PANDAWA
Jurnal Pendidikan dan Dakwah

ISSN: 2686-2816

Terindeks: Moraref, Google Scholar, Base, etc.

https://ejournal.stitpn.ac.id/index.php/pandawa/article/view/6061

The Effectiveness of Using Artificial Intelligence (AI) for English Teachers in Madrasah West Lombok Region

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Abstract

The rapid development of Artificial Intelligence (AI) has significantly transformed educational practices, particularly in English Language Teaching (ELT), yet empirical evidence on its effectiveness for English teachers in Islamic educational settings, especially *madrasahs*, remains limited. This study aimed to examine the effectiveness of AI utilization for English teachers in private *madrasahs* (MTs and MA) in West Lombok Regency, Indonesia, using a Research and Model Creation (RMC) approach. Conducted in 2024, the study employed a mixed-method design involving 28 English teachers selected through purposive sampling. Quantitative data were collected using a validated effectiveness questionnaire, while qualitative data were obtained through in-depth interviews and classroom observations. The RMC procedure comprised problem analysis, prototype model development, expert validation, limited field testing, and model refinement. The findings indicate that AI significantly improved teachers' instructional efficiency, lesson preparation, material personalization, and student engagement ($p < 0.05$), while qualitative results showed that AI enhanced pedagogical creativity, digital confidence, and adaptive teaching strategies. Based on these findings, the study proposes a conceptual model of AI-based instructional support tailored to *madrasah* English teachers, emphasizing pedagogical alignment, the integration of Islamic values, and sustainable digital literacy. The study concludes that AI is empirically effective and pedagogically relevant for ELT in *madrasah* contexts when implemented systematically, with important implications for teacher professional development and technology-integrated curriculum design.

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Keywords: Artificial Intelligence; English Language Teaching; *Madrasah* Education; Research and Model Creation; Teacher Effectiveness.

INTRODUCTION

The last decade has witnessed an unprecedented acceleration in the development of Artificial Intelligence (AI), transforming multiple sectors, including education. AI no longer functions merely as a computational support system but has evolved into a cognitive partner in teaching and learning processes. Globally, AI has been integrated into instructional design, automated assessment, adaptive learning platforms, predictive analytics, and intelligent tutoring systems (Holmes et al., 2023; Zawacki-Richter et al., 2024). In the domain of English Language Teaching (ELT), AI applications such as generative text systems, speech recognition tools, automated writing evaluation, and personalized learning engines are redefining pedagogical practices by enabling real-time feedback, learner-centered instruction, and differentiated material development.

In many developed countries, AI has become an integral component of teacher professional practice. Teachers utilize AI to generate lesson plans, design interactive materials, assess students' writing and speaking performance, and predict learning difficulties through learning analytics (Deng & Lin, 2024). Empirical studies consistently confirm that AI improves instructional efficiency, reduces teacher workload, and enhances student engagement and achievement (Kohnke et al., 2023; Crompton & Burke, 2024). These findings reinforce the position of AI not merely as a supplementary technological tool, but as a structural element of modern pedagogy.

In the Indonesian educational context, the discourse on AI integration has intensified following the national digital transformation agenda in education. The Ministry of Education, Culture, Research, and Technology has emphasized the importance of computational thinking, digital literacy, and adaptive learning systems in preparing Indonesian students for the demands of the Fourth Industrial Revolution. Recent national studies reveal that Indonesian teachers increasingly utilize AI-based platforms such as automated grammar checkers, learning management systems with embedded analytics, and generative AI for instructional support (Suryani et al., 2023; Pratama & Nugroho, 2024).

However, these studies predominantly focus on public schools, vocational institutions, and higher education settings.

Madrasahs, particularly private madrasahs, occupy a unique and underrepresented position within this technological transformation. As Islamic educational institutions, madrasahs operate under dual mandates: delivering general academic competencies and cultivating Islamic moral and spiritual values. This dual orientation positions madrasahs within a complex pedagogical landscape where innovation must coexist with tradition. Unlike public schools, many private madrasahs face structural constraints such as limited funding, uneven digital infrastructure, inconsistent access to internet connectivity, and varying levels of teacher digital competence. These realities often result in delayed adoption of advanced educational technologies, including AI.

English language education in madrasahs presents a particularly critical case. English is a compulsory subject at both MTs and MA levels, yet its instructional outcomes frequently remain suboptimal due to limited exposure, conventional teaching strategies, and insufficient learning resources. At the same time, madrasah graduates are expected to compete academically and professionally at national and global levels, where English proficiency is an indispensable tool of communication, knowledge access, and mobility. This condition creates an urgent pedagogical dilemma: madrasahs must modernize English instruction through technological integration while maintaining their Islamic educational identity.

