on the PPEPP cycle at Universitas Negeri Manado. The system is expected to become an innovative solution for improving educational management, strengthening assessment accountability, and enhancing the quality of micro teaching implementation. Furthermore, the results of this research are expected to contribute to the development of educational management

theory, particularly in the area of technology-based assessment and quality assurance in teacher education. In conclusion, effective micro teaching management requires more than good instructional practices; it demands a comprehensive system that integrates assessment, feedback, documentation, and improvement in a continuous cycle. The integration of information systems with educational management frameworks such as PPEPP represents a strategic step toward achieving this goal. Through this approach, micro teaching can truly function as a powerful instrument for preparing competent, reflective, and professional teachers who are ready to face the challenges of modern education.

LITERATURE REVIEW

Educational Management in Higher Education

Educational management refers to the systematic process of planning, organizing, implementing, and evaluating educational activities to achieve institutional goals effectively. In higher education, educational management plays a strategic role in ensuring academic quality, accountability, and continuous improvement (Sallis, 2014). Modern educational management emphasizes data-driven decision-making, transparency, and structured quality assurance mechanisms (Bush, 2018). In the context of teacher education, educational management is not limited to administrative functions but also covers academic governance, curriculum implementation, assessment systems, and professional development processes (Fullan, 2016). Effective management of teaching and learning processes requires reliable information systems that can provide accurate data for planning, evaluation, and improvement (Turban et al., 2018). Without an integrated management system, academic processes tend to be fragmented and less accountable.

Micro Teaching as a Core Component of Teacher Education

Micro teaching is a fundamental component in preparing prospective teachers to develop pedagogical competence. It provides a simulated teaching environment where students can practice teaching skills in a structured and controlled manner (Allen & Ryan, 1969). Through micro teaching, prospective teachers learn to design lesson plans, apply instructional strategies, manage classrooms, and conduct learning evaluations. From the perspective of educational management, micro teaching should be managed as a comprehensive system involving planning, implementation, assessment, and feedback (Arends, 2015). However, many institutions still manage micro teaching using conventional approaches that rely heavily on manual procedures and subjective judgments (Popham, 2017). Such practices limit the effectiveness of micro teaching as a tool for professional development.

Assessment in Micro Teaching

Assessment is a central element in the micro teaching process because it provides information about student performance and learning progress. Formative assessment in micro teaching aims to help students reflect on their teaching practices and continuously improve their competencies (Nicol & Macfarlane-Dick, 2006). Effective assessment must be objective, transparent, consistent, and supported by clear criteria (Wiliam, 2011). In traditional micro teaching practices, assessment is often conducted

using paper-based rubrics and informal feedback. These methods frequently lead to subjectivity, inconsistency among assessors, and poor documentation (Hattie, 2012). From an educational management standpoint, such conditions indicate weak assessment governance and limited use of assessment data for improvement planning.

Information Systems in Educational Assessment

The integration of information technology into educational assessment has become increasingly important in the era of digital transformation. Information systems enable institutions to manage assessment data more efficiently, provide real-time feedback, and support evidence-based decision-making (Alavi & Leidner, 2001). Technology-based assessment systems can enhance transparency, objectivity, and accountability in academic evaluation (Garrison & Vaughan, 2013). Web-based assessment systems allow lecturers to use standardized digital rubrics, store assessment records, and generate analytical reports automatically (Laurillard, 2012). These features are highly relevant to micro teaching management, where continuous feedback and performance monitoring are essential. The adoption of information systems also supports institutional accreditation processes by providing valid and traceable academic data (Reeves, 2006).

PPEPP Cycle as a Quality Assurance Framework

In Indonesian higher education, quality assurance is implemented through the PPEPP cycle, which consists of Planning (Perencanaan), Implementation (Pelaksanaan), Evaluation (Evaluasi), Control (Pengendalian), and Improvement (Peningkatan). The PPEPP cycle represents a continuous improvement model that must be applied to all academic activities (Kemendikbud, 2020). The PPEPP framework emphasizes that evaluation results should be used as the basis for planning and improvement. However, in many institutions, the PPEPP cycle is implemented only at the policy level and has not yet been operationalized in specific academic processes such as micro teaching assessment (Mulyasa, 2017). The absence of integrated information systems makes it difficult to apply the PPEPP cycle consistently.

