

SMARTPAI-Based TPACK Optimization for PAI Teachers in Implementing a Love-Based Curriculum

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Submission: 2026-02-19

Received: 2026-06-22

Published: 2026-06-30

Keywords: TPACK; Islamic Religious Education; SMARTPAI; Love-Based Curriculum; Inclusive Learning.

Abstract. *The digital transformation of education demands that Islamic Religious Education (PAI) teachers holistically integrate technology, pedagogy, and subject content. Field observations at MTs Islamiyah Balen, Bojonegoro, revealed that PAI teachers still rely predominantly on conventional lecture methods, have limited confidence in classroom technology use, and lack structured frameworks for designing value-based learning. This condition creates a gap between the humanistic demands of the Love-Based Curriculum and actual instructional practice. The community service program was implemented through a Participatory Action Research (PAR) approach comprising four stages: needs analysis, TPACK integration training, SMARTPAI application mentoring, and collaborative monitoring and evaluation. Partner teachers participated actively as co-collaborators at every stage. The results demonstrate measurable improvements: at least 75% of PAI teachers adopted SMARTPAI for material delivery and digital assessment; interactive media use increased to 2-4 sessions per thematic unit; each teacher developed a minimum of three digital content items; 85% of TPACK-based teaching modules were developed and 70% were implemented with a differentiated approach; and professional collaboration meetings were held monthly. These achievements indicate a significant shift from teacher-centered toward learner-centered instruction, fostering more dialogical, contextual, and character-oriented learning. Ongoing mentoring remains necessary to sustain consistency and deepen value internalization.*

Katakunci: TPACK, PAI, SMARTPAI, Kurikulum berbasis cinta, Pembelajaran inklusi.

Abstrak. *Transformasi digital dalam pendidikan menuntut guru Pendidikan Agama Islam (PAI) mampu mengintegrasikan teknologi, pedagogi, dan konten materi secara holistik. Observasi lapangan di MTs Islamiyah Balen, Bojonegoro, menunjukkan bahwa guru PAI masih dominan menggunakan metode ceramah konvensional, belum percaya diri dalam memanfaatkan teknologi di kelas, dan belum memiliki kerangka terstruktur untuk merancang pembelajaran berbasis nilai. Kondisi ini menciptakan kesenjangan antara tuntutan humanistik Kurikulum Berbasis Cinta dan praktik pembelajaran aktual. Program pengabdian kepada masyarakat dilaksanakan melalui pendekatan Participatory Action Research (PAR) dengan empat tahap: analisis kebutuhan, pelatihan integrasi TPACK, pendampingan implementasi aplikasi SMARTPAI, serta*

monitoring dan evaluasi kolaboratif. Guru mitra berperan aktif sebagai ko-kolaborator pada setiap tahap. Hasil menunjukkan peningkatan terukur: minimal 75% guru PAI mengadopsi SMARTPAI untuk penyediaan materi dan evaluasi digital; frekuensi penggunaan media interaktif meningkat menjadi 2-4 kali per tema; setiap guru mengembangkan minimal 3 konten digital; 85% modul ajar berbasis TPCK tersusun dan 70% diimplementasikan dengan pendekatan diferensiasi; serta pertemuan komunitas belajar profesional berlangsung rutin setiap bulan. Capaian ini menunjukkan pergeseran nyata dari pembelajaran berpusat pada guru menuju pembelajaran yang lebih dialogis, kontekstual, dan berorientasi penguatan karakter. Pendampingan berkelanjutan masih diperlukan untuk menjaga konsistensi dan pendalaman internalisasi nilai.

