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Integrating Digital Mind Mapping into the Islamic Education Curriculum: A Capacity-Building Program for Madrasah Teachers

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ABSTRACT

Digital transformation in madrasah education requires teachers to integrate technology with pedagogical and curricular needs rather than merely acquire basic technical skills. This community engagement program aimed to strengthen teachers' capacity to integrate digital Mind Mapping into the Islamic education curriculum at MI Al-Islamiyah Wonoplintahan, Prambon, Sidoarjo. The program employed a participatory training and mentoring approach combining conceptual orientation with hands-on practice in designing curriculum-aligned digital Mind Maps. Twelve madrasah teachers participated in activities involving curriculum mapping, visual organization of learning concepts, digital media authoring, guided practice, and peer-based reflection. The program facilitated the development of digital Mind Mapping skills and curriculum-oriented learning media across subject areas, including Islamic Education and Qur'an-Hadith. The integration of visual knowledge mapping with Islamic education content provided a practical pathway for transforming text-dominated curricular materials into more structured, contextual, and interactive learning resources. The activity indicates that curriculum-oriented digital capacity building can support madrasah teachers in connecting technological competence with pedagogical practice while maintaining the distinctive educational context of Islamic primary education. Future programs should strengthen longitudinal mentoring and classroom-based evaluation to examine the sustainability and educational impact of digital Mind Mapping integration.

ABSTRAK

Transformasi digital dalam pendidikan madrasah menuntut guru untuk mengintegrasikan teknologi dengan kebutuhan pedagogis dan kurikulum, bukan sekadar menguasai keterampilan teknis dasar. Program pengabdian masyarakat ini bertujuan memperkuat kapasitas guru dalam mengintegrasikan *Mind Mapping* digital ke dalam kurikulum pendidikan Islam di MI Al-Islamiyah Wonoplintahan, Prambon, Sidoarjo. Program ini menggunakan pendekatan pelatihan dan pendampingan partisipatif yang memadukan orientasi konseptual dengan praktik langsung dalam merancang *Mind Map* digital yang selaras dengan kurikulum. Sebanyak dua belas guru madrasah berpartisipasi dalam kegiatan yang mencakup pemetaan kurikulum, pengorganisasian visual konsep pembelajaran, pembuatan media digital, praktik terbimbing, dan refleksi antar-rekan sejawat. Program ini memfasilitasi pengembangan keterampilan *Mind Mapping* digital dan media pembelajaran berbasis kurikulum di berbagai mata pelajaran, termasuk Pendidikan Agama Islam dan Al-Qur'an-Hadis. Integrasi pemetaan pengetahuan secara visual dengan materi pendidikan Islam memberikan langkah praktis untuk mengubah materi kurikulum yang didominasi teks menjadi sumber belajar yang lebih terstruktur, kontekstual, dan interaktif. Kegiatan ini menunjukkan bahwa peningkatan kapasitas digital yang berorientasi pada kurikulum dapat mendukung guru madrasah dalam menghubungkan kompetensi teknologi dengan praktik pedagogis, sembari tetap mempertahankan konteks pendidikan khas sekolah dasar Islam. Program di masa mendatang perlu memperkuat pendampingan berkelanjutan dan evaluasi berbasis kelas untuk mengkaji keberlanjutan serta dampak pendidikan dari integrasi Mind Mapping digital tersebut.

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Keywords: Digital Mind Mapping; Islamic Education Curriculum; Madrasah Teachers; Digital Competence; Learning Media; Capacity Building

1. INTRODUCTION

Digital transformation has increasingly influenced how educational content is designed, communicated, and experienced across different levels of schooling. For teachers, digital competence is therefore no longer

limited to operating technological devices but includes the ability to select, design, and integrate digital resources in ways that support meaningful learning. Contemporary frameworks for teacher digital competence emphasize the intersection of technological knowledge, pedagogical decision-making, and subject-matter understanding (Caena & Redecker, 2020; Falloon, 2020). Nevertheless, the availability of digital technology does not automatically result in effective pedagogical integration. Teachers require opportunities to develop the capacity to transform curricular content into digital learning experiences that remain aligned with learning objectives and learners' characteristics (Lucas et al., 2021; Sailer et al., 2021).

This challenge is particularly relevant in madrasah education, where digital transformation needs to remain connected with the distinctive purposes and content of Islamic education. The Islamic education curriculum does not merely transmit subject knowledge; it also provides educational spaces for developing religious understanding, values, character, and meaningful relationships between knowledge and everyday life. Consequently, technological innovation in madrasahs should not be treated as an independent objective. Digital tools need to function as pedagogical instruments through which Islamic educational content can be organized, visualized, contextualized, and communicated more effectively.

In classroom practice, however, curriculum content can contain interconnected concepts that are difficult to communicate through linear textual explanations alone. This issue is relevant to Islamic Education, Qur'an-Hadith, and other madrasah subjects in which learners may need to recognize relationships among concepts, principles, values, classifications, and their practical applications. The previous formulation of this community engagement program identified similar challenges at MI Al-Islamiyah Wonoplintahan, Prambon, Sidoarjo, particularly concerning the pedagogical use of digital learning media. Thus, the relevant issue is not simply whether teachers have access to technology, but whether they are able to use digital tools to represent curriculum content in pedagogically meaningful forms.

One potential approach is digital Mind Mapping. Mind Mapping organizes information around central concepts and interconnected branches, enabling relationships among ideas to be represented visually rather than exclusively through continuous text. In an educational context, this approach can assist teachers in identifying core concepts, organizing related information, establishing conceptual hierarchies, and developing more visually structured learning resources (Buzan & Abbott, 2021; Kinchin, 2021). Digital applications extend these possibilities by allowing visual elements, links, icons, and other resources to be incorporated into conceptual structures. The original program similarly positioned digital Mind Mapping as a means of translating curricular content into structured visual representations.

For the Islamic education curriculum, this visual approach has particular pedagogical potential. Islamic educational content frequently involves relationships among foundational concepts, religious values, sources, practices, and applications. A visual map can help organize these relationships while maintaining the substantive meaning of the curriculum. For example, a central Islamic education topic may be decomposed into related concepts, supporting evidence, values, and contextual applications. Digital Mind Mapping should therefore not be understood merely as a visually attractive presentation technique, but as a tool for curriculum representation through which teachers reorganize subject content into a more explicit conceptual structure.

The pedagogical relevance of such integration can be understood through the Technological Pedagogical Content Knowledge (TPACK) framework. TPACK emphasizes that meaningful technology integration emerges from the relationship among technological knowledge, pedagogical knowledge, and content knowledge rather than from technological competence in isolation (Mishra & Koehler, 2006; Schmid et al., 2021). Within the present community engagement context, digital Mind Mapping represents the technological component, visual and contextual organization represents the pedagogical component, and Islamic education curriculum materials represent the content component. The intersection of these dimensions provides a useful conceptual foundation for developing digital learning media that remain curriculum-oriented.