Digital Transformation and Quality Improvement

Digital transformation in education is not merely about adopting technology but also about improving governance and management practices (Rogers, 2003). Information systems serve as strategic tools for transforming conventional academic processes into more structured, transparent, and accountable systems (Turban et al., 2018). In teacher education, digital assessment systems contribute to meaningful learning by enabling structured feedback, reflective practices, and continuous performance tracking (Schön, 1983). Research has shown that technology-based assessment improves assessment reliability, reduces administrative workload, and increases user satisfaction (Wiliam, 2011). Therefore, developing an integrated micro teaching assessment information system is highly relevant to current educational challenges.

Research Gap

Although many studies have discussed digital assessment and micro teaching, most of them focus on technical aspects of assessment tools. Limited research has attempted to integrate assessment systems with comprehensive educational management frameworks such as the PPEPP cycle. There is still a lack of studies that develop and evaluate an assessment information system specifically designed to support micro teaching management from an educational management perspective. This gap indicates the need for a holistic approach that combines technological innovation with quality assurance principles. The development of a PPEPP-based Micro Teaching Assessment Information System is expected to address this gap by providing an integrated solution that supports planning, evaluation, control, and continuous improvement in teacher education.

METHOD

Research Design

This study was conducted using a Research and Development (R&D) approach with the primary objective of designing, developing, and evaluating a Micro Teaching Assessment Information System based on the PPEPP (Planning, Implementation, Evaluation, Control, and Improvement) cycle. The selection of the R&D method was based on the need to produce a functional technological product that is empirically tested and systematically validated within the context of educational management. The research design integrates both qualitative and quantitative approaches in order to obtain comprehensive data regarding system feasibility, effectiveness, and usability. The methodological framework adopted in this study follows the modified R&D model proposed by Borg and Gall, which consists of several major stages: needs analysis, system planning, product design, prototype development, expert validation, field testing, product revision, and final implementation. Each stage was conducted sequentially to ensure that the developed system meets academic standards and institutional needs. The PPEPP cycle was embedded into every phase of development to align the product with the principles of higher education quality assurance.

Research Setting and Participants

The research was carried out at Universitas Negeri Manado, particularly within the Faculty of Education, where micro teaching courses are implemented as a compulsory component of teacher education programs. The participants involved in this study consisted of three main groups: lecturers of micro teaching courses, students enrolled in micro teaching programs, and educational management experts. A purposive sampling technique was employed to select respondents who have direct involvement and experience in micro teaching assessment. In the needs analysis phase, 15 lecturers and 60 students were involved as primary respondents. During the validation stage, five experts were engaged, including two experts in educational management, two experts in instructional technology, and one expert in educational evaluation. For the fieldtesting phase, the developed system was implemented in real micro teaching classes involving 120 students and 10 lecturers. This multi-level participation ensured that the evaluation of the system was conducted from both managerial and user perspectives.

Data Collection Techniques

Data in this study were collected using multiple instruments to ensure methodological rigor and triangulation. The main techniques included:

1. Observation, conducted to analyze the existing micro teaching assessment process and to identify managerial problems related to planning, implementation, and evaluation.
2. Interviews, semi-structured interviews were carried out with lecturers and academic administrators to explore institutional needs and expectations regarding an integrated assessment system.
3. Questionnaires, used to measure user perceptions, system usability, and feasibility levels.
4. Documentation analysis, to review existing assessment forms, rubrics, and academic regulations.
5. System testing and log analysis, to evaluate technical performance and user interaction with the developed application.

Each instrument was designed in accordance with the PPEPP framework to ensure that the collected data reflect the complete cycle of educational management processes.

Instrument Development

The primary research instruments were developed based on theoretical constructs of educational management, assessment systems, and information system usability standards. Questionnaires for expert validation and user testing utilized a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The instruments consisted of several evaluation dimensions:

1. Functional suitability
2. System reliability
3. Usability and user interface
4. Efficiency and performance
5. Conformity with PPEPP principles
6. Quality of feedback and reporting features

Before being used, all instruments were validated through content validity procedures involving experts in educational management and instructional technology. The validity of each item was analyzed using the Content Validity Index (CVI), while reliability was tested using Cronbach's Alpha to ensure internal consistency of the instruments

Data Analysis Techniques

1. Qualitative Data Analysis

Data obtained from interviews, observations, and open-ended questionnaire responses were analyzed using the interactive model of Miles and Huberman, which includes data reduction, data display, and conclusion drawing. This analysis was used to interpret user needs, implementation challenges, and managerial implications of the developed system.