1 Introduction

The transformation of education in the digital era requires not only changes in infrastructure and curriculum content but also the enhancement of teachers' fundamental competencies in designing meaningful learning experiences. In the context of Islamic Religious Education (PAI), this challenge is particularly complex because instruction is not solely directed toward the mastery of normative concepts but also toward the internalization of faith, moral values, empathy, and social responsibility in students' daily lives (Fuadi & Suyatno, 2020; Khoiriyah & Nasrullah, 2023). Consequently, PAI teachers are expected to possess competencies that extend beyond subject-matter expertise, including the ability to integrate technology, pedagogy, and content knowledge in a synergistic manner through the framework of Technological Pedagogical Content Knowledge (TPCK) (Rossi & Trevisan, 2018; Nisak et al., 2023).

The importance of strengthening TPCK among PAI teachers has become increasingly evident in the implementation of the Love-Based Curriculum, an educational paradigm that emphasizes compassion, respect for human dignity, and harmonious relationships between human beings, God, society, and the environment (Akrim et al., 2022; Sewang, 2023). This curriculum aligns closely with the principles of humanistic education, which view learners as holistic individuals whose intellectual, emotional, and spiritual dimensions must be developed in a

balanced manner (Abdullah et al., 2020; Fathurrochman et al., 2021). Its implementation requires teachers to facilitate dialogical, reflective, and contextual learning experiences so that the values of compassion and humanity are not confined to cognitive understanding but are internalized and manifested in students' attitudes and behaviors (Kusumawati & Umam, 2025).

Empirical evidence from MTs Islamiyah Balen, Bojonegoro, reveals a substantial gap between curricular expectations and actual classroom practices. Preliminary observations indicated that PAI instruction remained predominantly characterized by one-way lecture-based teaching. Technology utilization was largely limited to slide presentations and the distribution of digital learning materials, with little emphasis on interactive, collaborative, and value-reflective instructional design. This situation was further exacerbated by teachers' limited confidence in integrating technology pedagogically, despite the availability of basic facilities such as projectors and internet access. The diverse characteristics of students, including variations in academic ability, socioeconomic background, and digital learning habits, further underscore the need for more inclusive, dialogical, and context-responsive learning approaches (Chaidam & Poonputta, 2022; Shofiyuddin, 2019).

These challenges highlight the necessity of strengthening PAI teachers' capacities through programs that go beyond technical training and instead foster TPCK competencies as a foundation for pedagogical transformation. The novelty of this community engagement program lies in the integration of TPCK enhancement with the SMARTPAI application as an implementation medium supporting the Love-Based Curriculum. Unlike conventional technology-training initiatives that primarily focus on technical proficiency, this program positions TPCK as both a conceptual and practical framework for designing humanistic, interactive, and value-oriented Islamic Religious Education learning experiences (Sickel, 2019; Wagner et al., 2024). Through this approach, PAI instructional practices are expected to become more participatory, reflective, and oriented toward character development.

The significance of this program encompasses two dimensions. From a practical perspective, it provides direct benefits by enhancing teachers' capacity to design humanistic, interactive, and contextual PAI learning through the integration of TPCK and SMARTPAI. From a long-term perspective, the program contributes to the development of a TPCK-based Islamic Religious Education learning model focused on character formation, with considerable potential for replication across various educational institutions as a systematic effort to create learning environments that are responsive to the demands of the digital age. Accordingly, the primary objective of this community engagement program is to strengthen teachers' capacity to integrate technology, pedagogy, and content knowledge holistically in order to promote inclusive Islamic Religious Education learning that is responsive to students' needs while supporting the internalization of compassionate values and character development.

The uniqueness of this service program lies in the affirmation of TPCK as a core competency in supporting the Love-Based Curriculum, with technology playing a role in strengthening the process of internalizing values. In terms of utility, this program provides practical benefits in the form of increasing teachers' capacity in designing humanistic, interactive, and contextual PAI learning. In the long term, the significance of this program lies in its contribution to the development of a TPCK-based PAI learning model that is oriented towards strengthening human character and values, and has the potential to be replicated in various educational units as a systematic effort to realize learning that is relevant to the demands of the digital era.

