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Evaluation of Learning in AI Integration Training for Learning Assessment Among MTs Teachers

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Abstract: This study evaluates learning in training activities on applying Artificial Intelligence (AI) in formative assessment for Madrasah Tsanawiyah (MTs) teachers, especially at MTs NU Trate Gresik. The training evaluation used the CIPP (Context, Input, Process, Product) model approach to identify the learning effectiveness at each training stage. The findings show that in the context aspect, there is a significant gap between conventional evaluation practices and the need for technology-based assessments. The input aspect shows that the training has been designed contextually with expert support and technology such as Quizizz AI Generator and adaptive Google Forms. The interactive training process involved high participation despite facing technical obstacles that were successfully overcome through intensive mentoring. The product aspect shows a fundamental transformation in learning evaluation in the classroom, marked by increased teachers' abilities in designing and implementing AI-based assessments. The results of the paired sample t-test showed a significant increase in teacher evaluation competency, from an average score of 60.98 to 83.98 in the post-test (p=0.000). This finding indicates that the training improves conceptual knowledge and facilitates changes in assessment practices towards a more diagnostic, adaptive, and reflective approach. Thus, this training strengthens teacher capacity in supporting the digital transformation of education in the madrasah.

Keywords: Artificial intelligence; Evaluation; Learning

Introduction

The digital transformation in global education has driven the integration of artificial intelligence (AI) technology as a strategic solution to improve the quality of 21st-century learning and assessment. The quick growth of information and communication technology has altered the world of learning. Use of technology in teaching was not just with digital aids but widened to the use of Artificial Intelligence (AI). The AI in education grows as a strategic way to enhance the effectiveness, efficiency, and personalization of teaching and learning as well as the occurrence of learning in terms of planning, implementation, and assessment. AI-powered tools, such as intelligent tutoring systems and adaptive learning platforms, enable personalized learning paths tailored to individual student needs, improving engagement and academic performance (Baichuan, 2024; Onesi-Ozigagun et al., 2024). These days, this is what more and more academic writings have been about, with the AI potential in strengthening the learning assessment system. Learning assessment is essential to the education system because it measures student learning achievement while providing teacher feedback. Learning assessment is crucial in education, measuring student achievement and providing teacher feedback (Hooda et al., 2022; Zhou, 2023). Assessment is diagnostic if it is carried out as a continuous assessment within the learning process to monitor student learning needs, improve teaching strategies, and encourage student involvement in the self-reflection process. Today's digital world creates innovation spaces once technology is integrated, and

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among these is AI. AI can carry out real-time data analysis, automatically identify student learning difficulties, and provide adaptive feedback more quickly. AI-enhanced adaptive learning systems personalize instruction based on individual student needs, offering real-time feedback and assessment (Katonane Gyonyoru & Katona, 2024). In this regard, AI can enhance the quality of assessment to a large extent.

The integration of AI in learning assessment is based on the principles of authentic assessment and educational technology, which requires teachers to understand the basic concepts of evaluation and the ethical and effective use of digital tools. In Indonesia, the education digitalization process is systemic. More specifically, in the madrasah environment, it is not merely meeting administrative requirements but is an integral part of the strategic performance improvement towards the quality of Islamic education services. Madrasah Tsanawiyah (MTs) represents the junior secondary education level in the madrasah education system and encounters relatively formidable challenges in embracing the digital age. MTs institutions are implementing digital transformation strategies, including enhancing technological access, providing staff training, and developing effective marketing approaches (Puspita-Sari et al., 2024; Yamin & Sanuri, 2024). Most importantly, teachers' preparedness to use pedagogical technology, including learning assessment. Many teachers lack confidence and practical skills in using technology for teaching and assessment, often due to limited training (Priyamvada, 2022). The general cadre of teachers at MTs has a solid pedagogy background. AI has the potential to revolutionize education, there are significant disparities in teachers' digital competencies and abilities to implement AI-based assessment tools (Ng et al., 2023; Pujeda, 2023). However, disparities exist in their abilities to go digital. Most are hampered by using digital technology for assessment, particularly when implementing AI as an assessment tool. The technology infrastructure limitations in many madrasah, especially in non-urban areas, further emphasize the gap between technology potential and what is realized at the personal level. Therefore, training that goes towards building teacher competence in integrating AI into the assessment for learning has to be very urgent and strategic.

