

Mentimeter in Islamic Religious Education: A Systematic Review of Research Trends, Reported Pedagogical Impacts, and Implementation Challenges

Risdiani¹, Gigih Setianto², Siti Nur'aini³

¹ Universitas Muhammadiyah Pekajangan Pekalongan, e-mail: risdiani08@gmail.com

² Universitas Muhammadiyah Pekajangan Pekalongan, e-mail: gigihsetianto@gmail.com

³ Sekolah Tinggi Agama Islam Muhammadiyah Blora, e-mail: nurainimuthia24@gmail.com

Histori Naskah

Diserahkan:
23-06-2026

Direvisi:
17-07-2026

Diterima:
13-08-2026

ABSTRACT

This study aims to map research trends, synthesize reported pedagogical impacts, and identify implementation challenges associated with Mentimeter in Islamic Religious Education (PAI). A Systematic Literature Review (SLR) was conducted following PRISMA 2020 guidelines. Literature searches were conducted in ScienceDirect, SINTA, and Google Scholar on 15 June 2026 for publications from 2021 to 2026. Of 150 identified records, 20 studies met the inclusion criteria. The included studies covered quantitative, qualitative, and mixed-methods research, with varied sample sizes and research contexts. Data were synthesized using thematic synthesis to identify recurring patterns. Across the reviewed literature, student participation and classroom interaction were frequently reported as pedagogical outcomes associated with Mentimeter use. Several studies also reported improvements in indicators of critical and creative thinking, although the evidence varied in study design, samples, and outcome measures. Reported implementation challenges included limited technological infrastructure, lecturers' digital competencies, and institutional readiness. Overall, the evidence suggests that Mentimeter may support participatory and interactive IRE/PAI learning environments; however, the heterogeneous evidence is insufficient to establish causal effectiveness in improving critical and creative thinking. Further multi-site, rigorous, and longitudinal studies are needed.

Keywords : Mentimeter, Islamic Religious Education, Critical Thinking, Creative Thinking

ABSTRAK

Penelitian ini bertujuan untuk memetakan tren penelitian, menyintesis dampak pedagogis yang dilaporkan, dan mengidentifikasi tantangan implementasi terkait penggunaan Mentimeter dalam Pendidikan Agama Islam (PAI). Studi *Systematic Literature Review* (SLR) dilakukan dengan mengikuti pedoman PRISMA 2020. Pencarian literatur dilaksanakan pada basis data *ScienceDirect*, SINTA, dan *Google Scholar* pada tanggal 15 Juni 2026 untuk publikasi rentang tahun 2021 hingga 2026. Dari 150 catatan yang teridentifikasi, 20 penelitian memenuhi kriteria inklusi. Penelitian-penelitian tersebut mencakup metode kuantitatif, kualitatif, dan metode campuran (*mixed-methods*), dengan variasi ukuran sampel dan konteks penelitian. Data disintesis menggunakan pendekatan sintesis tematik untuk mengidentifikasi pola-pola yang berulang. Berdasarkan literatur yang ditinjau, partisipasi mahasiswa dan interaksi kelas sering dilaporkan sebagai hasil pedagogis yang terkait dengan penggunaan Mentimeter. Beberapa penelitian juga melaporkan peningkatan pada indikator berpikir kritis dan kreatif, meskipun terdapat variasi dalam desain penelitian, sampel, dan pengukuran hasil. Tantangan implementasi yang dilaporkan meliputi keterbatasan infrastruktur teknologi, kompetensi digital dosen, dan kesiapan institusi. Secara keseluruhan, bukti menunjukkan bahwa Mentimeter dapat mendukung lingkungan pembelajaran PAI yang partisipatif dan interaktif; namun, bukti yang beragam belum cukup kuat untuk menetapkan efektivitas kausal dalam meningkatkan kemampuan berpikir kritis dan kreatif. Diperlukan penelitian lanjutan yang bersifat longitudinal, ketat secara metodologis, dan melibatkan berbagai lokasi.

Kata Kunci : Mentimeter, Pendidikan Agama Islam, Berpikir Kritis, Berpikir Kreatif

Corresponding Author : Risdiani, Universitas Muhammadiyah Pekajangan Pekalongan, e-mail: risdiani08@gmail.com

INTRODUCTION

Digital transformation has become one of the primary agendas in higher education in response to rapid technological advancements and the demands of Society 5.0. According to Khoiriah et al. (2023), Society 5.0 places humans at the center of innovation, supported by the utilization of digital technologies and artificial intelligence to enhance quality of life. Rahmadani et al. (2024) further argue that the integration of digital technology into various aspects of life, including education, requires a shift toward more adaptive and innovative learning paradigms. Within the context of higher education, Wynda and Hufad (2025) emphasize that universities are no longer expected to function solely as providers of knowledge but also as facilitators of learning capable of fostering twenty-first-century competencies, including critical thinking, creativity, communication, and collaboration. In Islamic Education, this transformation is particularly important because learning should not only focus on the acquisition of religious knowledge but also on the development of higher-order thinking skills that are relevant to the challenges of contemporary society.

Various digital learning platforms have been adopted to support this transformation, including Kahoot!, Quizizz, Padlet, Google Classroom, and Mentimeter. These platforms facilitate two-way interaction, immediate feedback, and increased student participation throughout the learning process. Beigzadeh et al. (2024) explain that interactive technologies can effectively support constructivist learning approaches by positioning students as active participants in knowledge construction. Similarly, Sihombing et al. (2024) argue that the integration of digital technologies in education contributes to the creation of learning environments that are more participatory, collaborative, and student-centered.