The approach is also relevant to Dual Coding Theory and Cognitive Load Theory. Visual and verbal representations can provide complementary pathways for organizing information, while structured

presentation may help learners process relationships among concepts more efficiently (Paivio & Clark, 2021; Sweller et al., 2021). Digital Mind Mapping provides a practical mechanism for translating these principles into instructional design by combining keywords, hierarchical branches, visual cues, and conceptual relationships. The original program likewise linked Mind Mapping with visual-verbal structuring and cognitive organization. However, these theoretical perspectives should function as pedagogical foundations for the activity rather than as evidence that the activity itself automatically improves student achievement.

Previous studies and community engagement initiatives have widely addressed teacher digital literacy, educational technology, multimedia development, and digital learning platforms. Nevertheless, a practical gap remains between general digital-skills training and curriculum-oriented digital pedagogical capacity. Training that primarily introduces applications may improve familiarity with technology without necessarily helping teachers determine how a particular digital tool should represent specific curricular knowledge. The Introduction lama sebenarnya sudah mengidentifikasi masalah serupa, yaitu adanya jarak antara pelatihan digital umum dengan kebutuhan kurikulum lokal. For madrasah teachers, this gap becomes particularly important because digital innovation must remain responsive to the pedagogical and value-oriented characteristics of Islamic education.

Accordingly, the present community engagement program positions curriculum integration rather than technological adoption alone as its central orientation. Digital Mind Mapping is used as a practical bridge connecting technology, pedagogy, and Islamic education curriculum content. This orientation distinguishes the program from digital training that focuses predominantly on software operation. Teachers are instead introduced to a process in which curriculum content is first identified and organized, then translated into a visual conceptual structure, and subsequently represented through digital media. In this sense, technological competence develops in relation to authentic curricular tasks rather than as a detached technical skill.

The community engagement setting is also important. Teachers may encounter barriers when adopting unfamiliar educational technologies independently, particularly when technological learning is separated from their immediate instructional responsibilities. Capacity-building activities can provide opportunities for guided practice, collaborative problem solving, and contextualized exploration of digital tools. Rather than positioning teachers merely as recipients of technological information, such activities can involve them in constructing learning resources based on the curricular content they actually teach. This approach strengthens the relationship between professional development and classroom relevance.

The novelty of the present community engagement activity therefore lies in the contextual integration of digital Mind Mapping, teacher digital capacity building, and Islamic education curriculum representation within a madrasah setting. While previous digital-literacy initiatives have commonly emphasized general technological competence or media production, this activity places curriculum content at the center of the digital design process. Digital Mind Mapping is treated not merely as software to be mastered but as a pedagogical tool through which madrasah teachers can reorganize and visualize curricular knowledge. This curriculum-oriented perspective provides a more contextually grounded approach to digital capacity building in Islamic primary education.

The activity was conducted at MI Al-Islamiyah Wonoplintahan, Prambon, Sidoarjo, involving madrasah teachers as the principal educational partners. The institutional context is relevant because the program addresses digital pedagogical development within an authentic Islamic primary education environment rather than separating technology training from teachers' curricular responsibilities. Accordingly, the program seeks to bridge the relationship among digital competence, pedagogical practice, and Islamic education curriculum needs.

Therefore, this community engagement activity aimed to strengthen madrasah teachers' capacity to integrate digital Mind Mapping into curriculum-oriented learning media, with particular relevance to the Islamic education curriculum. Specifically, the activity sought to facilitate teachers' understanding of digital Mind Mapping as a pedagogical tool, support the organization and visualization of curricular concepts,

provide guided experience in developing curriculum-aligned digital learning resources, and identify practical implications for strengthening digital pedagogical capacity in madrasah education. Through this orientation, the program contributes to a more contextual approach to educational digitalization in which technological innovation remains connected to pedagogy, curriculum, and the distinctive educational environment of the madrasah.

2. METHOD

2.1 Community Engagement Design

This community engagement program employed a participatory training and mentoring approach to strengthen teachers' capacity to use technology-based learning media at MI Al-Islamiyah, Prambon, Sidoarjo. The activity was designed in response to the partner school's need to strengthen teachers' awareness, knowledge, and practical experience in utilizing educational technology. The official community engagement report identifies the activity as a teacher competency development program focusing on technology-based learning methods at MI Al-Islamiyah.

The program combined presentation, discussion, demonstration, and hands-on practice. Digital Mind Mapping was selected as the principal learning-media approach because it enabled teachers to organize curricular content into structured visual representations while simultaneously developing familiarity with technology-supported instructional design. The activity therefore emphasized practical capacity building rather than experimental intervention.

The implementation consisted of five interconnected stages: (1) technology and pedagogical orientation, (2) identification of teachers' instructional challenges through discussion, (3) selection and introduction of appropriate educational technology, (4) guided practice in developing Mind Mapping-based learning media, and (5) review of the developed work and program evaluation. These stages correspond directly to the implementation procedure documented in the original community engagement report.