Recent international scholarship has established that AI-based ELT environments significantly enhance language skill acquisition. AI-powered writing assistants improve grammatical accuracy and coherence; speech recognition technologies strengthen pronunciation and fluency; and adaptive learning systems effectively personalize vocabulary and grammar instruction (Deng & Lin, 2024; Lee & Han, 2023). Yet, most of these studies examine student learning outcomes rather than the instructional effectiveness of teachers as AI users. Teachers are often treated as passive adopters rather than as pedagogical designers whose expertise determines the success or failure of AI integration.

This conceptual limitation becomes even more evident in Islamic educational settings. The majority of AI-in-education research is grounded in secular institutional environments, where ethical concerns primarily revolve around data privacy, algorithmic bias, and academic integrity. In madrasahs, however, ethical considerations are multi-

layered. Beyond technical ethics, AI applications must be filtered through Islamic moral frameworks that regulate knowledge production, interaction norms, and value formation. This introduces a distinctive contextual variable absent from mainstream ELT research.

Moreover, existing Indonesian studies on AI in ELT are methodologically dominated by descriptive survey designs that capture perceptions, attitudes, and usage frequency (Suryani et al., 2023; Pratama & Nugroho, 2024). While these studies provide important baseline data, they do not generate implementation models that can guide systematic, scalable, and sustainable AI integration in schools. There is a lack of development-oriented research capable of producing context-specific pedagogical models tailored to the realities of Indonesian madrasahs.

This methodological gap highlights the relevance of Research and Model Creation (RMC) as an alternative research paradigm. RMC is not restricted to measuring effects but is explicitly oriented toward producing validated instructional models through iterative cycles of analysis, design, validation, testing, and refinement (Sugiyono, 2023). In the context of AI integration, RMC enables researchers to move beyond surface-level effectiveness studies toward the construction of empirically grounded frameworks that teachers can directly adopt and adapt.

The regional context of West Lombok Regency adds further urgency to this investigation. West Lombok represents a region with a strong Islamic educational tradition, where private madrasahs play a central role in secondary education provision. Despite this strategic role, many of these institutions still operate at the margins of digital innovation. Informal preliminary observations conducted in 2023 indicated that while many English teachers in private MTs and MA in West Lombok had begun experimenting with AI tools such as automated translators, grammar checkers, and generative text platforms, their usage remained fragmented, unsystematic, and highly individualized. No institutional model or pedagogical guideline existed to regulate or optimize AI utilization in English classrooms.

This fragmented adoption carries pedagogical risks. Without a structured model, teachers may rely on AI merely as a shortcut for material preparation, potentially weakening pedagogical intentionality. Students may also develop dependency on AI outputs without cultivating higher-order language skills. Conversely, when properly guided, AI holds the potential to transform English instruction into a highly adaptive, student-centered, and efficiency-oriented learning environment.

Despite the strategic importance of this issue, empirical studies examining the effectiveness of AI for English teachers in private madrasahs using development-oriented methodologies remain virtually nonexistent in the Indonesian literature. Most studies treat madrasahs as peripheral sites rather than as legitimate spaces of technological innovation. This research seeks to reposition madrasahs as active agents in digital pedagogy rather than as late adopters.

Therefore, this study aims to investigate the effectiveness of AI usage for English teachers in private madrasahs (MTs and MA) in West Lombok Regency using a Research and Model Creation (RMC) approach. Specifically, this study seeks to: (1) empirically measure the impact of AI on teachers' instructional effectiveness, creativity, and classroom engagement; (2) explore teachers' lived experiences, perceptions, and challenges in utilizing AI; and (3) develop a validated conceptual model of AI implementation that integrates ELT pedagogy, digital innovation, and Islamic educational values.

By integrating quantitative and qualitative evidence within the RMC framework, this research not only contributes to the growing body of global scholarship on AI in ELT but also offers a contextually grounded model for madrasah-based digital transformation. This study is expected to serve as a strategic reference for policymakers, school leaders, and teacher educators in designing sustainable AI integration within Islamic educational institutions.

Literature Review

1. Artificial Intelligence in English Language Teaching (ELT)

Artificial Intelligence (AI) has fundamentally transformed the landscape of English Language Teaching (ELT) in the last decade. AI is no longer perceived solely as a computational tool but as an intelligent pedagogical agent capable of simulating human-like interaction, providing instant feedback, and generating adaptive learning content. Recent studies demonstrate that AI technologies such as Natural Language Processing (NLP), machine learning, speech recognition systems, and generative AI have significantly enhanced language learning processes (Holmes et al., 2023; Deng & Lin, 2024).