Among the available digital learning platforms, Mentimeter has emerged as one of the most widely used applications in education due to its interactive features, such as live polling, word clouds, quizzes, and open-ended questions, which enable real-time student engagement. Ardita et al. (2024) reported that the use of Mentimeter significantly enhances student participation and classroom interaction. These findings are consistent with those of Madiseh (2023), who found that Mentimeter's interactive features increase learner engagement through instant feedback mechanisms. In addition, Anggriani and Atmojo (2022) demonstrated that Mentimeter can create a more active learning environment and promote greater student involvement in classroom activities. Furthermore, Risdiyani et al. (2023) found that Mentimeter was effective in improving students' critical thinking skills in Al-Islam and Kemuhammadiyah courses.

Despite the growing body of research on Mentimeter, existing studies remain fragmented across different educational contexts, levels of education, and methodological approaches. Some studies focus primarily on enhancing student participation, while others examine learner engagement, critical thinking, creative thinking, or the effectiveness of technology-enhanced learning. For instance, Putra and Andriansyah (2022) developed contextual learning media supported by Mentimeter for economics instruction at the secondary school level, whereas Nurhasnawati et al. (2023) investigated the influence of Mentimeter-based Problem-Based Learning on students' learning interest. The diversity of research contexts and objectives has limited the development of a comprehensive understanding of Mentimeter-related research, particularly within the field of Islamic Education.

Several studies have demonstrated the effectiveness of Mentimeter in improving student participation, learning motivation, classroom interaction, and learning outcomes. Ardita et al. (2024), Anggriani and Atmojo (2022), and Risdiyani et al. (2023) reported various positive impacts of Mentimeter on teaching and learning processes. Nevertheless, the existing empirical evidence remains dispersed across different disciplines and educational settings. To date, no systematic review has specifically synthesized research on the use of Mentimeter in Islamic Education (PAI) by comprehensively examining publication trends, methodological

characteristics, pedagogical impacts, and implementation challenges. Consequently, a holistic understanding of Mentimeter's contribution to the advancement of technology-enhanced Islamic Education remains lacking.

Addressing this gap, the present study aims to conduct a systematic review of the use of Mentimeter in Islamic Education. Specifically, this study seeks to: (1) map research trends published between 2021 and 2026; (2) analyze the pedagogical impacts of Mentimeter use in Islamic Education; (3) identify implementation challenges reported across existing studies; and (4) propose future research directions to strengthen the development of technology-enhanced Islamic Education.

RESEARCH METHOD

This study employs a Systematic Literature Review (SLR) method with a thematic synthesis approach to systematically examine research findings on the effectiveness of contextual learning based on Mentimeter in enhancing student participation, critical thinking skills, and creative thinking skills in Islamic Religious Education (PAI) courses. This method was selected because it enables the researcher to systematically search, select, evaluate, and synthesize empirical findings in a structured manner, thereby providing a comprehensive understanding of effectiveness patterns, pedagogical mechanisms, and implementation barriers across various research contexts. This approach is also appropriate for identifying research gaps and systematically formulating directions for future studies.

Page et al. (2021) emphasize that the literature search process in a systematic review should follow transparent and structured procedures. In line with this, the literature search process followed the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure transparency, accountability, and traceability at each stage of the review. The stages included article identification, removal of duplicates, screening based on titles and abstracts, eligibility assessment through full-text review, and final inclusion of articles that met the analysis criteria. The search was conducted in Scopus, SINTA, and Google Scholar databases for the period 2021–2026 to obtain relevant, up-to-date, and sufficiently comprehensive literature. The selection flow is presented in Figure 1.

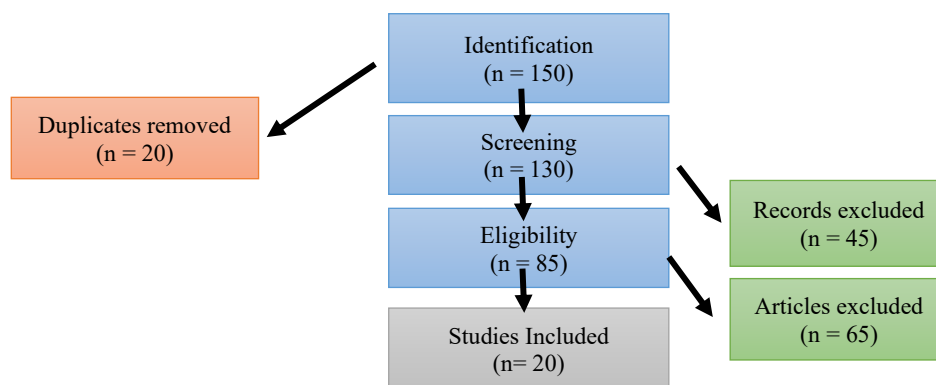


Figure 1. PRISMA 2020 Flow Diagram of Study Selection Process

The search strategy was developed using combinations of keywords related to Mentimeter, Islamic Religious Education (PAI), and higher education. Related terms and synonyms were combined using Boolean operators (AND/OR) to identify relevant studies across the selected databases. The search strategies were adapted to the characteristics of each database. The complete search strings, search fields, publication period, language, and search dates are presented in Table 1.