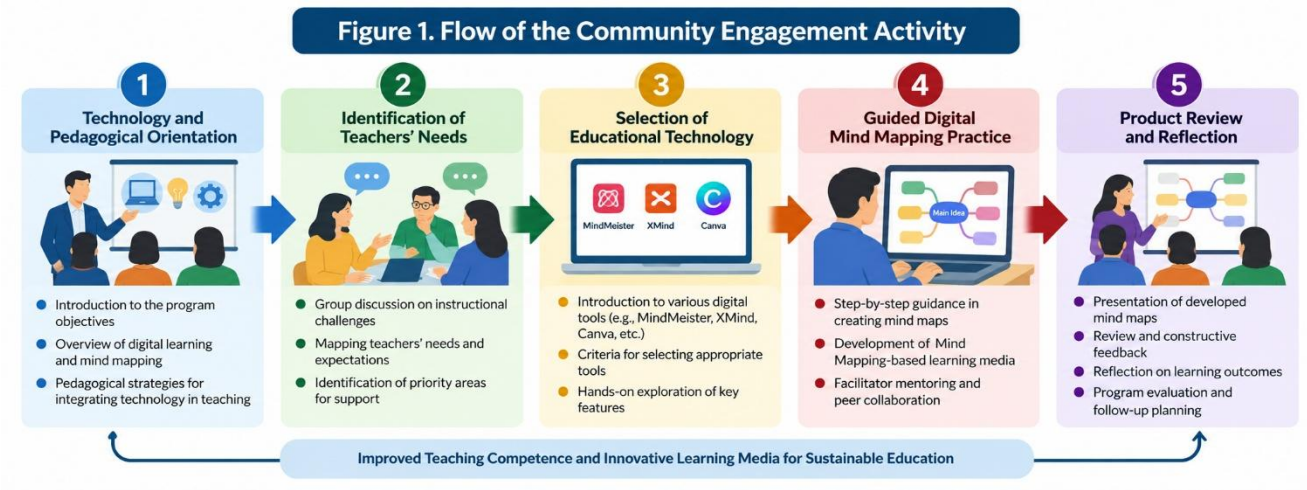

Figure 1. Flow of the Community Engagement Activity

Figure 1 illustrates the systematic flow of the community engagement activity, which was organized into five interconnected stages. The activity began with technology and pedagogical orientation to establish participants' understanding of digital learning and the pedagogical role of technology. This was followed by identifying teachers' instructional needs through collaborative discussion, allowing the facilitators to map existing challenges and priority areas for support. Based on these identified needs, appropriate educational technologies were selected and introduced to the participants. The fourth stage emphasized guided hands-on practice, during which participants developed Mind Mapping-based learning media with facilitator assistance and peer collaboration. Finally, the developed products were presented, reviewed, and reflected upon to identify areas for improvement and evaluate the overall implementation of the program. Collectively, these interconnected stages demonstrate that the activity was designed not merely as

technology training, but as a needs-based capacity-building process that connected pedagogical orientation, practical digital competence, product development, and reflective evaluation to strengthen teachers' capacity to create innovative learning media.

2.2 Activity Setting and Participants

The activity was conducted within the academic environment of FTIK IAIN Kendari, Southeast Sulawesi, as part of an international conference addressing contemporary and transformative educational issues. The forum provided an institutional setting for academic dissemination and professional exchange concerning educational transformation, sustainable futures, character development, cultural identity, and global citizenship.

The community engagement activity was conducted at MI Al-Islamiyah Wonoplintahan, Prambon, Sidoarjo, East Java, a private Islamic primary education institution. The madrasah context was selected because it provided an authentic educational setting in which technological capacity building could be connected directly with curriculum implementation and the pedagogical characteristics of Islamic primary education. The previous manuscript identifies the institution as a community-based private Madrasah Ibtidaiyah and reports the involvement of twelve instructional staff members.

The participants were 12 madrasah teachers representing different teaching responsibilities and educational backgrounds. Their involvement was based on their role as educators within the partner institution rather than on experimental sampling or assignment to treatment and control groups. The diversity of teaching responsibilities was relevant to the activity because digital Mind Mapping could be explored across different curricular contents while maintaining particular attention to Islamic education-related subjects. Instead of treating demographic characteristics as variables for statistical comparison, participant characteristics were used only to understand the educational context and to adapt the capacity-building process to teachers' professional needs. Accordingly, detailed age, gender, and percentage distributions were not used to infer differences in training outcomes.

Table 1. Context of the Community Engagement Activity

Component	Description
Partner institution	MI Al-Islamiyah
Location	Prambon, Sidoarjo, East Java
Educational context	Islamic primary education/madrasah
Participants	12 madrasah teachers
Program orientation	Teacher competency development
Main activity	Technology-based learning-media training
Main pedagogical approach	Mind Mapping
Implementation format	Presentation, discussion, demonstration, and guided practice
Curriculum orientation	Integration of digital learning media with teachers' curricular content

This contextual description provides the basis for understanding the implementation of the activity without positioning the participating teachers as experimental research subjects.

2.3 Implementation Procedures

To provide a clearer overview of the implementation process, the five stages described above are synthesized into a sequential framework that illustrates the progression of the community engagement activity from initial orientation to final reflection. The framework emphasizes that the activity was not limited to introducing digital tools but was organized as a needs-based capacity-building process in which technological orientation, identification of teachers' instructional challenges, selection of appropriate educational technology, guided practice, and evaluation were systematically interconnected. The overall implementation procedure is presented in Figure 2.

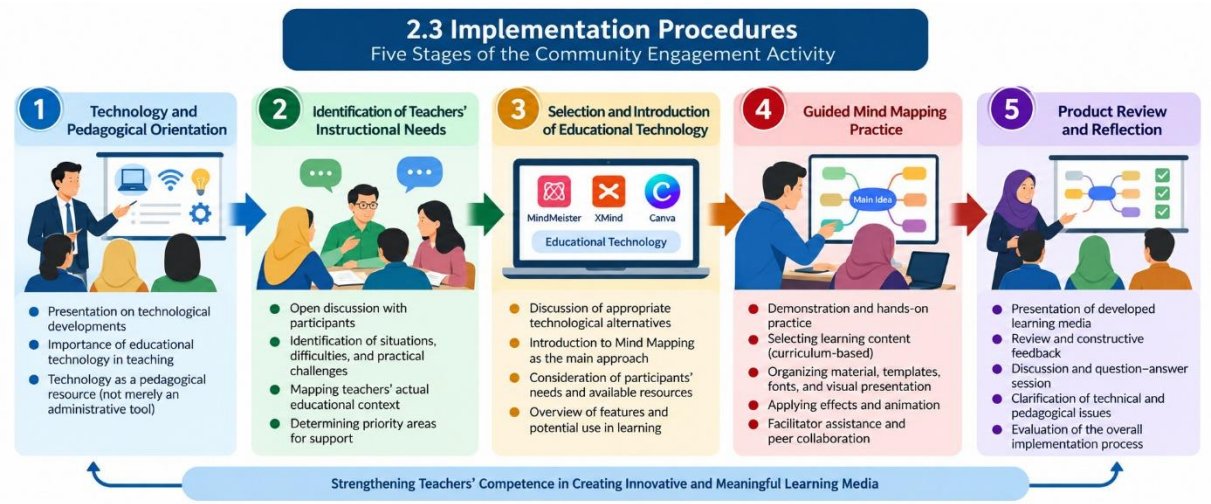

Figure 1. Five-Stage Implementation Procedure of the Community Engagement Activity

As illustrated in Figure 1, the implementation followed a progressive five-stage sequence. The first stage established participants' conceptual understanding of technology as a pedagogical resource, while the second stage identified teachers' actual instructional needs and challenges through participatory discussion. The third stage connected these identified needs with the selection and introduction of appropriate educational technology, with Mind Mapping serving as the principal approach for organizing instructional content. This foundation was subsequently translated into hands-on experience in the fourth stage, where teachers developed Mind Mapping-based learning media by organizing curricular content and considering templates, fonts, visual presentation, effects, and animation. The fifth stage completed the process through product presentation, review, discussion, question-and-answer activities, and reflection on both technical and pedagogical aspects of the developed media. Thus, the five stages formed an interconnected capacity-building cycle that moved participants from conceptual orientation and needs identification toward practical media development and reflective evaluation, with the broader objective of strengthening teachers' competence in creating innovative and meaningful learning media.