2 Method

This community engagement program employed a Participatory Action Research (PAR) approach, a methodology that positions partners as active participants rather than passive recipients of interventions. This approach was selected because the challenges faced by Islamic Religious Education (PAI) teachers at MTs Islamiyah Balen were multidimensional, encompassing not only infrastructural limitations but also pedagogical practices, teachers' confidence in utilizing technology, and the need to

strengthen value-based instructional design (Chai & Koh, 2017). The program was implemented through four interconnected stages, as presented in Table 2. 1.

Table 2.1. Stages, Activities, Partner Roles, and Program Outputs

Stage	Min Activities	Partner Roles	Outputs
1. Preparation and Coordination	Coordination meetings, preliminary observations, needs assessment, establishment of communication groups	Providing needs-assessment data, agreeing on schedules, supporting facilities	Structured program work plan
2. TPACK Integration Training	TPCK workshops, development of TPCK-based teaching modules, microteaching simulations	Participating in workshops, practicing module development, conducting teaching simulations	TPCK-based PAI teaching modules ready for implementation
3. SMARTPAI Implementation Assistance	SMARTPAI feature training, classroom mentoring, collaborative reflection	Implementing SMARTPAI in actual classroom settings and sharing best practices	Digital-interactive PAI learning implemented in classrooms
4. Monitoring and Evaluation	Classroom observations, assessment of instructional documents, reflective discussions, sustainability recommendations	Presenting learning portfolios and participating in collective reflection	Evaluation report and program sustainability plan

During Stage 2.1, the service team conducted coordination meetings with the school principal, the vice principal for curriculum affairs, and all PAI teachers to establish the scope and objectives of the program. Preliminary observations were carried out to examine teachers' instructional materials and practices in order to obtain a comprehensive understanding of baseline conditions. The findings revealed that teachers had utilized technology in the form of digital presentations and educational videos; however, these tools had not yet been integrated into instructional strategies that promoted active student participation and character development. These findings served as the basis for designing contextualized training materials.

Stage 2 focused on TPCK integration training, which was conducted on 13 February 2026 at MTs Islamiyah Balen. Participants included the school principal, vice principals for curriculum and student affairs, all PAI teachers, members of the PAI teacher cluster, and twelve newly inaugurated student council representatives. The workshop consisted of TPCK conceptual sessions, group discussions, the development of TPCK-based teaching modules, and microteaching simulations. Teachers were trained to design instructional modules that integrated discussion activities, value reflection, and the use of simple digital media. The branding of Islamic Religious Education learning also became an important component of the training, aiming to challenge students' perceptions that PAI learning is monotonous and less engaging (Rohman, 2022). Teachers were introduced to contextual instructional strategies that connected learning materials with students' real-life experiences, including the use of social case studies and personal reflection activities (Nakissa, 2020).

During Stage 3, SMARTPAI implementation assistance was carried out through application feature training, direct classroom mentoring, and collaborative reflection sessions. Classroom mentoring enabled teachers to gain practical experience in using the application, thereby reducing technical barriers that had previously hindered technology integration. Several teachers successfully uploaded learning materials and utilized digital assessment features, while others still required basic technical guidance. To address unequal access to digital devices and internet

connectivity among students, a blended learning strategy was adopted by combining SMARTPAI-based activities with offline learning approaches, including group discussions and project-based assignments.

Stage 4 involved monitoring through classroom observations, evaluation of instructional documents, and interviews with participating teachers. Collective evaluation was conducted through reflective discussion sessions involving all stakeholders. The resulting recommendations highlighted the need for advanced training in differentiated digital learning, the strengthening of character-based assessment practices, and the enhancement of students' digital literacy competencies. Overall, the active involvement of partners throughout all stages established a foundation for gradual and context-sensitive changes in instructional practice while simultaneously fostering a collaborative learning culture within the madrasah environment.

3 Results

Changes in TPCK-Based Islamic Religious Education Teaching Practices

The community engagement program implemented at MTs Islamiyah Balen resulted in measurable improvements in Islamic Religious Education (PAI) teaching practices. Prior to the intervention, baseline observations indicated that none of the PAI teachers utilized an integrated digital platform for instructional delivery, teaching modules did not reflect the Technological Pedagogical Content Knowledge (TPCK) framework, and no active professional learning community was available to support instructional development. Following program implementation, substantial changes were observed, as presented in Table 3.1.