Table 1. Keywords and Search Strategy

Database	Search string	Search Field	Publication period	Language	Search date
ScienceDirect	(Mentimeter OR "Mentimeter application" OR "Mentimeter platform") AND ("Islamic Religious Education" OR "Islamic Education" OR PAI OR "Islamic Studies")	Title/Abstract/Keywords	2021–2026	English	15 June 2026
SINTA	Mentimeter AND ("Pendidikan Agama Islam" OR PAI OR "Pendidikan Islam" OR "Islamic Religious Education")	Title/Abstract/Keywords	2021–2026	Indonesian/English	15 June 2026
Google Scholar	Mentimeter AND ("Islamic Religious Education" OR "Pendidikan Agama Islam" OR PAI)	Keywords	2021–2026	Indonesian/English	15 June 2026

The search identified 150 records, which were subsequently screened according to predefined inclusion and exclusion criteria. The eligibility criteria were applied consistently during the screening process to determine the studies relevant to the research objectives. The inclusion and exclusion criteria are presented in Table 2.

Table 2. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Peer-reviewed journals and proceedings	Editorials, opinions, comments
Full-text available	No full-text available
Published 2021–2026	Published before 2021
Indonesian and English language	Other languages
Higher education context	Primary and secondary education
Relevant to the use of Mentimeter in Islamic Religious Education	Irrelevant to research topic

The inclusion criteria consisted of: (1) journal articles and scientific proceedings; (2) availability of full-text documents; (3) publications in Indonesian or English; (4) publication period between 2021 and 2026; (5) focus on higher education; and (6) discussion of Mentimeter, contextual learning, student participation, critical thinking, or creative thinking. The exclusion criteria included editorials, opinion articles, and comments; articles without full-text availability; publications prior to 2021; studies in primary and secondary education; and articles not relevant to the research topic. Based on these selection stages, 20 articles met the criteria and were included for further analysis. Reference management was conducted using Mendeley software to facilitate literature organization, maintain citation consistency, and avoid data duplication.

Braun and Clarke (2006) describe thematic analysis as a systematic approach for identifying, analyzing, and reporting patterns within qualitative data. Byrne (2022) further develops this approach by emphasizing its application in systematic literature reviews. Subsequently, data from the selected articles were analyzed using thematic synthesis through

three stages: initial coding, grouping codes into meaningful categories, and developing overarching themes. The analysis results were organized into four major themes: (1) enhancement of student participation, (2) strengthening of critical thinking skills, (3) strengthening of creative thinking skills, and (4) implementation barriers. This thematic analysis technique was chosen because it enables the identification of patterns, similarities, and differences across studies in greater depth.

To ensure traceability of the selection process, this study also presents a screening flow starting from identification to the final articles included in the analysis. From 150 identified articles, 20 were removed due to duplication, 45 were excluded during title and abstract screening, 50 did not meet eligibility during full-text review, and finally 20 articles were included in the final analysis. This flow demonstrates that the selection process was conducted in a systematic and stepwise manner to ensure that the synthesis is based on relevant and high-quality literature. Overall, this SLR method is designed to provide a comprehensive overview of the effectiveness of contextual learning based on Mentimeter in Islamic Religious Education in higher education settings. Through this approach, the study not only examines existing research trends but also identifies supporting factors for successful implementation as well as challenges that need to be addressed in the development of technology-based learning in the era of Society 5.0.

RESULTS

The systematic review of 20 articles that met the inclusion criteria revealed four dominant themes consistently identified in the literature: (1) enhancement of student participation, (2) strengthening of critical thinking skills, (3) strengthening of creative thinking skills, and (4) implementation barriers of Mentimeter in Islamic Religious Education (PAI) learning. Overall, the majority of studies analyzed indicated a positive tendency, showing that Mentimeter contributes to more interactive, participatory, and reflective learning when integrated with a contextual learning approach. This pattern was consistently observed across various research contexts, including differences in institutional types, educational levels, and student characteristics.

A. Enhancement of Student Participation

The enhancement of student participation emerged as the most consistently reported theme in the reviewed literature. Twelve out of 20 articles explicitly reported a significant increase in student engagement and active participation following the use of Mentimeter. Various studies indicate that Mentimeter's interactive features particularly real-time polling, word clouds, open-ended questions, and anonymous responses encourage students to engage more actively in the learning process (Moorhouse & Kohnke, 2020; Pichardo et al., 2021; Qodriani et al., 2022; Sari, 2021; Tarazi & Ortega-Martín, 2023). The anonymity feature plays a particularly important role in reducing social pressure, which often acts as a psychological barrier for students to express their opinions, especially in sensitive discussion topics such as Islamic Religious Education.

Several studies also reported that increased participation through Mentimeter is not limited to behavioral engagement but also extends to cognitive and affective engagement. Nabila et al. (2024) found that more students actively participated through Mentimeter compared to traditional methods, with engagement levels reaching 89%. Putra et al. (2022) also reported a significant increase in student activeness and learning motivation in groups using Mentimeter. A comprehensive review by Khan (2025), which analyzed 40 peer-reviewed studies, reinforced these findings by showing that Mentimeter consistently enhances student engagement, promotes collaboration, and strengthens participation through interactive and anonymous features. In addition, Madiseh et al. (2023) reported that Mentimeter use simultaneously improves learning

motivation, learner autonomy, and academic achievement. Comparative studies between platforms indicate that Mentimeter has a competitive advantage over similar applications.