Stage 1: Technology and Pedagogical Orientation. The activity began with a presentation introducing technological developments and the importance of utilizing appropriate educational technology to support teaching and teacher professional competence. This stage provided participants with a conceptual foundation for understanding technology as a pedagogical resource rather than merely as an administrative tool. The original activity report documents the presentation of technological developments and their relevance to educational improvement as the first stage of the program.

Stage 2: Identification of Teachers' Instructional Needs. An open discussion was conducted to identify the situations, difficulties, and practical challenges experienced by teachers in classroom instruction. This stage allowed the activity to respond to the participants' actual educational context rather than introducing technology without consideration of their needs.

Stage 3: Selection and Introduction of Educational Technology. Based on the identified needs and available resources, the facilitator and participants discussed appropriate technological alternatives for learning. Mind Mapping was subsequently introduced as the principal approach for organizing and presenting instructional content. The process reflected the original activity sequence in which participants were first introduced to technological alternatives before engaging in more intensive Mind Mapping practice.

Stage 4: Guided Mind Mapping Practice. Teachers participated in demonstrations and practical exercises for developing Mind Mapping-based learning media. The practice included selecting learning content, organizing material, choosing templates and fonts, and considering visual presentation, effects, and animation. The activity report confirms that the face-to-face program combined lectures and demonstrations with exercises involving these practical media-development components.

Within the revised article, this stage is interpreted through a curriculum-oriented perspective. Teachers' curricular content became the basis for constructing Mind Maps, while Islamic education provides an important contextual domain because the activity took place within a Madrasah Ibtidaiyah. However, the article does not claim that every product developed during the activity exclusively addressed Islamic Education subjects unless this is demonstrated by the available documentation.

Stage 5: Product Review and Reflection. The final stage consisted of reviewing the learning media developed during the practice and evaluating the implementation process. Discussion and question-and-answer activities also provided opportunities for participants to clarify technical and pedagogical issues encountered during media development. Documented participant questions addressed matters such as appropriate learning-media design, efficient media preparation, layout, fonts, backgrounds, tables, effects, animation, and presentation settings.

Table 2. Implementation Stages and Documented Activities

Stage	Main Activity	Educational Focus	Evidence/Output
1. Technology and Pedagogical Orientation	Presentation on technology in education	Awareness of educational technology	Presentation/activity documentation
2. Identification of Teachers' Needs	Open discussion of classroom challenges	Contextual teacher needs	Questions and discussion
3. Technology Selection	Introduction and selection of learning technology	Appropriate technology for teaching	Mind Mapping selected as the principal approach
4. Guided Mind Mapping Practice	Demonstration and hands-on media development	Curriculum-oriented visual learning media	Teachers' practice/work
5. Product Review and Reflection	Review, Q&A, and evaluation	Technical and pedagogical reflection	Reviewed work and documented participant questions

2.4 Activity Documentation and Data Analysis

The revised article employed a descriptive qualitative analysis of documented community engagement activities rather than an experimental pre-test/post-test design. The primary evidence consisted of the official community engagement report, institutional documentation, activity photographs, training materials, documented implementation procedures, participants' questions during the activity, and follow-up communication where available and relevant.

The documentation was organized according to the five implementation stages and subsequently analyzed to identify recurring educational themes. Four analytical categories were used: (1) teachers' needs for technology-supported learning, (2) development of practical digital-media skills through Mind Mapping, (3) curriculum-oriented organization and visualization of learning content, and (4) challenges and sustainability needs for technology integration in the madrasah context.

The analysis distinguished between directly documented results and educational interpretations. For example, participant questions, hands-on practice, and the development or review of learning media were treated as documented aspects of program implementation. In contrast, broader implications concerning TPACK, digital competence, visual learning, and Islamic education curriculum integration were interpreted through relevant literature and are discussed as pedagogical implications rather than direct causal effects of the program.

3. RESULTS

3.1 Implementation Context and Initial Teacher Needs

The community engagement activity was implemented at MI Al-Islamiyah, Prambon, Sidoarjo, as a teacher capacity-building program focused on the use of technology-supported learning media. The official documentation identifies the partner institution as MI Al-Islamiyah and records the involvement of its teachers as the primary participants in the activity. The program was developed in response to a practical

institutional need to strengthen teachers' awareness and ability to use technology in classroom learning, particularly in a private madrasah context where access to professional development and educational technology may be more limited than in larger institutions. The activity did not begin by assuming that teachers required advanced software training; instead, it started from the more basic need to introduce the relevance of technology in education and to identify the concrete instructional difficulties experienced by teachers. The official implementation sequence confirms that the initial stages involved presenting information about technological developments and the importance of appropriate educational technology, followed by an open discussion in which teachers could communicate the situations and difficulties they encountered in teaching. This sequence is significant because it shows that the program adopted a needs-oriented approach rather than imposing a predetermined technological solution. The training therefore functioned as an initial bridge between teachers' existing classroom practices and possible technology-supported alternatives. The documentation also indicates that the activity was designed as a short-term community engagement program that required commitment from both the institution and the teachers if it was to produce longer-term benefits. From the perspective of the present article, this finding establishes the institutional and pedagogical context for the subsequent Mind Mapping activity and explains why technology integration was treated as a capacity-building issue rather than as a purely technical matter.

Figure 2. Institutional Coordination and Preparation for the Community Engagement Activity at MI Al-Islamiyah

3.2 Transition from Technology Orientation to Mind Mapping Practice

The second important result concerns the transition from general technological awareness toward practical exploration of Mind Mapping as a learning-media approach. The documented activity did not stop at presenting the importance of information and communication technology; it progressed toward the selection of a specific learning-media strategy that could be introduced to teachers within the available time and resource conditions. According to the activity report, the program included several main topics: an introduction to the importance of technology in education, basic theory of learning media, selection of technology-based learning media appropriate to participants' needs and abilities, steps for preparing and developing Mind Mapping-based learning media, practical media-development exercises, and evaluation of the media that had been prepared. This sequence demonstrates that Mind Mapping was not introduced as an isolated application but as part of a broader learning-media development process. The practical activities required teachers to work with learning content and to consider how that content could be selected, organized, and visually presented. The report specifically records that the practice involved choosing learning materials, arranging content, selecting templates and fonts, adding effects and animation, and creating an attractive visual presentation. These activities provide direct evidence that the training moved beyond conceptual explanation toward hands-on media design. At the same time, the evidence does

not support a claim that all participants mastered a standardized digital authoring tool or produced validated final products. The most defensible interpretation is that teachers were given structured exposure to the process of converting lesson content into more visually organized learning media. This result is particularly relevant to the revised focus of the article because it demonstrates how digital Mind Mapping can function as a practical bridge between technology and curriculum-oriented instructional design in a madrasah environment.