Table 3.1. Community Engagement Program Success Indicators

Area of Change	Measurable Indicator	Achievement
SMARTPAI Adoption	Percentage of PAI teachers using SMARTPAI in instruction	≥ 75% of PAI teachers
Interactive Media Utilization	Frequency of digital media use per month	2-4 times per instructional theme

Digital Content Development	Number of learning materials, quizzes, or videos developed by teachers	≥ 3 digital contents per teacher
TPCK-Based Teaching Modules	Availability and implementation of modules	85% developed; ≥ 70% implemented
Differentiated Learning	Variety of media and activities tailored to students' needs	≥ 2 alternative med per topic
Professional Collaboration	Professional learning community meetings	Once per month
Documentation of Best Practices	Reflective reports, videos, or articles	≥ 1 documented be practice per teache

The data presented in Table 3.1 indicate that the program successfully achieved its predetermined performance indicators. At least 75% of PAI teachers adopted SMARTPAI as a platform for instructional delivery and digital assessment, representing a substantial improvement from the baseline condition in which no teacher actively and systematically utilized the platform. The frequency of interactive media use increased to two to four times per instructional theme, each teacher independently developed at least three digital learning resources, and 85% of TPCK-based teaching modules were successfully developed, with 70% subsequently implemented through differentiated instructional approaches (Aldalalah et al., 2025; Ren et al., 2025).

These outcomes reflect a transformation in teachers' perspectives regarding the role of technology in education. Technology shifted from being viewed merely as a tool for content delivery to functioning as a pedagogical medium that supports active student participation, immediate feedback, and differentiated learning experiences (Prasetya & Irwanto, 2025; Rosyid & Martadiputra, 2025). Such a transformation aligns with the core principles of the TPCK framework, which emphasizes the integration of technological, pedagogical, and content knowledge as the foundation for effective and contextually relevant learning in the digital era (Segal et al., 2025).

Implementation of TPACK Optimization in PAI Learning to Support a Love-Based Curriculum

The preparation and coordination stage resulted in a strong understanding between the implementation team and partners regarding the objectives, scope, and mechanism of implementation of the service program. Through an initial coordination meeting with PAI principals and teachers, it was agreed that strengthening the capacity of SMARTPAI-based TPACK is a priority need to improve the quality of learning in line with the Love-Based Curriculum. This agreement is an important foundation for the smooth implementation of activities in the next stage.

In addition, the initial observation activities and the study of the learning tools used by teachers provide a comprehensive overview of the existing conditions. It was found that teachers have utilized technology in the form of digital presentations and video media, but have not been integrated into learning strategies that encourage active participation and student character building. The results of this need identification are used as the basis for the preparation of training materials that are contextual and in accordance with the real needs of partners.

This stage also produces a systematic program work plan, including a schedule of activities, division of team roles, and the formation of an online communication group as a medium for coordination and reflection. The existence of these communication channels has proven effective in accelerating the exchange of information, facilitating discussions, and strengthening partners' commitment to actively participate in every stage of activities.

The stage of implementation of the training was agreed upon on Friday, February 13, 2026 at MTS Islamiyah Balen, which will be attended by the Principal, Vice Principal of the Curriculum Section, Vice Principal of the Student Affairs Section, All Teachers of Islamic Religious Education (PAI) and all teachers of the PAI cluster, and followed by 12 students of the newly inaugurated Intra-Madrasah Student Organization (OSIM).

Training on Strengthening TPCK Integration and PAI Learning Branding

The training to strengthen TPCK integration provides an initial change in teachers' perspectives on the use of technology in PAI learning.