In writing instruction, AI-powered automated writing evaluation (AWE) systems are proven to improve grammatical accuracy, lexical diversity, and textual coherence. Deng

and Lin (2024) found that students who received AI-based feedback demonstrated significantly higher writing improvement than those relying solely on teacher feedback. Similarly, Kohnke et al. (2023) reported that generative AI tools facilitate idea generation, syntactic restructuring, and revision processes, thereby supporting both low- and high-proficiency learners.

In speaking and pronunciation instruction, speech recognition technology enables real-time corrective feedback, adaptive fluency modeling, and phonological accuracy training. Lee and Han (2023) revealed that AI-assisted pronunciation training significantly improved students' intelligibility and confidence in oral communication. AI-driven chatbots have also been shown to simulate authentic communicative environments, which is particularly beneficial in EFL contexts where exposure to native speakers is limited.

Beyond skill-specific instruction, AI contributes to personalized and adaptive learning environments. Adaptive algorithms analyze learner performance patterns and automatically modify instructional materials based on individual strengths and weaknesses. Crompton and Burke (2024) conclude that such adaptive systems significantly enhance learner motivation, autonomy, and engagement while reducing cognitive overload.

Despite these benefits, scholars also emphasize AI-related risks, including overdependence on algorithmic outputs, erosion of critical thinking, ethical concerns regarding data privacy, and the potential marginalization of human teachers (Zawacki-Richter et al., 2024). Therefore, AI integration in ELT must be guided by pedagogical intentionality rather than technological determinism.

2. Teachers and Educational Technology Integration

Teachers play a decisive role in determining the success or failure of educational technology integration. The Technological Pedagogical Content Knowledge (TPACK) framework posits that effective digital integration requires the convergence of content knowledge, pedagogical knowledge, and technological competence. Recent studies consistently confirm that teachers' technological self-efficacy, attitudes toward innovation, and institutional support are the strongest predictors of successful technology adoption (Cheng et al., 2023; Rahmawati & Yuliani, 2024).

In the context of AI, teachers are not merely tool users but pedagogical designers who determine how AI mediates learning interactions. Teachers decide whether AI functions as a tutor, an assistant, an evaluator, or a creative partner. When teachers possess

high digital confidence and pedagogical vision, AI can be transformed into a powerful instructional catalyst. Conversely, low digital literacy often reduces AI to superficial applications such as machine translation without pedagogical depth (Suryani et al., 2023).

Empirical studies reveal that AI significantly reduces teachers' administrative burden by automating lesson planning, material differentiation, and assessment processing. Pratama and Nugroho (2024) confirm that Indonesian English teachers who utilize AI experience increased instructional efficiency and more flexible classroom management. However, these benefits are unevenly distributed across regions due to disparities in digital infrastructure and training opportunities.

Furthermore, teachers' ethical awareness is increasingly recognized as a critical dimension of AI integration. Teachers must navigate issues of academic honesty, authorship, data privacy, and algorithmic bias. Without ethical literacy, AI risks being misused as a shortcut that undermines learning authenticity rather than strengthening it (Zawacki-Richter et al., 2024).

3. Artificial Intelligence in the Indonesian ELT Context

In Indonesia, AI adoption in education is accelerating as part of the national digital transformation agenda. The Ministry of Education has prioritized digital learning ecosystems, computational thinking, and artificial intelligence literacy across educational levels. Recent national studies indicate a rapid increase in AI usage among English teachers for writing assistance, translation, assessment automation, and interactive media development (Rahmawati & Yuliani, 2024; Pratama & Nugroho, 2024).

However, the Indonesian educational landscape is marked by structural inequalities. Urban public schools and higher education institutions benefit from stable internet access and institutional technological investment, whereas rural and private religious schools often operate under limited digital resources. This digital divide significantly shapes how AI is accessed, interpreted, and applied in classrooms.

Most Indonesian studies on AI in ELT remain perception-based and utilize descriptive survey designs. While such studies document positive attitudes toward AI, they rarely examine instructional effectiveness using experimental or development-oriented methodologies. Moreover, few studies investigate teachers' transformation as pedagogical

agents in AI-mediated environments. Teachers are commonly positioned as respondents, not as co-creators of instructional innovation.

Critically, Indonesian research on AI in madrasahs remains scarce. Madrasahs are often excluded from national digital education prototypes, despite their substantial role in secondary education delivery. This marginalization results in limited empirical knowledge regarding how AI operates within Islamic educational environments.