Figure 3. Mind Mapping Concepts and Practical Guidance Used in the Teacher Capacity-Building Activity

3.3 Curriculum-Oriented Development of Visual Learning Media

A third result is the emergence of curriculum-oriented media development as a central feature of the training process. The activity documentation shows that teachers were not simply introduced to generic digital tools; they were guided to work with learning materials and reorganize them into Mind Mapping-based visual structures. This distinction is important because it shifts the focus from software familiarity to pedagogical representation of curriculum content. The supporting training material included explanations of what a Mind Map is, its purposes, its usefulness for organizing ideas, the materials or resources needed to construct one, and practical steps for developing a map. The visual materials also introduced principles such as beginning from a central topic, using branches, employing different colors, using curved lines, applying keywords, and adding images. These elements provided a concrete framework through which teachers could translate text-dominated content into more structured visual relationships. In the context of a Madrasah Ibtidaiyah, this process is particularly relevant because teachers work with subjects that often contain interconnected concepts, classifications, values, examples, and sequences. The revised article therefore interprets the activity as having particular relevance to the Islamic education curriculum, while recognizing that the participating teachers represented multiple subject areas rather than Islamic Education alone. The result should not be described as proof that Mind Mapping improved student learning outcomes, because the available documentation does not contain standardized classroom achievement data. Instead, the strongest documented outcome is that teachers were introduced to and engaged with a curriculum-oriented method of organizing and visualizing learning content. This provides an important foundation for subsequent professional development because it positions educational technology as a means of representing subject matter rather than as an end in itself. In this sense, the activity contributes to a more pedagogically grounded form of digital capacity building in which the teacher begins with curriculum content and then selects visual and technological features to support its presentation.

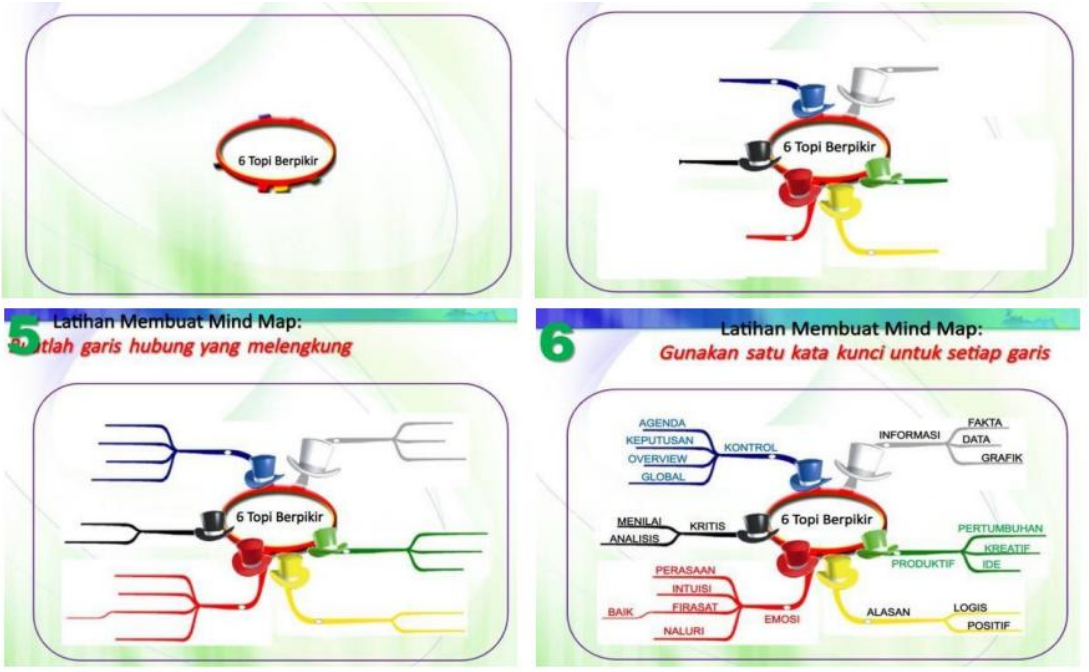

Figure 4. Step-by-Step Mind Mapping Exercise Used to Support Visual Organization of Learning Content

3.4 Teachers' Questions as Evidence of Practical Capacity-Building Needs

The fourth result emerged from the question-and-answer process documented during the activity. The participants' questions provide valuable evidence because they reveal the kinds of practical support teachers actually required during technology-based learning-media development. The report records that teachers asked about the requirements for preparing good learning media, procedures for developing media quickly and efficiently, appropriate selection of layout, fonts, and backgrounds, creation of tables in presentation slides, incorporation of sound effects and animation, and management of presentation settings. These questions indicate that the participating teachers' needs were multidimensional. Some concerns were technical, such as how to change layouts or configure presentation settings, while others were related to visual communication and pedagogical usability, such as choosing appropriate typography or organizing media effectively. This pattern is important because it demonstrates that teacher digital capacity cannot be reduced to the ability to operate a device or open a software application. Teachers also need guidance on how visual and technical decisions influence the readability, clarity, and instructional usefulness of the media they create. The activity therefore identified a practical gap between general awareness of educational technology and the ability to make informed design decisions during actual media production. The questions also confirm that the workshop provided space for interaction and clarification rather than functioning as a one-way lecture. The report notes that participants were actively involved in question-and-answer exchanges concerning the problems they encountered during the training. For the revised article, these documented questions are more useful than unsupported satisfaction scores or pre-test/post-test statistics because they constitute authentic evidence of participant needs. They also provide a basis for designing future capacity-building activities that differentiate between technical, visual-design, curricular, and pedagogical forms of support.

Table 3. Documented Teacher Questions and Identified Capacity-Building Needs

Documented Question	Capacity-Building Need	Pedagogical Relevance
Requirements for good learning media	Media-design principles	Alignment between content and presentation
Developing media efficiently	Technical workflow	Practical teacher productivity
Layout, font, and background selection	Visual design	Readability and clarity
Creating tables in slides	Information organization	Structured presentation
Sound and animation effects	Multimedia skills	Appropriate multimedia use
Presentation settings	Technical operation	Classroom usability

3.5 Follow-Up Engagement and Emerging Independent Practice

A fifth result concerns participant engagement beyond the formal activity. The original report records that teachers continued to contact the facilitator after the training through short messages to ask questions about material they had not fully understood and to request additional references for further study. This follow-up communication is important because it indicates that the formal session did not completely resolve participants' learning needs and that some teachers sought further clarification independently. Such behavior can be interpreted as evidence of continued interest and willingness to practice, although it should not be treated as a standardized measure of motivation, self-efficacy, or competence. The documentation also includes informal reports from several teachers through messages and telephone communication suggesting that, after using Mind Mapping-based media, classroom learning appeared more enjoyable and sustained learner attention for longer periods. The same informal communication mentioned perceived improvement in learning performance. These observations are potentially valuable because they suggest that teachers attempted to apply the learning-media approach beyond the training session. However, the evidence is anecdotal and was not obtained through structured classroom observation, validated student questionnaires, or standardized achievement tests. For this reason, the revised article should describe these statements as **preliminary practitioner feedback** rather than as confirmed learning outcomes. The strongest result is therefore not that student achievement improved, but that some teachers reportedly experimented with the media after the activity and continued to communicate with the facilitator. This finding also highlights the need for a structured follow-up mechanism in future community engagement programs. If subsequent activities include documented teacher portfolios, classroom observation, reflective journals, or follow-up mentoring sessions, the transition from training participation to actual classroom implementation could be examined more systematically.