Andrini (2021) compared Mentimeter with Quizizz and found that Mentimeter is superior in interactive presentation features that support multidirectional engagement. Boateng (2022) reported that although Padlet is effective for online discussion, Mentimeter is more effective in real-time interaction that enables instant feedback. These findings suggest that Mentimeter's strength lies not only in its usability but also in its ability to create an inclusive, anonymous, and participatory learning environment—characteristics that are particularly relevant in Islamic Religious Education contexts, where discussions often involve sensitive value-based topics.

B. Strengthening of Critical Thinking Skills

The second dominant theme is the strengthening of students' critical thinking skills. The synthesis shows that 8 out of 20 articles explicitly associate Mentimeter use with improvements in critical thinking indicators, particularly analysis, evaluation, inference, and reflection (Dwi Anggriani & Eko Atmojo, 2022; Triani & Putra, 2023). Sutarto (2023) emphasizes that critical thinking is one of the core 4C competencies that must be developed in Islamic Religious Education through innovative and student-centered learning approaches. Putri et al. (2023) also report that blended learning models significantly enhance students' critical thinking skills alongside creative thinking abilities. This pattern indicates that Mentimeter, especially when combined with contextual learning, not only increases participation quantitatively but also enhances the quality of students' cognitive processes to a higher level.

The most frequently reported mechanism in the literature is the use of open-ended questions and argumentative polling in Mentimeter, which require students to actively process information, compare different perspectives, and construct evidence-based arguments. When integrated with a contextual learning approach that connects academic content with real-life experiences and issues, students are encouraged not only to recall information but also to analyze its relevance in daily life. Triani and Putra (2023) emphasize that contextual learning enhances critical thinking by encouraging students to connect academic concepts with real situations, analyze problems, and develop arguments based on authentic learning experiences.

This synthesis is also supported by quantitative empirical evidence from Risdiyani et al. (2026) Mentimeter-based 5E learning model in Islamic Religious Education courses across three universities in Semarang. The study reported a significant improvement in students' critical thinking skills with an average N-Gain of 0.48 (moderate category), consistently observed across institutions with a large effect size ($r = 0.74\text{--}0.77$). This quantitative evidence strengthens the pattern identified in the narrative synthesis, indicating that Mentimeter's effectiveness in enhancing critical thinking is not merely perceptual or qualitative but also statistically measurable. Thus, the findings suggest that Mentimeter, particularly when used within a structured and contextual instructional design, has strong potential as a tool for fostering students' critical thinking skills in Islamic Religious Education.

C. Strengthening of Creative Thinking Skills

The third theme is the strengthening of students' creative thinking skills. The synthesis reveals that several studies associate specific Mentimeter features with the stimulation of creative thinking indicators, particularly fluency (idea generation), flexibility (diversity of perspectives), originality (novelty of ideas), and elaboration (development of ideas) (Behnamnia et al., 2025; Mubarak et al., 2023). This pattern suggests that Mentimeter functions not only as a tool for collecting responses but also as a medium that creates a safe space for students to express ideas freely without high social evaluation pressure.

The word cloud feature is particularly reported to enhance fluency by allowing many students to submit ideas simultaneously and anonymously, resulting in diverse responses

displayed collectively. The brainstorming feature promotes flexibility by enabling students to immediately observe different peer perspectives, while open-ended questions foster originality and elaboration by requiring students to develop more complex and meaningful responses rather than reproducing taught content. Pratesta (2023) explains that contextual learning also provides opportunities for students to explore alternative solutions and develop new ideas based on meaningful learning experiences, thereby creating a synergistic effect between CTL and Mentimeter in fostering creativity.

Several studies report that the use of Mentimeter in contextual learning contributes to the improvement of students' creative thinking skills. These findings are supported by studies showing improvements in fluency, flexibility, originality, and elaboration through brainstorming activities, open discussions, and idea exploration. Similar results were found in multisite studies indicating increased student creativity following the implementation of technology-enhanced learning approaches (Risdiyani et al., 2026). Behnamnia (2025) further strengthens this argument by demonstrating that all four creative thinking indicators are positively correlated with improvements in student motivation and learning outcomes in digital learning environments. Ritonga et al. (2026) report that interactive and activity-based learning models can simultaneously enhance both critical and creative thinking skills. Overall, cross-study patterns indicate that the effectiveness of Mentimeter in fostering creativity depends largely on the quality of instructional design and task formulation by lecturers, rather than solely on the application features.

D. Implementation Barriers

The fourth recurring theme in the literature is implementation barriers. The synthesis shows that 5 out of 20 articles consistently identify three main categories of barriers: technological infrastructure limitations, low digital competence among lecturers, and institutional readiness in adopting technology-based learning. These barriers are not sporadic but are found across different institutional contexts, indicating that they are systemic issues requiring comprehensive solutions. The first barrier relates to infrastructure limitations, particularly unstable internet connectivity and limited hardware availability. Khair (2026) notes that such technical barriers often disrupt the implementation of digital learning, especially in institutions located outside major urban areas. Khan (2025), in a systematic review of 40 studies, also identifies technical and cost-related challenges as universal barriers to Mentimeter implementation, not only in Indonesia but also globally. This indicates that infrastructure challenges are not merely local issues but global concerns requiring policy-level attention.

The second barrier is the low digital competence of lecturers in optimally utilizing Mentimeter features. Ardi Nugraha et al. (2022) highlight that insufficient Technological Pedagogical Content Knowledge (TPACK) training prevents the full potential of the application from being realized. The third barrier is institutional cultural readiness, including traditional teaching habits and low adaptability to innovation, which influence both lecturers' and students' acceptance of digital transformation. Hidayat et al. (2021) emphasize that technological advancement requires institutions to adapt through strategy development, organizational culture strengthening, and sustainable change management. Therefore, optimizing Mentimeter use requires an approach that goes beyond technology, encompassing human capacity building and institutional ecosystem development.