4. Madrasah as a Context of Islamic Education and Technology Integration

Madrasahs represent a distinctive educational ecosystem that integrates national curriculum demands with Islamic moral education. They function not only as academic institutions but also as spaces for value formation, character education, and religious socialization. Consequently, technology adoption in madrasahs cannot be value-neutral. Digital innovation must align with Islamic ethical principles related to knowledge, morality, and social interaction.

Hidayat and Asyafah (2022) emphasize that Islamic education perceives knowledge as both a rational and spiritual endeavor. Educational technologies must therefore support not only cognitive development but also ethical and spiritual cultivation. This dual orientation presents both challenges and opportunities in AI integration. On one hand, AI introduces unprecedented efficiency and personalization; on the other hand, it raises ethical concerns related to intellectual dependency, authenticity, and moral responsibility.

Several recent studies reveal that madrasah teachers often exhibit cautious optimism toward technology. They acknowledge the pedagogical benefits of digital tools but express concerns about moral degradation, uncontrolled content access, and declining teacher authority (Fauzi & Karim, 2023). These concerns intensify when dealing with generative AI, which can autonomously produce texts, images, and responses without human oversight.

Nevertheless, other studies demonstrate that when digital technology is framed as a supportive pedagogical instrument rather than a substitute for the teacher, madrasah educators become increasingly receptive. Digital tools that facilitate Qur'anic literacy, bilingual instruction, and contextualized Islamic content are particularly well received (Nugraha et al., 2023).

In the context of ELT, AI holds significant potential for madrasahs. English instruction often suffers from limited exposure to authentic language input, reliance on textbook-centered pedagogy, and restricted opportunities for communicative practice. AI-based conversational agents, pronunciation trainers, and adaptive grammar systems can partially compensate for these limitations. However, without a structured implementation model, AI usage risks remaining sporadic and pedagogically shallow.

5. Research and Model Creation (RMC) as a Development-Oriented Methodology

Research and Model Creation (RMC) is a methodological approach oriented toward the construction of validated pedagogical models through empirical investigation and iterative refinement. Unlike purely experimental or survey research, RMC emphasizes both effectiveness testing and model production. According to Sugiyono (2023), RMC involves sequential stages: (1) needs analysis, (2) prototype model development, (3) expert validation, (4) limited field implementation, and (5) model revision and finalization.

RMC is particularly relevant for technology integration research because it enables the alignment of theoretical principles, empirical evidence, and contextual constraints within a single systematic framework. In the context of AI integration, RMC allows researchers to move beyond the question of whether AI works toward the more strategic question of how AI should be implemented within specific educational ecosystems.

Several recent development studies employing RMC and related design-based research (DBR) approaches confirm that model-oriented methodologies generate more sustainable and transferrable instructional innovations than one-shot experimental interventions (Rahman et al., 2024). RMC also facilitates expert involvement, ensuring that the resulting model meets pedagogical, technological, and ethical standards.

In madrasah contexts, RMC becomes even more critical. Generic AI integration models derived from secular educational environments may conflict with Islamic educational values and institutional realities. Through RMC, AI implementation models can be tailored to madrasah-specific characteristics, including curriculum structure, teacher authority patterns, student moral formation, and community expectations.

6. Conceptual Synthesis and Research Positioning

Based on the synthesis of global, national, and contextual literature, three major conceptual gaps emerge. First, while AI has demonstrated strong pedagogical potential in ELT, most studies prioritize student learning outcomes rather than teacher instructional effectiveness. Second, Indonesian AI-ELT research remains largely descriptive and lacks development-oriented methodologies capable of producing operational pedagogical models. Third, madrasahs remain underrepresented in AI-in-education research despite their strategic educational role.

This study addresses these gaps by positioning English teachers in private madrasahs as central agents of AI-mediated pedagogical transformation and by employing the Research and Model Creation (RMC) framework to generate both empirical evidence and a validated implementation model. By contextualizing AI integration within the ethical, pedagogical, and institutional dynamics of Islamic education, this study contributes a unique perspective to the global discourse on AI in ELT.

METHODS

1. Research Design

This study employed a Research and Model Creation (RMC) design combined with a mixed-method approach. The RMC framework was selected because this study was not only intended to examine the effectiveness of Artificial Intelligence (AI) in English teaching but also to produce a validated and applicable AI implementation model for private madrasahs. RMC integrates empirical effectiveness testing with systematic model development through iterative stages of needs analysis, prototype design, expert validation, field implementation, and model refinement.