3.6 Implementation Constraints and Sustainability Needs

The final major result concerns the constraints that affected the implementation and sustainability of the capacity-building activity. The report clearly states that limited meeting time prevented all planned material from being delivered in depth. In addition, device availability was not uniform: teachers who owned laptops used their own devices, while those without individual laptops worked collaboratively, and a projector was used to support the presentation and demonstration process. These conditions are important because they show that practical technology training in a private madrasah must be adapted to the resources actually available to participants. Beyond immediate implementation issues, the broader discussion in the activity report identifies several structural challenges, including variation in teacher competence and skills, the need for continuous mentoring, limited access to affordable internet infrastructure, and broader concerns related to teacher welfare and institutional support. The report also specifically emphasizes the importance of more accessible internet support for private educational institutions and the need for continued assistance to enable teachers to develop their professional capacities. These findings indicate that one-off training can function effectively as an introduction, but sustainable digital integration requires a broader support system. Teachers need repeated opportunities to practice, accessible devices and connectivity, institutional encouragement, and channels for continued consultation. The result therefore shifts the interpretation of program success away from a short-term claim of "effectiveness" and toward a more realistic understanding of professional development as an ongoing process. In the context of Islamic primary education, this also means that digital innovation should be developed gradually and in accordance with institutional capacity, curricular needs, and the practical conditions faced by teachers.

Table 4. Implementation Constraints and Follow-Up Directions

Documented Condition	Implication	Follow-Up Direction
Limited activity time	Not all material could be explored in depth	Periodic follow-up training
Unequal access to personal devices	Some teachers required collaborative work	Shared-device and school-resource strategy
Different levels of digital familiarity	Teachers require different levels of support	Differentiated mentoring

Continued questions after training	One session was insufficient	Online/offline follow-up mentoring
Internet and infrastructure limitations	Digital practice may be difficult to sustain	Institutional infrastructure support

4. DISCUSSION

The findings of this community engagement activity indicate that strengthening digital pedagogical capacity in a madrasah context requires more than introducing teachers to technological applications. The documented implementation shows that participating teachers needed support in understanding how technology could be connected with actual instructional tasks, particularly the selection, organization, visualization, and presentation of learning content. The activity therefore moved from a general orientation to educational technology toward discussion of classroom difficulties, selection of an appropriate technological approach, guided Mind Mapping practice, and reflection on the resulting media. This sequence is significant because it positions technology as a pedagogical resource rather than as an independent technical objective. Such an interpretation is consistent with the Technological Pedagogical Content Knowledge framework proposed by Mishra and Koehler (2006), which emphasizes that meaningful technology integration emerges through the interaction of technological knowledge, pedagogical knowledge, and content knowledge. In the present activity, Mind Mapping represented the technological and visual-design component, while teachers' actual learning materials provided the content component and the organization of those materials for classroom use provided the pedagogical component. Unlike the previous version of the manuscript, however, the present findings do not claim that the activity empirically validated TPACK or produced measurable improvements in teachers' digital competence. The available evidence instead demonstrates that the activity created a practical setting in which technology, pedagogy, and curriculum content were brought together. This more proportional interpretation is important because the old Discussion claimed profound cognitive reorientation and direct transformation of classroom dynamics. Such claims cannot be maintained without validated pre/post measurements or systematic classroom observation.

A second important finding concerns the nature of teachers' digital learning needs. The documented participant questions focused on criteria for good learning media, efficient media development, selection of layouts, fonts, and backgrounds, preparation of tables, use of sound and animation, and management of presentation settings. These questions demonstrate that teacher digital competence is multidimensional. Teachers may know that technology is important but still require practical support to decide how information should be arranged, which visual elements are appropriate, and how digital features should be used without reducing the clarity of the learning material. This finding is consistent with previous research on teacher digital competence. Redecker (2017), through the DigCompEdu framework, conceptualizes educators' digital competence as extending beyond technical operation toward the pedagogical use of digital resources, teaching and learning, assessment, learner empowerment, and professional engagement. Similarly, Instefjord and Munthe (2017) argue that professional digital competence should be integrated with pedagogical practice rather than treated as a separate technical domain. The present activity supports these perspectives in a small-scale private madrasah setting. However, it also contributes a contextual nuance: teachers' immediate needs were highly practical and closely tied to media construction. This suggests that capacity-building programs for madrasah teachers should avoid beginning with highly abstract technological frameworks alone. Instead, professional learning can be more relevant when abstract digital-competence principles are translated into authentic tasks such as organizing a lesson topic, selecting keywords, creating visual relationships, and preparing media that teachers can recognize as directly related to their daily work.

The use of Mind Mapping as the central pedagogical medium also deserves particular attention. The training materials documented in the activity introduced Mind Mapping through its definition, functions, visual principles, and practical procedures, including the use of a central topic, branches, colors, curved lines, keywords, and images. From a cognitive perspective, these features are compatible with established

principles of multimedia learning and cognitive load management. Mayer (2021) argues that learning from words and visuals can be enhanced when information is organized in ways that support meaningful processing, while Sweller, van Merriënboer, and Paas (2019) emphasize the importance of instructional design that avoids unnecessary cognitive load. The present activity cannot be used to claim that Mind Mapping reduced learners' cognitive load because this variable was not measured. Nevertheless, the process of reducing long textual material into central concepts, branches, and keywords is conceptually aligned with those theories. The significance of the activity therefore lies not in "proving" cognitive theory but in translating broad cognitive principles into an accessible teacher-development practice. This interpretation is more defensible than the previous Discussion, which claimed that classroom trials empirically substantiated Dual Coding Theory and Cognitive Load Theory. The revised discussion instead recognizes Mind Mapping as one possible visual-organization strategy whose actual effect on student understanding would require separate classroom-based evaluation.