DISCUSSION

The synthesis of 20 articles that met the inclusion criteria indicates that contextual learning based on Mentimeter has strong potential to support the development of student competencies in Islamic Religious Education (PAI) courses in higher education. The four main themes identified enhancement of student participation, strengthening of critical thinking,

strengthening of creative thinking, and implementation barriers are interrelated and collectively provide a comprehensive understanding of both the effectiveness and challenges of integrating interactive technology into Islamic learning. This discussion interprets these patterns, relates them to relevant theoretical foundations, and compares them with empirical evidence from related studies.

A. Student Participation as a Foundation of Effective Learning

The consistent increase in student participation through Mentimeter can be explained through two complementary theoretical perspectives: contextual learning theory and social constructivism. From the CTL perspective, Johnson (2014) emphasizes that knowledge is actively constructed when learners engage in meaningful learning experiences connected to real-life contexts. From Vygotsky's (1978) social constructivist perspective, social interaction and participation in a learning community are essential prerequisites for cognitive development. Mentimeter facilitates both conditions simultaneously: its interactive features promote active engagement, while the visualization of collective responses creates a dynamic space for dialogue and learning communities.

The anonymity feature in Mentimeter has important pedagogical implications, particularly in PAI contexts where discussions often involve sensitive topics such as religious interpretation, moral values, and socio-religious issues. Moorhouse and Kohnke (2020) found that anonymity significantly reduces social pressure, which often prevents students from expressing their opinions openly. Students who are typically passive become more willing to contribute when their identities are not directly exposed. In religious learning environments where differences of opinion are highly sensitive, this feature becomes a crucial advantage compared to other interactive platforms.

This pattern of increased participation is also closely linked to improvements in student motivation and learning autonomy. Madiseh et al. (2023) reported that Mentimeter integration enhances motivation, learner autonomy, and academic achievement simultaneously. This indicates that Mentimeter does not merely increase momentary engagement but also encourages students to take greater responsibility for their own learning process. Thus, participation improvement should not be interpreted merely as a technical effect of the application, but as a deeper pedagogical impact that transforms how students interact with content, lecturers, and peers in PAI learning contexts.

B. Synergy between Contextual Learning and Digital Technology

The synthesis shows that Mentimeter achieves its optimal effectiveness when integrated with a structured pedagogical approach, particularly contextual learning. CTL provides a pedagogical framework that positions students' experiences and real-world contexts as the starting point of learning, while Mentimeter provides technological infrastructure that facilitates exploration, dialogue, and real-time feedback. The combination of both creates a synergy that makes learning more meaningful, adaptive, and student-centered. Suhermi et al. (2025) emphasize that effective contextual learning must activate prior knowledge, encourage authentic exploration, and facilitate deep reflection all of which are technically supported by Mentimeter features.

This integration is also consistent with the TPACK framework, which emphasizes that educational technology must align with pedagogy and content rather than function as a standalone innovation. When Mentimeter is used merely as a quiz or polling tool without strong pedagogical design, its impact tends to be limited to surface-level engagement. Studies indicate that its effectiveness increases significantly when embedded within structured, constructivist learning models, where technology supports exploration, elaboration, and reflection processes.

The synergy between CTL and Mentimeter also has important implications for lecturers as instructional designers. The synthesis shows that lecturers who use Mentimeter effectively are those who design contextual, open-ended, and higher-order thinking questions, rather than relying on simple right–wrong polling. In this sense, the lecturer's role shifts from knowledge transmitter to learning experience designer who utilizes technology to enhance interaction, reflection, and meaning-making. This transformation aligns with the demands of higher education in the Society 5.0 era, which emphasizes creativity, collaboration, and higher-order thinking skills.

C. Development of Critical Thinking through Mentimeter and CTL

The findings on critical thinking enhancement can be interpreted through Ennis's (1985) theory of critical thinking, defined as reflective and reasonable thinking focused on deciding what to believe or do. In Mentimeter-based learning, open-ended questions and argumentative polling directly encourage students to engage in analysis (identifying arguments), evaluation (assessing validity), and inference (drawing conclusions based on evidence). However, these processes do not occur automatically through technology use; they depend heavily on the quality of instructional design and the learning environment that supports open intellectual exploration.

In PAI contexts, the development of critical thinking is particularly complex because students must navigate between normative religious values and dynamic socio-religious realities. Contextual learning plays a crucial role by enabling students to connect Islamic concepts with real-life issues in a reflective and critical manner. Triani and Putra (2023) explain that CTL enhances critical thinking by encouraging students to link theory with reality, analyze problems from multiple perspectives, and construct arguments based on authentic learning experiences. Mentimeter further supports this process by providing a safe and inclusive platform for expressing critical ideas without fear of judgment.

Empirical evidence from Risdiyani et al. (2026) strengthens these findings. Their study reported a significant improvement in students' critical thinking skills in Islamic Religious Education across three universities, with an average N-Gain of 0.48 (moderate category) and a large effect size ($r = 0.74–0.77$), consistent across different institutional contexts. This consistency indicates that Mentimeter's effectiveness in enhancing critical thinking is not institution-dependent but rooted in pedagogical mechanisms that emerge from the integration of interactive technology and contextual learning. These findings align with the present synthesis and provide quantitative support for its narrative interpretation.