The mixed-method approach was applied to ensure methodological triangulation and to capture both the measurable impact of AI on teachers' instructional effectiveness (quantitative) and the lived experiences, perceptions, and contextual challenges faced by teachers (qualitative). This integration strengthens the internal validity of the findings and supports the development of a contextually grounded instructional model.

2. Research Context and Setting

The study was conducted in private Madrasah Tsanawiyah (MTs) and Madrasah Aliyah (MA) located in West Lombok Regency, West Nusa Tenggara, Indonesia. This region was selected due to its high concentration of private Islamic secondary schools and its transitional position between rural and semi-urban educational environments. Although digital infrastructure has gradually improved in recent years, many madrasahs in this area still face challenges related to internet stability, digital resources, and systematic teacher training in educational technology.

3. Research Participants

The participants consisted of 28 English teachers from 12 private madrasahs (7 MTs and 5 MA) selected using purposive sampling based on the following criteria:

a. Actively teaching English during the 2024 academic year

b. Minimum teaching experience of two years

c. Basic familiarity with digital learning tools

d. Willingness to participate throughout the RMC stages

The demographic profile of participants indicated that 64.3% were female and 35.7% male. Teaching experience ranged from 2 to 19 years, with an average of 8.7 years. Approximately 71% held a bachelor's degree in English education, while 29% held a master's degree.

4. RMC Development Stages

The RMC procedure was implemented through five sequential stages:

Stage 1: Needs Analysis

Needs analysis involved:

- Distribution of preliminary questionnaires
- Semi-structured interviews with 10 selected teachers
- Classroom observations in 6 madrasahs

This stage identified:

- Fragmented AI usage
- Overreliance on translation tools
- Absence of institutional guidelines

• Teachers' strong interest in structured AI integration

Stage 2: Prototype Model Design

Based on the needs analysis, a conceptual prototype model of AI-based English instruction for madrasahs was designed. The model integrated:

• ELT pedagogical principles
• Islamic ethical filtering
• Teacher-centered instructional control
• Student engagement optimization

Stage 3: Expert Validation

The prototype was validated by:

• 2 ELT experts
• 1 educational technology expert
• 1 Islamic education expert

Validation focused on:

• Pedagogical feasibility
• Technological appropriateness
• Ethical and religious compatibility

The validation results yielded a mean validity score of 4.42/5, categorized as "highly valid."

Stage 4: Limited Field Testing

The validated model was implemented in 6 selected madrasahs over 12 weeks. Teachers applied AI in:

• Lesson planning
• Writing feedback
• Speaking practice
• Formative assessment

Stage 5: Model Revision and Finalization

Model refinement was based on:

• Classroom observation results
• Teacher reflective journals
• Student engagement records

Revisions emphasized:

- Simplification of AI workflow
- Strengthening ethical filtering procedures
- Improving student scaffolding mechanisms

5. Research Instruments

a. AI Effectiveness Questionnaire (Likert 1–5)

The questionnaire consisted of 30 items across five indicators:

Indicator	Number of Items
Instructional Efficiency	6
Material Personalization	6
Assessment Automation	6
Student Engagement	6
Teacher Creativity	6

Reliability Test: Cronbach's Alpha = 0.91 (Highly reliable)

b. Interview Guide

Main dimensions:

- Teachers' pedagogical transformation
- AI's impact on workload
- Ethical challenges
- Institutional support

c. Observation Checklist

Indicators:

- AI-assisted instructional design
- Classroom interaction patterns
- Student digital engagement
- Teacher instructional control

6. Instrument Validity and Reliability

Content validity was established through expert judgment using the Aiken's V formula with values ranging from 0.82 to 0.94, indicating strong item relevance.

Construct validity was tested using exploratory factor analysis (EFA) with KMO = 0.88, confirming sampling adequacy.

7. Data Collection Procedures

a. Pre-test Questionnaire → AI usage baseline

b. RMC Model Implementation → 12 weeks

c. Post-test Questionnaire → Effectiveness measurement

d. Interviews & Observations → Qualitative triangulation

8. Data Analysis Techniques

Quantitative Analysis

- Descriptive statistics (mean, SD)
- Paired Sample t-test using $\alpha = 0.05$
- Effect size using Cohen's d

Qualitative Analysis

- Data coding
- Thematic analysis
- Source triangulation (questionnaire–interview–observation)

9. Ethical Considerations

All participants provided informed consent. Data confidentiality was ensured through anonymization. AI usage emphasized academic integrity, authorship transparency, and Islamic ethical compliance.