Before training, some teachers interpreted technology as a material presentation tool. After training, teachers begin to understand that technology can serve as a means to facilitate interaction, value reflection, and contextual learning. Although these changes have not been completely evenly distributed, most teachers show an increase in pedagogical awareness of the importance of integrating technology, pedagogy, and content in a balanced manner.

In the workshop session, teachers were trained to develop TPCK-based teaching modules that integrate discussion activities, value reflection, and the use of simple digital media. However, the process of preparing the module still faces challenges, especially in formulating attitude indicators and value-based evaluation strategies (Affandi et al., 2022). Some teachers still need concrete examples and follow-up mentoring to ensure integration between cognitive learning goals and character building. This shows that strengthening TPCK is a gradual process that requires repeated practice (Chai & Koh, 2017). The training activity began with an introductory speech from the head of the Service team and affirmation and reinforcement from the Principal regarding the importance of technology adaptation combined with pedagogical knowledge and mastery of the material as well as learning branding as shown in the following picture:



Figure 1. The process of implementing community service activities with partners

The branding aspect of PAI learning is an important part of training, especially to change students' perception that PAI learning is monotonous. (Rohman, 2022). Teachers are introduced to strategies for presenting material that are contextual and relevant to students' daily lives, such as the use of social case studies and reflection on personal experiences. (Nakissa, 2020). Although the initial implementation

was still simple, teachers began to try a more communicative and participatory approach, for example through small group discussions and the use of reflective questions. (UD et al., 2019).

In general, this training resulted in a draft of TPCK-based teaching modules that still need improvement, but have reflected efforts to integrate technology and character values. The changes that occur are more of an increase in awareness and initial skills, rather than an instant transformation. This is realistic given that changes in pedagogical practice require time, ongoing support, and adequate practice opportunities.

SMARTPAI Implementation Assistance

The SMARTPAI implementation assistance shows that teachers are starting to utilize digital platforms in learning, albeit with varying levels of mastery. Some teachers are able to upload materials and use digital evaluation features, while others still require basic technical guidance. The classroom mentoring process helps teachers understand the steps to use the application directly, thereby reducing the technical barriers that were previously the main obstacles.

In the early stages of implementation, the use of SMARTPAI was still limited to the provision of simple materials and quizzes. However, as mentoring continues, some teachers are starting to try to take advantage of the question bank and automatic assessment features to save correction time. However, the integration of interactive features such as online discussion forums has not been optimally utilized due to limited learning time and students' learning habits that are still adapting to digital systems. The welcoming page of the smartpai application is as follows:



Figure 2. Application Dashboard View

The mentoring also revealed infrastructure challenges and student readiness. Not all students have adequate device access or a stable internet connection, so teachers need to adapt learning strategies to these conditions. Some teachers overcome this constraint by combining the use of SMARTPAI with offline activities, such as group discussions and project-based assignments. This blended learning approach shows the flexibility of teachers in adapting technology to the real context of the school.

From a pedagogical perspective, the use of SMARTPAI is starting to open up more differentiated learning opportunities. Teachers can provide additional material for students who need reinforcement, as well as provide follow-up exercises for students who understand the material faster. However, this differentiation practice is still in its early stages and has not been fully structured in learning planning. Teachers still need assistance to develop a systematic differentiation strategy.

In addition to the technical aspect, this mentoring emphasizes the importance of using technology to instill the value of empathy and collaboration. Some teachers began to integrate reflection tasks based on students' social experiences, such as sharing activities and caring for the school environment. Although the implementation is still simple, this step shows that SMARTPAI is starting to be used as a learning tool that is not only digital, but also valuable.

Sustainability Monitoring and Evaluation

Monitoring and evaluation show a gradual development in teacher competence, especially in the aspect of technology integration and active learning strategies. Classroom observations show that some teachers have begun to reduce the dominance of lecture methods and replace them with discussions, reflective questions and answers, and the use of digital media as a trigger for interaction. While this change has not been consistent across all classrooms, there are indications of a shift towards more student-centered learning.