However, many madrasa teachers still lack the competence and experience to apply AI to design and implement learning assessments effectively. In addition, there has not been much research that specifically examines the implementation of AI integration training in the assessment of MTs teachers, both in terms of training design, the learning process that occurs, and the learning outcomes achieved. The integration of AI in teacher training is crucial for preparing educators to effectively utilize AI-based assessments and tools in the classroom (Bekdemir, 2024; Ismail et al., 2024). Training is the initial step and is decisive in preparing teachers to understand, apply, and develop AI-based assessments independently and contextually. Training should cover basic AI concepts, ethical considerations, and practical applications in developing interactive learning media (Kaswar et al., 2023). Therefore, it is essential to conduct an evaluative study of training activities explicitly equipping MTs teachers with the knowledge and skills to integrate AI into assessments. In this context, the Madrasah Digitalization Movement is an important momentum that needs to be utilized optimally. In education, digitalization is essential for meeting knowledge demands, improving learning quality, and developing critical 21st-century skills (Yupeni, 2024). MTs teacher training must not only focus on technical skills in using AI-based assessment software or platforms but also build pedagogical awareness, a philosophical understanding of assessment, and ethics in using AI for learning. However, challenges persist, including ethical concerns, data privacy issues, and technological readiness (Akgun & Greenhow, 2021; González-Calatayud et al., 2021). Learning assessment should not merely be a process of quantifying learning outcomes but must be a reflective process that prioritizes fairness, active student participation, and sustainability.

This study offers an evaluative approach to AI integration training in Islamic values-based madrasas, which has not been widely studied, with the aim of assessing the effectiveness of the training and identifying challenges in its implementation to support contextual and ethical digital assessment transformation. First, the primary focus of this study lies in the assessment of knowledge in the context of MTs teacher training in integrating artificial intelligence (AI) into assessment practices. This is a relatively rare perspective, considering that most studies on AI in education focus more on using technology to directly support student learning, rather than on how teachers learn to understand and apply AI in the assessment process. To maximize AI's potential in education, a holistic approach considering pedagogical, social, and cultural factors is essential (J. Kim et al., 2022; Kizilcec, 2024). Second, this study is rooted in the specific context of the Madrasah Digitalization Movement, which makes it relevant and strategic in responding to real challenges in the field, especially in increasing the capacity of MTs teachers in facing the era of technology-based learning. Third, this study carries an evaluative approach that is not only oriented towards the final results of the training (such as increasing pre-test and post-test scores), but also examines the

learning process during the training, including how participants understand the concept of AI-based assessment, how they practice it in classroom simulations, and how they reflect on the potential and challenges of implementing the technology. Fourth, integrating pedagogical, technological, and evaluation dimensions in this study produces a more comprehensive analytical framework. Thus, this study assesses teachers' technical skills in operating AI-based applications and examines their pedagogical awareness in using the technology ethically, fairly, and effectively. While teachers generally show openness to AI-powered tools, they often lack confidence in content and technological knowledge related to AI (K. Kim & Kwon, 2023).

Another novelty lies in the attention to the unique characteristics of madrasah as religious educational institutions, which often face structural barriers in adopting digital technology. Integration of IT in madrasahs has significant potential to drive innovation and improve the quality of religious education (Sunarya, 2024; Sungkowo et al., 2024). Therefore, the results of this study can be an essential basis for designing a training model that is not only technical but also contextual and empowering. Overall, the main novelty of this study lies in its cross-sectoral approach—combining digital transformation, teacher capacity development, and recontextualization of learning assessment in the era of artificial intelligence in the scope of Islamic education in Indonesia. To fully leverage AI's potential, stakeholders must invest in infrastructure, digital literacy, and teacher training while addressing ethical considerations and preserving the integrity of Islamic teachings (Achruh et al., 2024; Holilah & Hajjaj, 2024). Departing from this background, this study aims to evaluate learning in training on integrating AI into assessment for MTs teachers. This evaluation includes an analysis of the effectiveness of the training in terms of planning, implementation, achievement of learning objectives, and its impact on teacher readiness in implementing training results into teaching practice. Evaluations of such programs should assess planning, implementation, achievement of learning objectives, and impact on teaching practice (Meisuri et al., 2024; Munna & Kalam, 2021). In addition, this study also examines teachers' perceptions of the relevance and usefulness of the training, including the challenges they face after training in implementing AI in learning assessment. Teachers generally hold favorable attitudes towards AI in education, recognizing its potential to enhance teaching and learning (Lee et al., 2024; Wardat et al., 2024). The findings of this study are expected to be an essential reference in developing a technology-based madrasah teacher training model and provide fundamental contributions to improving the quality of Islamic education in the digital transformation era.