2. Quantitative Data Analysis

Quantitative data from questionnaires and system testing were analyzed using descriptive and

inferential statistics. The following statistical techniques were employed:

- Descriptive Statistics: mean, percentage, and standard deviation to describe feasibility and usability levels.
- Validity Testing: Pearson Product Moment correlation to determine the validity of questionnaire items.
- Reliability Testing: Cronbach's Alpha coefficient to assess the internal consistency of the instruments.
- Normality Testing: Kolmogorov–Smirnov test to ensure data distribution assumptions.
- Effectiveness Testing: Paired Sample t-test to compare assessment efficiency before and after system implementation.
- User Satisfaction Analysis: System Usability Scale (SUS) scoring method to evaluate overall user acceptance.
- Inter-rater Reliability: Intraclass Correlation Coefficient (ICC) to measure consistency among lecturers in using digital rubrics.

The criteria for system feasibility were determined based on percentage scores:

- 85–100% = Very Feasible
- 70–84% = Feasible
- 55–69% = Fairly Feasible
- <55% = Not Feasible

Evaluation Criteria

The quality of the developed system was evaluated using three main criteria:

1. Correctness – the extent to which the system functions according to its design specifications and PPEPP principles.
2. Efficiency – the ability of the system to simplify assessment processes and reduce time consumption.
3. Usability – the ease of use, accessibility, and user satisfaction when interacting with the system.

These criteria were assessed through expert judgment, user testing, and statistical analysis of questionnaire data.

RESULTS AND DISCUSSION

Results of Needs Analysis

The initial stage of this study was the needs analysis conducted to identify the existing problems in the management of micro teaching assessment at Universitas Negeri Manado. Data were collected through observations, interviews with lecturers, and questionnaires distributed to students and academic administrators. The results of the needs analysis revealed several fundamental issues in the current assessment practices. First, the micro teaching assessment process was still conducted manually using paper-based rubrics. Each lecturer used different assessment formats, which resulted in inconsistency in evaluation standards. Second, assessment results were not systematically documented,

making it difficult to monitor student progress over time. Third, feedback to students was mostly delivered verbally and was rarely recorded for further reflection. Fourth, there was no integrated system that connected assessment results with planning and improvement programs. From the perspective of educational management, these findings indicate that the existing micro teaching management had not yet implemented the PPEPP cycle effectively. Planning was not based on accurate data, evaluation results were not properly analyzed, control mechanisms were weak, and improvement actions were not systematically designed. These conditions confirmed the urgent need for an integrated assessment information system that could support structured and data-driven management.

Development of the Micro Teaching Assessment Information System

Based on the needs analysis, a web-based Micro Teaching Assessment Information System was designed and developed. The system was structured in accordance with the PPEPP cycle and consisted of several main modules:

1. Planning Module: allows lecturers to design assessment plans, input learning outcomes, and prepare digital rubrics.
2. Implementation Module: facilitates the process of conducting assessments during micro teaching practice.
3. Evaluation Module: provides features for scoring, feedback delivery, and performance analysis.
4. Control Module: enables academic managers to monitor assessment activities in real time.
5. Improvement Module: supports follow-up actions based on assessment data.

The system was developed using a user-centered design approach to ensure that it meets the needs of both lecturers and students. The interface was designed to be simple, intuitive, and accessible through multiple devices. All assessment data are stored in an integrated database, allowing for long-term tracking and analysis of student performance.

Expert Validation Results

After the prototype was developed, expert validation was conducted to evaluate its feasibility and conformity with educational management principles. Five experts in educational management, instructional technology, and educational evaluation were involved in the validation process. The validation results showed that the system achieved very high feasibility scores:

- Functional suitability: 92%
- Usability: 90%
- System reliability: 88%
- Conformity with PPEPP framework: 94%
- Quality of assessment features: 91%

These results indicate that the developed system met academic standards and was considered highly feasible for implementation in micro teaching management. Experts emphasized that the integration of the PPEPP cycle into the system design was one of the main strengths of the product.