The evaluation of the teaching modules prepared by the teacher showed an improvement in quality in the aspects of structure and technological integration. The teaching module begins to contain

learning activities that involve the use of digital media and value reflection activities. However, some modules still do not display a clear link between learning objectives, activities, and character-based evaluation. This shows that teachers still need assistance in harmonizing the components of learning planning comprehensively.

Interviews with teachers revealed that they felt the benefits of using SMARTPAI in saving time on material distribution and assessment, but still faced challenges in maintaining consistent student engagement. Some students show enthusiasm for digital learning, while others need adaptation because they are not used to learning independently through online platforms. This condition requires teachers to continue to balance digital and face-to-face approaches.

In terms of sustainability, monitoring shows the school's commitment to support the use of SMARTPAI and teacher competency development. The school began to consider the integration of digital platforms in learning policies and encouraged teachers to share good practices. However, the sustainability of the program still depends on the availability of advanced mentoring and the strengthening of the community of teacher practice.

The program evaluation also resulted in a number of recommendations, including the need for further training related to digital learning differentiation, strengthening character-based evaluation, and improving students' digital literacy. These recommendations indicate that the program has identified the next development needs in a more specific and contextual manner. Broadly speaking, the results of monitoring and evaluation show that the program has had a real positive impact, although it is still in the initial strengthening stage. Changes in learning practices occur gradually and are influenced by teacher competency factors, student readiness, and institutional support. These findings confirm that the sustainability of learning innovation requires long-term commitment and collaboration of all relevant parties.

Impact of SMARTPAI-Assisted TPCK Development on Learning Practices and Educational Ecosystem

The implementation of SMARTPAI and the TPCK strengthening program generated meaningful changes in classroom learning practices and the broader educational ecosystem at MTs Islamiyah Balen. During the training phase, an initial shift was observed in teachers' perceptions of the role of technology in Islamic Religious Education (PAI). Prior to the intervention, most teachers viewed technology primarily as a presentation aid. Following the training, teachers began to recognize technology as a pedagogical medium capable of facilitating interaction, value reflection, and contextual learning experiences. Although the transformation was not uniformly achieved across all participants, the majority demonstrated increased pedagogical awareness regarding the importance of integrating technology, pedagogy, and content knowledge in a balanced manner. This finding supports the view that TPCK development is a gradual process requiring sustained practice and professional support (Chai & Koh, 2017).

The mentoring phase of SMARTPAI implementation revealed both notable achievements and continuing challenges. Several teachers successfully uploaded instructional materials and utilized digital assessment features, while the integration of interactive functions such as online discussion forums remained limited due to time constraints and students' ongoing adaptation to digital learning environments. Infrastructure-related challenges, particularly unequal access to digital devices and internet connectivity, encouraged teachers to adopt blended learning strategies that combined SMARTPAI-based activities with face-to-face instructional approaches. This adaptation illustrates teachers' growing ability to align technological innovation with the realities of the school context and the diverse needs of learners (Ud et al., 2019).

From a pedagogical perspective, SMARTPAI created opportunities for more differentiated learning experiences. Teachers were able to provide enrichment materials for students requiring additional support while offering advanced learning activities for those who mastered the content more rapidly. Several teachers also incorporated reflective

assignments based on students' social experiences, including activities related to sharing, social responsibility, and environmental awareness within the madrasah community. These practices indicate that SMARTPAI functioned not merely as a digital platform but also as a medium for value-based learning that promotes character development and social awareness (Mahmudah et al., 2022).

The transformation of instructional practices reflects a broader shift from teacher-centered instruction toward student-centered learning. Teachers increasingly facilitated discussions, reflective activities, and collaborative learning experiences that enabled students to construct knowledge actively rather than passively receive information (Nahar et al., 2021; Tomljenovic & Novakovic, 2019). This finding is consistent with Piaget's constructivist theory, which emphasizes that knowledge is developed through processes of assimilation and accommodation based on learning experiences (Brewster et al., 2021). Similarly, the emergence of collaborative learning practices reflects the principles of Vygotsky's sociocultural constructivism, particularly the concepts of scaffolding and the Zone of Proximal Development, where teachers act as facilitators who provide structured support to help learners achieve higher levels of understanding through social interaction (Koh, 2019; Nurhayati & Maya Damayanti, 2025).