D. Development of Creative Thinking through Digital Exploration

The enhancement of creative thinking through Mentimeter can be understood through Torrance's (1974) theory of creative thinking, which includes four main dimensions: fluency, flexibility, originality, and elaboration. The synthesis shows that each of these dimensions is stimulated by different Mentimeter features. Word clouds promote fluency by enabling simultaneous idea generation from many students. Collaborative brainstorming enhances flexibility by exposing students to diverse peer perspectives. Open-ended questions foster originality by requiring responses beyond content reproduction, while elaboration features encourage students to refine and expand their ideas. The relationship between contextual learning and creative thinking is also theoretically grounded. Pratesta (2023) explains that CTL provides opportunities for students to explore alternative solutions and develop new ideas based on meaningful learning experiences. In PAI contexts, this means students are encouraged not only to understand Islamic teachings normatively but also to construct relevant and contextual responses to contemporary challenges. Creativity in this sense does not imply deviation from religious values but rather the development of richer and more contextualized understanding.

The anonymity feature of Mentimeter reduces psychological barriers that often inhibit creative expression, allowing students to think more freely. Behnamnia (2025) found a positive correlation between creative thinking indicators and improvements in motivation and academic achievement in digital learning environments. Similarly, Risdiyani et al. (2026) reported a moderate N-Gain (0.40) in creative thinking skills across three universities, indicating stable but gradual improvement. The slightly lower gain compared to critical thinking suggests that creativity requires longer developmental processes and more sustained instructional conditions, consistent with the view that creativity is a more complex competency.

E. Implementation Barriers: A Systemic Perspective

The implementation barriers identified in this synthesis should not be interpreted as failures of Mentimeter, but rather as reflections of the complexity of digital transformation in Indonesian higher education. Infrastructure limitations, low digital competence among lecturers, and academic cultural readiness represent three interrelated layers of challenges that cannot be addressed in isolation. Sihombing et al. (2024) emphasize that education systems in the Society 5.0 era must develop a futuristic, resilient, and sustainable ecosystem—conditions that are not yet fully realized in many institutions. Lecturers' digital competence is the most frequently identified determinant of implementation quality. Ardi Nugraha et al. (2022) highlight that without adequate TPACK mastery, lecturers tend to use Mentimeter superficially, merely as a substitute for whiteboards or simple quizzes, without leveraging its pedagogical potential for higher-order thinking. Khan (2025) also identifies training needs as a universal challenge across global contexts, indicating that professional development must be institutional rather than individual responsibility.

Academic culture represents the most complex barrier because it involves long-established mindsets and teaching traditions. Hidayat et al. (2021) emphasize that sustainable educational transformation requires systematic change management, including strategy development, organizational culture strengthening, and adaptive facilitation. In PAI contexts, resistance to digital tools may also stem from concerns that interactive platforms could reduce the depth of religious textual analysis. Therefore, effective communication about how Mentimeter enhances rather than diminishes academic depth is essential for successful adoption.

F. Theoretical and Practical Implications

Theoretically, this synthesis contributes to the development of a conceptual framework for integrating interactive technology in Islamic Religious Education in the digital era. The findings suggest that Mentimeter functions not merely as a teaching aid but as a pedagogical mediator that strengthens interaction between students, content, and lecturers when embedded within structured and contextual learning design. This enriches the relatively limited body of literature on digital Islamic education and provides a foundation for developing more innovative and responsive PAI learning models aligned with Society 5.0 demands.

Practically, the findings have several important implications. For lecturers, the study highlights the importance of designing open-ended, contextual, and higher-order thinking tasks when using Mentimeter, rather than relying solely on simple polling features. For institutions, it emphasizes the need for investment in adequate digital infrastructure, continuous TPACK training programs, and adaptive academic culture development. For policymakers, the study underscores that digital transformation in Islamic higher education requires not only technological provision but also a holistic ecosystem, including regulation, funding, and clearly defined digital competency standards for educators.

CONCLUSION

This systematic review indicates that Mentimeter has been increasingly used as an interactive digital tool in Islamic Religious Education and related learning contexts. Across the reviewed studies, Mentimeter was commonly associated with increased student participation, classroom interaction, engagement, and opportunities for active learning. Several studies also reported improvements in learning-related outcomes, including indicators of critical and creative thinking. However, the available evidence remains heterogeneous in terms of research designs, sample characteristics, learning contexts, and outcome measures. Therefore, the findings should be interpreted as reported pedagogical associations rather than conclusive evidence of the causal effectiveness of Mentimeter. The review also identified several implementation challenges, particularly limitations in technological infrastructure, lecturers' digital competencies, and institutional readiness. These challenges indicate that the effective integration of Mentimeter depends not only on the availability of the technology but also on pedagogical planning and institutional support. Future research should employ more rigorous and transparent methodologies, larger and multi-site samples, validated outcome measures, and longitudinal or comparative designs to strengthen the evidence regarding the pedagogical contribution of Mentimeter in Islamic Religious Education.