The curriculum dimension provides one of the strongest contributions of this article. The revised paper positions digital Mind Mapping not merely as a generic digital literacy tool but as a mechanism for curriculum representation, with particular relevance to the Islamic education curriculum. This distinction is important because Islamic education content often involves relationships among concepts, values, sources, practices, examples, historical developments, and applications. A visual map can potentially help teachers display these relationships more explicitly than continuous textual explanation alone. At the same time, the present activity involved teachers from different subject areas; therefore, it would be inappropriate to claim that the entire program was exclusively designed for Islamic Education. The more accurate interpretation is that the madrasah setting gives Mind Mapping particular relevance for Islamic education while retaining applicability across the wider curriculum. Compared with conventional digital training, this curriculum-oriented perspective strengthens the pedagogical basis of the activity because it begins with what teachers teach rather than with what the software can do. Tondeur et al. (2012) similarly emphasized that technology integration becomes more meaningful when technological experience is connected with pedagogical practice, authentic teaching tasks, and reflection. The present activity reflects the same principle at a community-service scale: participants first identified their instructional situations, were introduced to technological alternatives, practiced Mind Mapping with learning content, and subsequently discussed practical media-design issues. The contribution is therefore not the invention of a new instructional theory but the contextual translation of existing technology-integration principles into the daily reality of a private Islamic primary school.

This curriculum-oriented approach also differentiates the present activity from the stronger claims contained in the old Discussion. The previous version argued that the program established a formal instructional design model for primary Islamic education and demonstrated exceptional suitability for abstract theological concepts such as Akidah and Fiqh. Such conclusions go beyond the evidence currently available. The revised interpretation should be more modest but also more credible: the activity demonstrates that Mind Mapping can be explored as a visual organization strategy for Islamic education curriculum content, but the relative effectiveness of this approach for Akidah, Fiqh, Qur'an-Hadith, or other subjects has not yet been empirically compared. This distinction is important for scholarly rigor. Rather than presenting the community engagement activity as final proof of an instructional model, the current article positions it as an initial capacity-building experience that generates a plausible pedagogical direction for subsequent development. Future studies could specifically examine how teachers represent Islamic concepts through Mind Maps, whether visual mapping supports conceptual relationships in Qur'an-Hadith or Islamic history, and how learners respond to these forms of representation. Such work would move the present article from a descriptive community-engagement contribution toward a more specialized evidence base for Islamic educational technology.

Another significant finding relates to teacher engagement during and after the formal activity. The report documents active questions during the training and subsequent communication through short messages in which teachers requested clarification and additional learning references. This follow-up behavior is useful evidence because it suggests that the activity stimulated continued learning needs beyond the scheduled session. However, it should not be interpreted as a validated increase in motivation, confidence,

self-efficacy, or professional autonomy. The old Discussion made precisely this mistake by describing a psychological transition from technophobia to sustained self-directed experimentation and pedagogical joy. The available evidence supports a narrower conclusion: participants raised practical questions and some continued seeking assistance after the activity. This interpretation is nevertheless educationally meaningful. It suggests that short-term training may function as an entry point into professional learning, while continued mentoring is required to support actual competence development. This is consistent with Ertmer and Ottenbreit-Leftwich (2010), who emphasize that teacher technology change is influenced by knowledge, confidence, beliefs, culture, and contextual support rather than by access to tools alone. Thus, the follow-up communication recorded in this program strengthens the argument for designing community engagement as a continuum rather than as a one-time event.

The program also revealed the importance of guided practice in teacher professional development. The original report records that the activity began with lecture and demonstration and then continued with practice in selecting learning materials, arranging content, and designing visual media. This practical orientation aligns with previous research suggesting that teachers are more likely to develop meaningful technology-integration practices when professional development includes authentic tasks, opportunities to experiment, and pedagogical reflection rather than only abstract explanation. Tondeur et al. (2012) identified modeling, authentic experience, collaboration, and reflection as important elements in preparing educators for technology integration. The present activity provides contextual support for this perspective. At the same time, the results reveal that guided practice must be calibrated to participants' conditions. Some teachers had access to personal laptops, whereas others needed to work collaboratively, and the training relied on a projector to support demonstration. These conditions remind us that professional-development models developed in technology-rich environments cannot always be transferred directly to smaller private madrasahs. Capacity building must be adapted to available hardware, digital familiarity, time, and institutional support.

Infrastructure and institutional context represent another major issue arising from the activity. The report identifies unequal teacher competence, limited access to affordable internet, the need for continued mentoring, and broader institutional challenges affecting private educational institutions. These findings are consistent with broader research showing that educational technology adoption is not determined solely by individual teacher willingness. Ertmer and Ottenbreit-Leftwich (2010) demonstrate that knowledge, confidence, beliefs, and school culture interact in shaping teachers' technology use. The present community engagement activity adds a practical illustration from the private madrasah context, where infrastructure and institutional capacity may constrain the sustainability of digital initiatives. Importantly, this differs from the old manuscript's claim that the primary challenge was not hardware but pedagogical competence and that targeted intervention had already resolved the digital divide. The revised evidence suggests a more complex relationship. Teacher capacity, device availability, internet access, time, institutional commitment, and continued support are interdependent. Sustainable integration therefore requires a combination of human-resource development and institutional support rather than a single solution.

The issue of sustainability is especially important because the community engagement activity was relatively short. The official documentation and schedule indicate a concentrated program rather than the five-day longitudinal intervention described in the old paper. Therefore, claims of permanent institutional transformation, sustained professional culture, or fully autonomous digital media production would be inappropriate. Instead, the activity should be positioned as the first stage of a longer professional-learning pathway. A reasonable progression would be: orientation and needs identification → guided Mind Mapping practice → independent teacher product development → peer review → classroom application → reflective evaluation → continued mentoring. The present program primarily documented the first three components and some early follow-up communication. This distinction strengthens the article because it converts a limitation into a concrete development agenda. Future community engagement can create structured teacher portfolios, establish periodic mentoring sessions, document products generated by teachers, and observe their use in actual classrooms. If these activities are then accompanied by appropriate evaluation instruments, stronger claims regarding competence, confidence, instructional

change, and student outcomes could be justified.

The informal teacher reports concerning classroom use must also be interpreted carefully. The activity report notes that some teachers communicated through WhatsApp or telephone that learning appeared more enjoyable after using Mind Mapping and that there may have been improvement in student learning results. These statements are valuable as practitioner perceptions because they suggest that at least some participants attempted to transfer the training into practice. However, they cannot substitute for systematic classroom data. The old manuscript reported dramatic student score increases and described enhanced conceptual retention as an empirical outcome. Such claims are not warranted by the available evidence. The revised discussion therefore distinguishes perceived classroom benefit from measured learning effectiveness. This distinction is essential in community-engagement research because practitioner testimony can provide exploratory evidence and identify directions for follow-up, but standardized assessment, classroom observation, and appropriate comparison are required before causal conclusions can be made. Future work could therefore examine whether Mind Mapping-based Islamic education materials affect conceptual understanding, student participation, retention, or learning achievement through more rigorous designs.