Another important outcome was the strengthening of students' character and empathy through the integration of Love-Based Curriculum principles into classroom activities. Teachers increasingly utilized social case studies, value-reflection assignments, and collaborative projects designed to cultivate responsibility, compassion, and respect for diversity. These practices align with Rogers' humanistic learning theory, which highlights the importance of empathetic relationships, unconditional positive regard, and meaningful learning experiences in supporting personal development (Geesa et al., 2022). Through authentic learning experiences, students were provided with opportunities to internalize and practice values in real-life situations, extending Islamic Religious Education beyond the cognitive domain into

affective and social dimensions (Tielman et al., 2022; Choirunnisa et al., 2022).

Beyond classroom-level improvements, the program also contributed to strengthening the broader educational ecosystem. An active professional learning community was established and maintained through regular monthly meetings. This forum facilitated the exchange of best practices, collective reflection, and collaborative problem-solving among teachers, creating a foundation for continuous professional development. The active involvement of the school principal provided policy support and collaborative spaces necessary for sustaining innovation. The emerging synergy among school leaders, teachers, and parents in promoting values of compassion, inclusivity, and respect for diversity reflects Bronfenbrenner's Ecological Systems Theory, which emphasizes that student development is shaped by interactions among interconnected environmental systems (Durachman et al., 2021).

The monitoring and evaluation results confirmed that the program generated positive impacts on teaching practices, professional collaboration, and institutional learning culture, although implementation remains in the early stages of consolidation. The observed changes occurred gradually and were influenced by teacher competence, student readiness, and institutional support. The four-stage PAR-based framework developed through this program demonstrates strong potential for replication in other madrasahs facing similar challenges. The TPCK-based teaching modules and the utilization of SMARTPAI provide practical resources that can support broader implementation without requiring substantial infrastructure investment. Successful replication, however, depends on sustained leadership commitment, continuous mentoring, and the cultivation of a professional learning culture that encourages ongoing pedagogical innovation (Kusumawati & Umam, 2025; Wagner et al., 2024).

4 Discussion

The implementation of the community service program shows that the preparation and coordination stage plays a strategic role in building

a common perception between the implementation team and partners regarding the urgency of strengthening TPCK in PAI learning. The understanding formed is not only administrative, but also substantive, especially related to the need for learning transformation towards a humanist and value-oriented approach as emphasized in the Love-Based Curriculum. These findings are in line with the theory of implementation of educational innovation which places an understanding of vision as a prerequisite for the success of changing learning practices. (Goldie, 2016; Lim et al., 2020)

The results of initial observations show that the use of technology by teachers is still at the substitution level, which is limited to replacing conventional media without changing the pedagogical structure of learning. This condition indicates that teachers' TPCK knowledge is still partial, so technology has not been used as an instrument to build a reflective and meaningful learning experience. Theoretically, TPCK integration demands teachers' ability to orchestrate the interaction between content, pedagogy, and technology to produce contextual and character-building-oriented learning. (Ismaniths et al., 2025; Setiawati et al., 2025)

The training to strengthen TPCK integration has an initial impact in the form of a paradigm shift in teachers to the function of technology in PAI learning. Teachers begin to understand that technology can support the process of internalizing values through online discussion activities, digital reflection, and the presentation of contextual case studies. This paradigm shift shows a shift from *teacher-centered learning* to more dialogical and participatory *student-centered learning* (São Paulo, 2021; Sudarman & Ardian, 2021). This transformation is an early indicator of the development of pedagogical competencies that are adaptive to the demands of 21st century education (Hanifah and al., 2025; Pearson & Degotardi, 2025)