REFERENCES

- Andrini, V. S., & Pratama, H. (2021). Implementasi Quiz Interaktif dengan Software Mentimeter dalam Meningkatkan Hasil Belajar. *Mimbar Ilmu*, 26(2), 287. <https://doi.org/10.23887/mi.v26i2.36923>
- Ardi Nugraha, C., Kuswandi, D., & Praherdhiono, H. (2022). Teacher Professional Development to Train Digital Skills with Technological Pedagogical Content Knowledge (TPACK). *JTP - Jurnal Teknologi Pendidikan*, 24(3), 330–340. <https://doi.org/10.21009/jtp.v24i3.31019>
- Ardita, M., Yunus, M., Supriadi, D., Saprudin, A., Difinubun, B. A., & Rahmat, M. (2024). Application of Digital Learning Media Through Mentimeter in Increasing Motivation to Learn Arabic in Class XI Religion Students at MAN 2 Ciamis. *Journal for Islamic Studies*, 7(4). <http://files/1631/Ardita et al. - 2024 - Application of Digital Learning Media Through Mentimeter in Increasing Motivation to Learn Arabic in.pdf>
- B. Johnson, E. (2014). *Contextual teaching & Learning: Menjadikan Kegiatan Belajar-Mengajar Mengasyikkan dan Bermakna* (Edisi Baru). Kaifa Learning.
- Behnamnia, N., Kamsin, A., Ismail, M. A. B., & Hayati, S. A. (2025). Relationship between creative thinking and outcomes in a digital STEM-based learning environment: A mixed methods case study. *Thinking Skills and Creativity*, 57, 101816.
- Beigzadeh, A., Bazyar, H., Delzendeh, M., Razmi, M. H., & Sharifi, N. (2024). *Comparing the effect of lecture method and cooperative teaching method on the learning , communication skills , and attitudes of students : a quasi-experimental study*. December. <https://doi.org/10.3389/feduc.2024.1449538>
- Boateng, S. (2022). Learning Science With Technology: The Use of Padlet Pedagogical Tool to Improve Students' Attainment in Integrated Science. *Proceedings of the 2022 AERA Annual Meeting*. <https://doi.org/10.3102/1897090>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Byrne, D. (2022). A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality and Quantity*, 56(3), 1391–1412. <https://doi.org/10.1007/s11120-021-01182-y>
- Dwi Anggriani, M., & Eko Atmojo, S. (2022). The Impact of Problem-Based Learning Model Assisted by Mentimeter Media in Science Learning on Students' Critical Thinking and Collaboration Skills. *International Journal of Elementary Education*, 6(2), 200–209.

<https://doi.org/10.23887/ijee.v6i2.46837>

- Ennis, R. H. (1985). A Logical Basis for Measuring Critical Thinking Skills. *Education Leadership*, 44–50.
- Hidayat, A., Hadi, S., & Marlin, S. (2021). Strategi Pendidikan di Era Distrupsi. *Misykat al-Anwar Jurnal Kajian Islam dan Masyarakat*, 4(2), 215. <https://doi.org/10.24853/ma.4.2.215-234>
- Intan Nabila, N., Sumantri, S., & Zakiah, L. (2024). Meningkatkan Keterlibatan Mahasiswa dalam Pembelajaran Melalui Platform Mentimeter. *Jurnal Teknodik*. <https://doi.org/10.32550/teknodik.vi.1071>
- Khair, H. (2026). Transformasi Pembelajaran DI Era Society 5.0 Tantangan dan Strategi Guru. *Jurnal Pendidikan Dan Keguruan*, 4(2), 94–102.
- Khan, M. A. (2025). Mentimeter Tool for Enhancing Student Engagement and Active Learning: A Literature Review. *International Journal of Changes in Education*. <https://doi.org/10.47852/bonviewIJCE52023801>
- Khoiriah, S. U., Lubis, L. karunia L. U., & Anas, D. K. N. (2023). Analisis Perkembangan Sistem Manajemen Pendidikan. *JISPENDIORA, Jurnal Ilmu Sosial, Pendidikan Dan Humaniora*, 2(2), 117–132.
- Madiseh, F. R., Al-Abri, A., & Sobhanifar, H. (2023). *Integrating Mentimeter to Boost Students' Motivation, Autonomy, and Achievement*. 24(3), 232–251.
- Moorhouse, B. L., & Kohnke, L. (2020). Using Mentimeter to Elicit Student Responses in the EAP/ESP Classroom. *REL C Journal*, 51(1), 198–204. <https://doi.org/10.1177/0033688219890200>
- Mubarak, I. M. Al, Rahayu, P., Pratiwi, I., Jauhari, Z. A., & Khusnul, A. (2023). *Pengembangan Berpikir Kreatif pada Pembelajaran PAI dalam Menghadapi Tantangan Pendidikan Islam Menuju Society 5.0*. 4.
- Nurhasnawati, N., Muzayanati, A., & Ichsan, I. (2023). The Effect of the Mentimeter Application-Based PBL Model on Student Learning Interests in Science Learning Courses Integrated with Religious Values. *Jurnal Penelitian Pendidikan IPA*, 9(6), 4331–4337. <https://doi.org/10.29303/jppipa.v9i6.2069>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *Bmj*, 372. <https://doi.org/10.1136/bmj.n71>
- Pichardo, J. I., López-Medina, E. F., Mancha-Cáceres, O., González-Enríquez, I., Hernández-Melián, A., Blázquez-Rodríguez, M., Jiménez, V., Logares, M., Carabantes-Alarcon, D., Ramos-Toro, M., Isorna, E., Cornejo-Valle, M., & Borrás-Gené, O. (2021). Students and teachers using mentimeter: Technological innovation to face the challenges of the covid-19 pandemic and post-pandemic in higher education. *Education Sciences*, 11(11). <https://doi.org/10.3390/educsci11110667>
- Pratesta, H. (2023). *Penerapan Pendekatan contextual Teaching And Learning (CTL) dalam Pembelajaran Pendidikan Agama Islam dan Implikasinya Terhadap Pengembangan Kemampuan Berpikir Kritis Siswa di SMA Negeri 1 Pasemah Air Keruh*. IAIN Curup.
- Putra, H. M. R., & Andriansyah, E. H. (2022). *Pengembangan Media Interaktif Berbasis Kontekstual Berbantuan Mentimeter dalam Pembelajaran Daring pada Mata Pelajaran Ekonomi*. 10. <http://files/1218/Putra dan Andriansyah - 2022 - Pengembangan Media Interaktif Berbasis Kontekstual.pdf>
- Putri, A. S., Prasetyo, Z. K., Purwastuti, L. A., Prodjosantoso, A. K., & Putranta, H. (2023). Effectiveness of STEAM-based blended learning on students' critical and creative thinking skills. *International Journal of Evaluation and Research in Education*, 12(1), 44–52.