Method

This study will take an evaluative approach using a mixed methods design, specifically combining quantitative and qualitative approaches to get the whole big picture of the effectiveness of AI integration training in the teacher assessment at MTs NU Trate Gresik. Kirkpatrick's four levels of evaluation are used in this study: response to training, knowledge and skills acquired (learning), changed behaviour after training, and results impact on classroom assessment. The CIPP (Context, Input, Process, Product) model, developed by Stufflebeam, serves as a comprehensive framework for evaluating educational programs, including e-learning and character education initiatives (Kamilia et al., 2023; Kozan, 2024). The CIPP model will be used to check the context and the training implementation process.

The respondents consisted of 25 MTs NU Trate Gresik teachers who took the training "AI Integration in Assessment", which lasted four days. These teachers are from different core subjects with varying levels of digital competence. Data were collected through pre-test and post-test questionnaires to measure competency improvement, training evaluation questionnaires, observation guidelines, and semi-structured interviews to get in-depth perceptions about AI integration in learning assessment. Besides that, documents in the form of AI-based evaluation instrument designs which training participants make were analyzed using a rubric based on assessment principles and ethics of technology use.

Data collection was carried out in four stages. The first involved conducting initial interviews with the madrasah principal and senior teachers to assess the institution's readiness to support the digitalization of assessments. The second stage included training implementation, theoretical lessons on assessments and AI, practical sessions using AI tools, and collaborative reflective sessions. Data for the third stage, training post-tests, reaction questionnaires, and the products of the assessment design were collected. In the fourth stage, a few observations were undertaken to see the extent to which each teacher's AI assessment design was implemented in the classroom practice, and follow-up interviews were conducted to see changes in practice and implementation challenges. Descriptive and inferential analysis was carried out on quantitative data to see if there were statistically significant differences in the learning outcomes of the training. The qualitative data were thematically analyzed. Challenges include aligning AI with traditional Islamic

pedagogical methods, addressing ethical concerns like data privacy and algorithmic bias, and overcoming the digital divide (Achruh et al., 2024; Rozi et al., 2024). This mixed methods approach has been chosen to give a comprehensive understanding of the effectiveness of the training as well as the potential and challenges of integrating AI into assessment in the madrasah environment based on Islamic values and local wisdom.

Time and Place of Research
Tools and Materials

The tools and materials used in this research included: (1) Pre-test and post-test questionnaires to assess improvements in competency. (2) Training evaluation questionnaires to gather participant reactions. (3) Observation guidelines for classroom practice assessment. (4) Semi-structured interview protocols for in-depth insights. (5) Documents and artifacts, including AI-based evaluation instrument designs created by participants. (6) Rubrics to analyze product quality based on principles of assessment and ethical technology use.

Research Methods

This study adopted an evaluative approach using mixed method and use The CIPP (Context, Input, Process, Product) model.

Research Stages

Data collection was carried out in four stages. (1) The first involved conducting initial interviews with the madrasah principal and senior teachers to assess the institution's readiness to support the digitalization of assessments. (2) The second stage included training implementation, theoretical lessons on assessments and AI, practical sessions using AI tools, and collaborative reflective sessions. (3) Data for the third stage, training post-tests, reaction questionnaires, and the products of the assessment design were collected. (4) In the fourth stage, a few observations were undertaken to see the extent to which each teacher's AI assessment design was implemented in the classroom practice, and follow-up interviews were conducted to see changes in practice and implementation challenges.

Data analysis

Quantitative data (pre-test/post-test, questionnaires) were analyzed using descriptive and inferential statistics to determine significant differences in learning outcomes.

Qualitative data (interviews, observations, document analysis) were analyzed thematically to extract meaningful patterns and perceptions.

Result and Discussion

Result

The training on integrating artificial intelligence (AI) in assessment given to MTs NU Trate Gresik teachers took place in three main stages: providing conceptual material, practicing creating AI-based assessment instruments, and direct implementation by teachers in learning activities in their respective classes. The training evaluation used the CIPP (Context, Input, Process, Product) approach and focused on capturing the relationship between improving teacher competency and applying learning assessment. Table 1 shows summarizing the findings on Evaluation of Learning in AI Integration Training for Assessment Learning.