Field Testing Results

The system was then implemented in real micro teaching classes involving 120 students and 10 lecturers. During the trial period, all assessment activities were conducted using the developed application. Quantitative analysis of user responses revealed positive results:

- Average System Usability Scale (SUS) score: 86.5 (excellent category)
- Lecturer satisfaction level: 89%
- Student satisfaction level: 87%
- Efficiency improvement in assessment time: 40% faster than manual process
- Increase in feedback quality: 42% improvement

The paired sample t-test conducted to compare the effectiveness of the manual assessment process and the digital system showed a significant difference ($p < 0.05$). This indicates that the use of the information system significantly improved the efficiency and quality of micro teaching assessment.

Impact on Micro Teaching Management

The implementation of the system produced several important managerial impacts:

1. Assessment data became well organized and easily accessible.
2. Monitoring of student performance could be conducted in real time.
3. Feedback to students became more structured and documented.
4. Decision-making processes were supported by valid empirical data.

The PPEPP cycle could be implemented more consistently. These results demonstrate that the developed system successfully addressed the main problems identified in the needs analysis phase.

Discussion

Strengthening Educational Management through Digital Transformation

The findings of this study confirm that the integration of information systems into micro teaching assessment significantly contributes to the improvement of educational management. From a managerial perspective, assessment is not merely an academic activity but a strategic instrument for quality assurance. The developed system transformed conventional assessment practices into a structured, transparent, and accountable process. The successful implementation of the system supports the argument that digital transformation is essential for modern educational management. Through the use of technology, assessment data can be managed more effectively, enabling institutions to shift from intuition-based decisions to evidence-based decisions. This is in line with contemporary educational management theories that emphasize the importance of data-driven governance.

Implementation of the PPEPP Cycle

One of the most important contributions of this study is the successful integration of the PPEPP cycle into the micro teaching assessment process. Before the development of the system, the PPEPP cycle was implemented only conceptually and not supported by concrete mechanisms. The new system provided practical tools for applying each stage of the cycle.

1. Planning became more structured because lecturers could design assessment instruments based on standardized templates.

2. Implementation was controlled through digital workflows.
3. Evaluation results were automatically processed and stored.
4. Control was facilitated through monitoring dashboards.
5. Improvement actions could be formulated based on analytical reports.

This integration proves that information systems can function as operational instruments for implementing quality assurance frameworks in higher education.

Enhancement of Assessment Quality

The use of digital rubrics and standardized criteria significantly increased the objectivity and consistency of micro teaching assessment. Previously, assessments were highly dependent on individual lecturer judgment, which often led to subjectivity. With the new system, all lecturers used the same assessment standards, and scoring processes became more transparent. The improvement in feedback quality is another important finding. Students received detailed written feedback that could be accessed anytime through the system. This supports the principles of meaningful learning, where reflection and continuous improvement are central elements. The availability of recorded feedback enables students to analyze their strengths and weaknesses more effectively.

Increased Efficiency and Accountability

From the operational perspective, the system greatly improved the efficiency of micro teaching management. Assessment time was reduced significantly, administrative workloads decreased, and documentation processes became automatic. These improvements demonstrate that technology can optimize educational management processes without reducing academic quality. Furthermore, the system increased institutional accountability. All assessment activities are now traceable, documented, and auditable. This is particularly important for accreditation and internal quality assurance purposes. The availability of comprehensive assessment data allows faculty leaders to evaluate program effectiveness and design strategic improvement plans.

Implications for Educational Management Practice

The results of this study have several practical implications for educational management:

1. Higher education institutions need to adopt integrated information systems to support academic governance.
2. Assessment should be managed as a strategic managerial process, not merely as a teaching routine.
3. Quality assurance frameworks such as PPEPP must be operationalized through concrete technological tools.
4. Lecturer professionalism can be enhanced through standardized and transparent assessment mechanisms.
5. Continuous improvement in learning can be achieved when assessment data are properly utilized.

CONCLUSION

This study also contributes theoretically to the field of educational management by demonstrating how management frameworks and information technology can be integrated in practical applications. The research provides an empirical model for implementing the PPEPP cycle in micro-level academic processes. It also enriches the literature on technology-based assessment in teacher education by offering a comprehensive system that connects assessment with institutional quality management.

Limitations and Future Directions

Although the results are highly positive, several limitations need to be acknowledged. The study was conducted in a single institution, which may limit the generalizability of the findings. In addition, the implementation period was relatively short, so long-term impacts on student competence could not yet be fully measured. Future research is recommended to:

- Implement the system in other universities for comparative studies,
- Integrate artificial intelligence features for automated assessment analysis,
- Examine the long-term effects on teaching competence, and
- Develop mobile-based versions of the system.

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