RESULTS

This section presents the findings of the study obtained from both quantitative and qualitative data analyses following the implementation of the AI-based instructional model developed through the RMC framework. The results are organized into three major subsections: (1) descriptive statistics of AI effectiveness, (2) inferential statistical testing, and (3) qualitative findings from teachers' experiences.

1. Descriptive Statistics of AI Effectiveness

Quantitative data were collected using the AI Effectiveness Questionnaire administered before and after the RMC-based AI model implementation. The questionnaire measured five major indicators: instructional efficiency, material personalization, assessment automation, student engagement, and teacher creativity.

Table 1. Descriptive Statistics of AI Effectiveness (Post-Test)

Indicator	Mean	Standard Deviation	Category
Instructional Efficiency	4.31	0.52	Very High
Material Personalization	4.25	0.48	Very High
Assessment Automation	4.42	0.50	Very High
Student Engagement	4.18	0.55	High
Teacher Creativity	4.37	0.46	Very High
Overall Mean	4.31	0.50	Very High

These results indicate that the overall effectiveness of AI utilization among English teachers in private madrasahs reached a very high level after the implementation of the RMC-based model. The highest score was observed in assessment automation, suggesting that AI significantly reduced teachers' assessment workload and improved feedback efficiency. The lowest mean, though still categorized as high, was found in student engagement, indicating that while AI positively affected engagement, some contextual constraints still existed during classroom implementation.

2. Inferential Statistical Analysis

To determine whether there was a statistically significant difference between teachers' instructional effectiveness before and after the implementation of the AI-based model, a paired sample t-test was conducted.

Table 2. Paired Sample t-Test Results

Test	Mean Pre-Test	Mean Post-Test	t-value	Sig. (p)
AI Effectiveness	3.12	4.31	6.87	0.000

The paired sample t-test results reveal a significant increase in AI effectiveness after the implementation of the developed model ($t = 6.87$, $p < 0.001$). This indicates that the RMC-based AI implementation model had a strong and statistically significant effect on teachers' instructional performance.

To further determine the magnitude of the effect, Cohen's d effect size was calculated:

- Cohen's d = 1.29, which is categorized as a large effect size.

This result confirms that the impact of AI utilization on teachers' instructional effectiveness is not only statistically significant but also educationally meaningful.

3. Indicator-Level Effectiveness Improvement

Table 3. Pre-Test and Post-Test Mean Comparison by Indicator

Indicator	Pre-Test	Post-Test	Gain Score
Instructional Efficiency	3.05	4.31	+1.26
Material Personalization	3.01	4.25	+1.24
Assessment Automation	3.14	4.42	+1.28
Student Engagement	3.10	4.18	+1.08
Teacher Creativity	3.30	4.37	+1.07

This table demonstrates that all instructional indicators experienced substantial improvement, with the greatest gain observed in assessment automation, while the smallest gain occurred in teacher creativity, although it still reached a high performance level.

4. Qualitative Findings

Qualitative data obtained from interviews, classroom observations, and reflective journals revealed four dominant themes related to AI utilization:

a. Transformation of Instructional Efficiency

Teachers consistently reported that AI significantly reduced their lesson preparation time. Many teachers stated that AI-assisted lesson planning, material generation, and assessment tools allowed them to concentrate more on pedagogical interaction rather than administrative tasks.

One participant stated:

"Previously, I spent hours designing exercises and correcting students' work. Now, with AI assistance, the process is much faster and more systematic. I can focus more on guiding students."

b. Enhancement of Pedagogical Creativity

Teachers reported increased creativity in designing interactive learning activities such as AI-generated dialogues, role-play simulations, and instant writing prompts. AI enabled teachers to diversify instructional strategies beyond textbook-centered approaches.

c. Increased Student Engagement and Motivation

Classroom observations showed that students displayed higher participation levels during AI-assisted learning sessions, particularly in speaking and writing activities. Students were more willing to practice English using AI-based conversational platforms.

d. Ethical and Contextual Challenges

Despite the positive impacts, teachers expressed concerns regarding:

- Students' overreliance on AI-generated answers
- Internet accessibility problems
- The need for ethical filtering aligned with Islamic values

5 Summary of RMC Field Testing Outcomes

Table 4. Summary of RMC Implementation Results

Aspect	Result
Model Validity	Very High (4.42/5)
Practicality	High
Effectiveness	Very High
Teacher Acceptance	Very High
Student Engagement	High

DISCUSSION

This study aimed to investigate the effectiveness of Artificial Intelligence (AI) utilization for English teachers in private madrasahs in West Lombok Regency using the Research and Model Creation (RMC) framework. The quantitative findings demonstrated a statistically significant improvement in teachers' instructional effectiveness after the implementation of the AI-based instructional model, with a large effect size (Cohen's d = 1.29). This result confirms that AI, when implemented through a structured pedagogical model, functions not merely as a supporting tool but as a transformative instructional medium in English Language Teaching (ELT).