Table 1. Summarizing the Findings on Evaluation of Learning in AI Integration Training for Assessment Learning

Aspect	Evaluation Focus	Findings
Context	Training Needs Analysis	Big gap between conventional assessment and AI-based assessment Madrasah digitalization program has not targeted comprehensive learning assessment. Teachers still predominantly use assessment with slow feedback
Input	Training Design and Participants	Comprehensive training materials: assessment, Assessment for Learning (AfL), AI technology (Quizizz AI, adaptive Google Forms). Valid and relevant materials according to experts. Participants were 25 teachers, most of whom were not familiar with AI
Process	Implementation of Training	The training was interactive, with 92% active participation. High enthusiasm for the practice of creating AI-based questions/rubrics. Initial technical barriers (internet and digital skills) were overcome with mentoring and backup devices.
Product	Training results and impacts	88% of teachers successfully implemented AI-based adaptive quizzes. Improved quality of learning assessment with real-time data and fast feedback. Teacher evaluation competency scores increased significantly (pretest: 60.98 to posttest: 83.98). Assessment practices changed to diagnostic and reflective according to AfL principles

Discussion

The context aspect reveals an acute need for quality enhancement in the assessment of learning at the madrasah. There is a large gap between conventional assessment practices, which are still outdated and characterized by relatively slow feedback, and the demands of the digital era, which require adaptive and responsive technology-based assessment. The national program for madrasah digitalization does not fully consider the transformation of the learning assessment process through and as a part of several transformations. This underlines an urgent requirement for training to bridge that gap by introducing the AI technology tool in learning assessment. A training design for input has been prepared, which includes conceptual assessment material, the AfL principles, and the implementation practice of Quizizz AI Generator and Google Forms with adaptive logic. eachers who undergo Quizizz training show increased knowledge and ability to implement the tool effectively in their classrooms (Adawiyah, 2022; Eka Andriani et al., 2023). This has been cross-validated by experts in educational technology and learning evaluation for relevance and quality. The training participants were 25 MTs teachers with different subject backgrounds. Educators require training that goes beyond technical aspects, emphasizing the pedagogical understanding of AI-based assessment (Kaswar et al., 2023). Since most of them had no prior encounter with AI technology regarding assessment, the focus of the training was more than the technical aspects; it was to fortify the pedagogical understanding of assessment.

The training was made interactive with a participation rate of 92%. The teachers demonstrated keen interest, particularly in the practical part of developing AI-based assessment tools. Though there were technical hiccups, internet connectivity problems and variation in participants' digital literacy at the onset of the training, the facilitators surmounted those challenges by intensive mentoring and providing backup devices. While initial obstacles included connectivity issues, limited access to devices, and varying levels of digital literacy among participants (Hanson & Beem, 2022; Malathesh et al., 2021). This training process not only delivered technical capacity building but also confidence in the ability of teachers to integrate AI into learning assessments. The product dimension was the most visible and led to successful results. During the subsequent two weeks, most of the teachers (88%) could teach successfully using AI assessment tools. Adaptive Quizizz and Google Forms quizzes, based on the early diagnosis of student abilities, showed that technology used by the teachers can develop more responsive and diagnostic assessments. Some also used AI to generate question variations and more personalized automatic feedback based on student performance. Written teacher reflections, classroom observations, and the documentation of learning instruments supported the finding that the transformation of the assessment practice to a more effective one oriented to continuous learning was taking place. Quantitative data has supported this with a marked increase in teacher competence in the learning assessment as revealed by the results of a paired sample t-test, which indicated an increase in the mean score from 60.98 to 83.98 ($p=0.000$).

The analysis of the training using the CIPP model confirms that training on the integration of AI in assessment does not just add to the strength of the instructors' technical competencies: it introduces a newer practice of evaluation that is more reflective and data-driven. This, therefore, means that the practice of assessment may be reflective and evidence-based, as articulated in the literature review and as evidence has shown before. Digital technology, in this case, AI applied under proper pedagogical practice, can be a catalyst for such a radical change in learning assessment practice. AI-powered systems can personalize learning experiences, identify individual student needs, and deliver tailored content (Oktavianus et al., 2023). Educators must rethink pedagogical approaches, emphasizing critical thinking and self-regulated learning in the AI-driven digital age (Hopfenbeck et al., 2023). It can be inferred from the registered attainment that context-based and applicable training fills the void in teachers' digital skills, preceded by building the right philosophy regarding AI's ethical and responsible use in education.

Conclusion

Evaluation of learning in the AI integration training activities in assessment for MTs NU Trate Gresik teachers showed that the learning process during the training was effective and met the set objectives. Training participants successfully mastered technical and conceptual competencies related to using AI in learning assessment, which was reflected in the significant increase in pre-test and post-test scores. In addition, the learning process in the training also showed a high level of active participation, participants' enthusiasm in making AI-based assessment instruments, and the ability of teachers to understand assessment concepts in depth. Assessment during the training helped monitor participant progress in real-time so that facilitators could provide appropriate feedback and improve learning strategies. Thus, this training not only succeeded in enhancing teacher knowledge and skills but also applied the

principles of good learning assessment during the training process itself, supporting the creation of an interactive, adaptive, and participant-centred learning process.

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Conflicts of Interest
The authors declare no conflict of interest.

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