The comparison with previous research reveals both convergence and contextual contribution. The activity converges with Mishra and Koehler (2006) by integrating technological, pedagogical, and content considerations; with Redecker (2017) and Instefjord and Munthe (2017) by treating digital competence as a pedagogical rather than merely technical capability; with Mayer (2021) and Sweller et al. (2019) by emphasizing structured visual presentation; and with Tondeur et al. (2012) by highlighting authentic practice and reflection in teacher professional learning. The contextual contribution lies in applying these ideas within a small private Madrasah Ibtidaiyah and linking digital Mind Mapping explicitly with curriculum representation, including Islamic education content. The contribution is therefore one of contextual integration rather than empirical validation of a new model. This is a more defensible scholarly position than the previous claim that the intervention provided a pioneering, highly replicable, empirically grounded roadmap for national Islamic education modernization.

From a practical perspective, the results suggest that madrasah-based digital capacity building should begin with teachers' real curricular and instructional needs. Technology training should provide simple, usable tools; allow teachers to practice with content they actually teach; create space for questions and collaborative problem solving; and include post-training mentoring. Mind Mapping is suitable for such a capacity-building approach because its basic structure can be introduced without requiring highly sophisticated hardware or software, while its educational use can be progressively developed. However, practitioners should avoid equating visually elaborate media with pedagogically effective media. The quality of a Mind Map depends on the accuracy of the curriculum content, clarity of conceptual relationships, appropriateness of visual elements, and relevance to instructional goals.

From an institutional and policy perspective, the findings support stronger collaboration among madrasahs, universities, teacher working groups, and relevant education authorities. The original report itself emphasizes the importance of continued mentoring and improved access to technology and internet services for private institutions. Universities can contribute through periodic community engagement, curriculum-based design clinics, mentoring, and documentation of teacher-created learning resources. Madrasah leadership can support sustainability by allocating time for collaborative media development and encouraging teachers to share their practices. Teacher working groups may further provide peer-based spaces in which educators exchange examples, discuss problems, and revise digital learning materials. These directions are more proportionate than the old Discussion's recommendation to immediately adopt standardized field guides, national repositories, and formalized training blueprints.

Finally, intellectual property should not be presented as an outcome unless actual registration documents exist. The old Discussion stated that training handbooks and digital media collections had been officially registered with the Directorate General of Intellectual Property and treated this as evidence of institutional asset creation. The available community engagement report does not provide sufficient documentation to support that claim. The revised article should therefore omit HKI as a reported result.

If teacher-developed media are subsequently refined and formally registered, this may be reported in future dissemination. At present, the scholarly contribution of the program rests more credibly on the documented training process, teacher questions, practical Mind Mapping exercises, follow-up communication, and identification of contextual constraints.

Overall, this community engagement activity demonstrates that technology-based professional development in a private madrasah can be meaningfully organized around curriculum-oriented practice rather than generic software training. Digital Mind Mapping provided a concrete medium through which teachers could explore the relationship between learning content, visual organization, and technology. The activity also revealed that sustainable digital transformation depends on more than a single training session; it requires continued mentoring, infrastructure, institutional support, opportunities for practice, and systematic classroom evaluation. For Islamic education specifically, the activity opens a relevant pedagogical direction by showing how curricular concepts can potentially be represented through structured visual relationships. However, the effectiveness of this approach for particular Islamic education subjects and learner outcomes remains an empirical question for future study. This evidence-proportionate interpretation strengthens the academic credibility of the article while preserving the practical value of the community engagement activity.

5. CONCLUSION

5.1 Conclusion

This community engagement activity demonstrated that digital pedagogical capacity building in a private madrasah can be developed effectively when technology training is connected directly with teachers' authentic curricular and instructional needs. The program at MI Al-Islamiyah moved from technology orientation and discussion of teachers' classroom difficulties toward the selection of an appropriate technological approach, guided Mind Mapping practice, review of developed media, and reflective follow-up. The documented results show that participating teachers engaged with practical aspects of learning-media development, including content selection, visual organization, layout, typography, background, table construction, animation, sound, and presentation settings. The activity also generated continued communication after the formal training, indicating that some participants still required clarification and additional references, which reinforces the need for ongoing professional support.

The principal contribution of the activity lies in positioning digital Mind Mapping as a practical bridge between technology, pedagogy, and curriculum representation, with particular relevance to the Islamic education curriculum in a Madrasah Ibtidaiyah context. Mind Mapping provided teachers with a structured way to reorganize learning content into central concepts, branches, keywords, colors, and visual relationships. The training materials themselves documented these visual principles and practical procedures. However, the activity should not be interpreted as experimental proof that teacher competence or student achievement increased, because the available evidence does not include validated pre-test/post-test measurements or systematic classroom observations. The most appropriate conclusion is that the program created an initial and contextually relevant capacity-building process that can support further integration of digital learning media into madrasah teaching, provided that follow-up mentoring, institutional support, and classroom-based evaluation are continued.

5.2 Recommendations

Based on the documented implementation, future community engagement programs should extend the initial training into a more sustained professional-development sequence. Periodic mentoring, curriculum-based design clinics, peer review of teacher-developed media, and follow-up classroom implementation are recommended so that teachers have repeated opportunities to strengthen both technical and pedagogical skills. This recommendation is consistent with the activity report, which identifies the need for continued mentoring and broader institutional support, including improved access to technology and internet services for private educational institutions. In addition, madrasah leadership should facilitate collaborative learning among teachers by allocating time for media development, encouraging sharing of digital resources, and supporting teachers with different levels of digital familiarity.

For future research, the effectiveness of digital Mind Mapping should be evaluated using more systematic evidence. Subsequent studies may employ validated instruments to assess teacher digital competence, authentic teacher products, classroom observation, student engagement measures, and learning outcomes before and after implementation. Particular attention should be given to the use of digital Mind Mapping within the Islamic education curriculum, including subjects such as Qur'an-Hadith, Akidah, Fiqh, Islamic history, or other relevant content areas. Such future work would make it possible to determine whether the approach merely supports visual organization or also contributes to deeper conceptual understanding, learner engagement, and classroom effectiveness. In this way, the present activity can serve as a foundation for a more evidence-based and sustainable model of digital pedagogical development in private madrasahs.

AUTHOR CONTRIBUTIONS, INSTITUTIONAL SUPPORT, AND DECLARATIONS

Akhmad Sirojuddin contributed to the conceptualization, preparation and implementation of the community engagement activity, coordination with the partner institution, activity documentation, analysis, and manuscript preparation, while **Rahmat Rahmat** contributed to the literature review, interpretation of the results, development of the discussion, and manuscript review and editing. The activity was conducted within the institutional community engagement framework of **Universitas KH. Abdul Chalim** in collaboration with **MI Al-Islamiyah, Prambon, Sidoarjo**, and the authors acknowledge both institutions for their support and cooperation. The authors declare no conflict of interest and no external funding that could have influenced the reporting of this work. No experimental intervention or sensitive personal data were used in the revised reporting, and all activity documentation was handled with due regard for academic integrity and participant privacy. Both authors reviewed and approved the final manuscript and accept responsibility for their respective contributions.

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