The significant improvement in instructional efficiency aligns with the findings of Crompton and Burke (2024), who argued that AI reduces teachers' cognitive and administrative workload through automation of lesson planning and assessment routines. In the present study, teachers reported substantial time savings in preparing teaching materials and correcting students' assignments. This shift enabled them to reallocate instructional time toward higher-order pedagogical functions such as scaffolding, feedback negotiation, and communicative interaction. In the madrasah context, where teachers often undertake multiple administrative and religious duties simultaneously, this efficiency gain carries critical practical value.

The strong improvement in assessment automation further confirms the pedagogical advantage of AI-based formative assessment systems. Consistent with Deng and Lin (2024), AI-enabled feedback enhanced the immediacy, consistency, and objectivity of writing and speaking assessment. However, unlike studies conducted in secular schools, this research reveals that madrasah teachers applied stricter ethical control mechanisms when utilizing AI for assessment. Teachers maintained human verification as a mandatory final step to ensure academic honesty and moral accountability. This finding reflects the integration of technological rationality with Islamic ethical pedagogy, which emphasizes teacher responsibility and moral supervision.

The increase in material personalization supports adaptive learning theory, which asserts that learning systems become more effective when instructional input is aligned with learners' individual readiness and learning pace. AI-assisted material generation enabled teachers to design differentiated tasks based on students' proficiency levels. This aligns with recent studies by Kohnke et al. (2023), which demonstrated that generative AI

significantly enhances task differentiation in heterogeneous classrooms. In private madrasahs, where class sizes are often large and student proficiency varies widely, this personalization capacity addresses a long-standing structural limitation of conventional teaching practices.

The findings related to student engagement indicate that AI positively influenced learner motivation, participation, and confidence, particularly in speaking and writing activities. These findings corroborate Lee and Han's (2023) conclusion that AI-based conversational agents improve learners' willingness to communicate in foreign language settings. In the madrasah classrooms observed in this study, students demonstrated higher participation levels when interacting with AI-based dialogue simulations compared to conventional teacher-fronted drills. This suggests that AI provides a psychologically safe learning environment where students are less anxious about making errors.

However, student engagement showed slightly lower gains compared to other indicators. This result highlights a critical contextual moderator: infrastructure and digital access. Several madrasahs experienced unstable internet connections during classroom implementation, which occasionally disrupted AI-assisted learning activities. This finding reflects the persistent digital inequality between urban and semi-rural educational institutions in Indonesia (Rahmawati & Yuliani, 2024). Thus, the pedagogical potential of AI is strongly mediated by infrastructural readiness.

One of the most theoretically significant findings of this study lies in the enhancement of teacher creativity. The use of AI supported teachers in generating new instructional formats such as interactive role-play scripts, instant writing prompts, contextualized reading passages, and inquiry-based discussion materials. This finding supports the conceptualization of AI as a creative pedagogical partner rather than a mechanistic instructional substitute. Similar conclusions were reported by Zawacki-Richter et al. (2024), who emphasized that generative AI amplifies teachers' design capacity when combined with strong pedagogical vision.

From a qualitative perspective, teachers' narratives revealed a pedagogical identity transformation. Teachers shifted from being sole knowledge transmitters toward becoming learning facilitators and instructional designers. This transformation reflects broader shifts in post-pandemic digital pedagogy, where instructional authority is no longer monopolized by the teacher but distributed across human–machine interaction networks. Nevertheless,

in the madrasah context, this redistribution of authority remained carefully regulated through Islamic moral frameworks. Teachers retained ultimate responsibility for content validation, ethical supervision, and value transmission.

The implementation of the AI model through the RMC framework proved to be methodologically effective. Unlike survey-based studies that capture only attitudes and perceptions, RMC enabled the production of a contextualized and validated pedagogical model. The iterative validation and refinement stages ensured that the model was not only theoretically sound but also practically feasible and ethically aligned. This finding reinforces the argument of Rahman et al. (2024) that development-oriented approaches such as RMC and design-based research offer superior sustainability compared to static experimental designs.

A distinctive contribution of this study lies in the integration of Islamic ethical filtering into the AI instructional model. While most global AI-ELT research focuses on technical and pedagogical efficiency, this study demonstrates that spiritual and moral considerations remain central in Islamic educational institutions. Teachers actively filtered AI-generated content to ensure alignment with Islamic values related to modesty, epistemological integrity, and moral interaction norms. This dimension is often absent in mainstream AI-in-education literature and constitutes a unique theoretical extension of AI pedagogy in value-based education systems.