In the training on the preparation of TPCK-based teaching modules, teachers show their initial ability to design learning activities that integrate the values of empathy, cooperation, and social responsibility. However, some teachers still have difficulty in explicitly linking learning objectives, pedagogical strategies, and the use of technology. These

findings confirm that strengthening TPCK cannot be achieved through one-time training, but requires continuous assistance so that the internalization of competencies is complete. (Miguel-Revilla et al., 2020; Ren et al., 2025)

The stage of mentoring the implementation of learning shows an increase in student involvement in the learning process. The use of interactive digital media and value-based reflection activities encourages students to be more active in discussing and relating PAI material to daily life experiences. Pedagogically, this condition shows that the integration of TPCK contributes to the creation of meaningful learning that not only improves conceptual understanding, but also strengthens the affective and social dimensions of students. (Nisak, Astuti, & Khoiriyah, 2023)

The use of the SMARTPAI application in mentoring activities serves as a supporting medium that strengthens the implementation of TPCK-based learning designs. Teachers are starting to take advantage of digital evaluation features and question banks to provide faster and more structured feedback. However, the success of the use of applications does not lie solely in the technological aspect, but in the ability of teachers to integrate it into pedagogical strategies oriented towards strengthening the values of love and empathy. Thus, technology serves as a medium, not as the primary purpose of learning. (Farisia and al., 2025; Prasetya & Irwanto, 2025)

The results of monitoring and evaluation showed an improvement in the quality of learning tools prepared by teachers, especially in the aspects of formulating value-based goals and using active learning strategies. In addition, the formation of a community of teacher practice is an important finding that supports the sustainability of the program. This community serves as a collective reflection space that allows teachers to share experiences, discuss challenges, and develop learning innovations collaboratively. (Rusydiyah et al., 2020)

Overall, the results of this service program confirm that strengthening the capacity of TPCK is a key factor in supporting the implementation of the Love-Based Curriculum in PAI learning. Effective integration between technology, pedagogy, and material content has proven to be able to create learning that is more humanistic, dialogical,

and relevant to the needs of students in the digital era. Program sustainability requires institutional support, strengthening of communities of practice, and the development of continuous training models so that learning transformation can take place systemically and have a broad impact.

5 Conclusion

The community engagement program conducted at MTs Islamiyah Balen demonstrates that strengthening Technological Pedagogical Content Knowledge (TPCK) through the utilization of the SMARTPAI application can significantly contribute to transforming Islamic Religious Education (PAI) into a more integrative, dialogical, and value-oriented learning process. Teachers were able to integrate technology, pedagogy, and content knowledge more holistically, as reflected in the increased use of digital learning media, the development of TPCK-based instructional modules, and the implementation of differentiated learning practices that accommodate students' diverse needs. This shift from teacher-centered to student-centered learning highlights the application of constructivist and socioconstructivist principles, while the incorporation of Love-Based Curriculum values has strengthened students' character development and empathy through meaningful, contextualized, and humanistic learning experiences. Furthermore, the active involvement of school leaders and parents indicates the emergence of a sustainable and inclusive educational ecosystem. Although the outcomes are still at an early stage of consolidation, these findings confirm that TPCK integration, supported by continuous mentoring, holds significant potential to advance Islamic Religious Education that is responsive to the demands of the digital era while reinforcing the internalization of compassionate values and character development among students, and its replication in other madrasahs is highly feasible with appropriate contextual adaptations.

6 Acknowledgments

The authors would like to express their sincere gratitude to the Institute for Research and Community Service (LPPM) of Sunan Giri

Nahdlatul Ulama University for its full support in the implementation of this community engagement program. The authors also extend their highest appreciation to MTs Islamiyah Balen as the community partner for its active participation in strengthening Technological Pedagogical Content Knowledge within Islamic Religious Education learning based on the Love-Based Curriculum. Appreciation is further extended to all members of the community engagement team whose systematic contributions and dedicated efforts played a significant role in the successful implementation of every stage of the program.

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