- <https://doi.org/10.11591/ijere.v12i1.22506>
- Qodriani, R. N. L., Asrori, & Rusman. (2022). Implementasi Metode Pembelajaran Kuis Interaktif Berbasis Mentimeter pada Mata Pelajaran Pendidikan Agama Islam. *Jurnal Pendidikan Agama Islam Al-Thariqah*, 7(2), 326–339. [https://doi.org/10.25299/al-thariqah.2022.vol7\(2\).9689](https://doi.org/10.25299/al-thariqah.2022.vol7(2).9689)
- Rahmadani, K., Rifaldi, U. A., & Umam, H. (2024). Revolusi Pendidikan Indonesia Di Era 5.0. *CENDEKIA, Jurnal Pendidikan Dan Pembelajaran*, 18(01), 65–71.
- Risidiani, R., Raharjo, R., Saminanto, S., Warsiyah, W., Qutni, D., Rizkillah, R. W., & Setianto, G. (2026). The Effectiveness Of The Mentimeter-Based 5E Model. *Scaffolding: Jurnal Pendidikan Islam Dan Multikulturalisme*, 8(1), 384–402. <https://doi.org/10.37680/scaffolding.v8i1.8482>
- Risidiani, R., Srifariyati, S., Raharjo, R., & Rohman, A. (2023). The Application of Mentimeter to Improve Critical Thinking Skills in Al Islam dan Muhammadiyah (AIK) Course. *Jurnal Tarbiyatuna*, 14(1), 63–74. <https://doi.org/10.31603/tarbiyatuna.v14i1.9000>
- Ritonga, K. R., Murniati, A., Hulawa, D. E., Islam, U., Sultan, N., & Kasim, S. (2026). Open-Ended Learning Model Effect on Critical and Creative Thinking in Islamic Education. *Journal Of Islamic Education*, II(I), 104–120.
- Sari, A. B. P. (2021). the Impacts of Mentimeter-Based Activities on Efl Students' Engagement in Indonesia. *LLT Journal: Journal on Language and Language Teaching*, 24(1), 249–260. <https://doi.org/10.24071/llt.v24i1.3025>
- Sihombing, A. A., Putranti, H. R. D., Noviani, N. L., & Atasoge, A. D. W. (2024). Technology-Based Education Transformation: Futuristic, Quality, Resilient, and Sustainable Education System in the Age of Society 5.0. *Indonesian Journal of Educational Research and Review*, 7(3), 477–490. <https://doi.org/10.23887/ijerr.v7i3.70080>
- Suhermi, L., Barokah, N., & Kamal, R. (2025). Pembelajaran Kontekstual sebagai Inovasi Kreatif dalam Menjadikan Materi Ajar Lebih Bermakna. *JISPENDIORA, Jurnal Ilmu Sosial, Pendidikan Dan Humaniora*, 4(2), 94–103.
- Sutarto, S. (2023). Strategi guru untuk meningkatkan keterampilan 4c's (kolaborasi, komunikasi, berpikir kritis dan kreatif) dalam pembelajaran pendidikan agama islam. *JPPI (Jurnal Penelitian Pendidikan Indonesia)*, 9(3), 1543. <https://doi.org/10.29210/020232187>
- Tarazi, A., & Ortega-Martín, J. L. (2023). Enhancing EFL students' engagement in online synchronous classes: The role of the Mentimeter platform. *Frontiers in Psychology*, 14(February), 1–11. <https://doi.org/10.3389/fpsyg.2023.1127520>
- Triani, T., & Putra, S. (2023). Analisis Penerapan Pembelajaran Berbasis Kontekstual (Contextual and Teaching Learning) pada Mata Pelajaran Bahasa Arab. *Nusantara: Jurnal Pendidikan Indonesia*, 3(3), 733–754. <https://doi.org/10.14421/njpi.2023.v3i3-19>
- Vygotsky, L. S. (1978). *Mind in Society: : The Development of Higher Psychological Processes* (M. Cole, V. Jolm-Steiner, S. Scribner, & E. Souberman (eds.)). Harvard University Press. <https://doi.org/10.2307/j.ctvjf9vz4>
- Wynda, H., & Hufad, A. (2025). Transformasi Pendidikan Tinggi : Mengasah Soft Skills untuk Menjawab Tantangan Kerja di Era Society 5 . 0. *JSSH, Jurnal Sains Sosio Humaniora*, 9(1), 91–102.