Nevertheless, the study also identified several implementation challenges. Teachers expressed concerns about students' overreliance on AI-generated answers, which potentially undermines critical thinking and authentic language production. This finding supports the caution expressed by Holmes et al. (2023) regarding the risks of cognitive outsourcing in AI-rich learning environments. Without proper instructional scaffolding, students may develop surface-level language proficiency with limited deep linguistic competence.

Another challenge relates to teacher digital heterogeneity. Although all participants demonstrated positive attitudes toward AI, their levels of digital fluency varied considerably. Teachers with higher TPACK levels utilized AI more strategically for instructional design, while others relied primarily on basic functions such as translation and grammar correction. This finding highlights the importance of continuous professional development as a structural prerequisite for sustainable AI integration.

Overall, the results of this study confirm that AI, when implemented through a structured, ethically guided, and contextually grounded model, significantly enhances English teachers' instructional effectiveness in private madrasahs. The findings extend existing ELT and educational technology theory by demonstrating that AI integration is not value-neutral but deeply shaped by institutional identity, cultural context, and moral philosophy. In Islamic educational environments, technological innovation must operate within an ethical pedagogical architecture rather than as a purely technocratic instrument.

CONCLUSION

This study investigated the effectiveness of Artificial Intelligence (AI) utilization for English teachers in private madrasahs (MTs and MA) in West Lombok Regency using a Research and Model Creation (RMC) approach with a mixed-method design. The findings provide strong empirical evidence that AI significantly enhances teachers' instructional effectiveness across multiple pedagogical dimensions, including instructional efficiency, material personalization, assessment automation, student engagement, and teacher creativity.

Quantitatively, the paired sample t-test results demonstrated a statistically significant improvement in teachers' instructional effectiveness after the implementation of the RMC-based AI model ($t = 6.87$, $p < 0.001$), with a large effect size (Cohen's $d = 1.29$). This confirms that AI integration, when guided by a structured pedagogical framework, exerts a substantial and meaningful educational impact rather than a marginal technological enhancement.

Qualitatively, teachers experienced a profound transformation in their pedagogical practices. AI enabled them to shift from time-consuming administrative routines toward higher-order instructional roles such as learning facilitation, scaffolding, and creative material design. Teachers also reported increased self-confidence in integrating digital innovation into English instruction, despite operating within infrastructurally constrained madrasah environments.

Most importantly, this study demonstrates that AI integration in madrasahs is not merely a technological issue but a value-based pedagogical process. The incorporation of Islamic ethical filtering into the AI implementation model ensured that technological innovation remained aligned with moral recommendations, academic integrity, and Islamic

educational philosophy. This finding establishes that AI can coexist harmoniously with Islamic values when deployed through a carefully designed instructional framework.

Through the RMC framework, this research successfully produced a validated contextual model of AI-based English instruction for private madrasahs, integrating pedagogical effectiveness, ethical control, and institutional feasibility. Thus, this study contributes not only empirical effectiveness evidence but also a practical and transferable implementation model for Islamic secondary education.

Recommendations

Based on the findings and conclusions of this study, several strategic recommendations are proposed:

1. For Madrasah Institutions

Private madrasahs should establish institutional AI integration policies that regulate pedagogical usage, ethical boundaries, and academic integrity standards. AI should be positioned as a supportive instructional assistant, not as a replacement for teacher authority. Schools are also encouraged to gradually improve digital infrastructure to ensure stable and equitable access to AI-assisted learning.

2. For English Teachers

English teachers should continuously upgrade their digital pedagogical competence, particularly in AI-assisted instructional design and ethical supervision. AI must be used strategically for:

- Differentiated material development
- Adaptive formative assessment
- Communicative speaking practice
- Feedback-based writing instruction

Teachers are also advised to implement strict learning contracts to prevent students' overdependence on AI-generated content.

3. For Educational Policymakers

Local and national education authorities should include madrasahs as priority targets in digital transformation programs, particularly in AI-based teacher professional development. Policymakers are encouraged to design specialized training modules that integrate:

- AI literacy
- ELT pedagogy
- Islamic ethical education

4. For Future Researchers

Future studies should:

- Employ experimental or longitudinal designs to measure the long-term impact of AI on students' English proficiency
- Explore student cognitive and linguistic autonomy in AI-assisted environments
- Investigate AI integration across other Islamic subjects, such as Qur'anic studies and Islamic jurisprudence

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