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Evaluation of The Effectiveness of Digital-Based PAI Learning in Secondary Education Using The CIPP Stufflebeam Model Approach

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ABSTRACT

The use of digital media in learning has the potential to enhance interactivity, students' understanding, and learning motivation. However, the implementation of digital-based Islamic Religious Education (PAI) learning at the secondary education level in the Bangka Belitung Islands still faces various challenges. This study aims to evaluate the effectiveness of digital-based PAI learning using the Stufflebeam CIPP evaluation model, which includes context, input, process, and product aspects. A qualitative approach with a case study method was employed in 20 senior high schools, vocational schools, madrasahs, and Islamic boarding schools through observations, interviews with teachers and students, and document analysis. The findings indicate that digital-based PAI learning is relevant to national education policies; however, disparities exist in infrastructure availability and human resource readiness. Digital media enhances learning interactivity and students' motivation, although its implementation has not yet been optimal. The study concludes that improving facilities and strengthening teachers' digital competencies through continuous training are essential to enhance the effectiveness of digital-based PAI learning. and ongoing training for PAI teachers that is tailored to the needs of each evaluation aspect.

1. Introduction

The development of digital technology in the Era 5.0 has brought fundamental changes across various sectors of life, including education. This era is characterized by the convergence of physical, digital, and biological technologies, which increasingly influence learning patterns, interaction, and access to information. In the context of education, these changes demand a renewal of learning approaches that not only emphasize the transfer of knowledge but also strengthen digital literacy, critical thinking skills, creativity, collaboration, and adaptability. Islamic

Religious Education (PAI) as an integral part of the national curriculum is no exception to these demands. The integration of information and communication technology (ICT) into PAI learning has become crucial in creating learning processes that are relevant to the characteristics of digital-native generations, who are accustomed to quick access to information and technology-based interactions.

Several studies indicate that effective PAI curriculum management in the digital era requires a well-planned ICT integration strategy to enhance interactivity, personalized learning, and the quality of student learning outcomes (Neliwati et al., 2024). The blended learning approach, which combines face-to-face methods with digital media, has been proven to encourage active student engagement and facilitate more flexible learning (Arifin & Mustofa, 2025; Bajac & Fišer, 2024). Tools such as e-learning platforms and mobile applications can enrich the learning process by providing materials accessible anytime and anywhere, thus supporting independent learning (Amrullah et al., 2024; Novitasari et al., 2024). Nevertheless, the implementation of digital technology in PAI still faces challenges, including teacher readiness, limited infrastructure, and the need for continuous professional development to ensure optimal utilization of these technologies (Azhar et al., 2024; Shofiyah et al., 2024).

The local context shows a different dynamic. The Bangka Belitung Islands Province, as an archipelagic region with unique geographical characteristics, faces its own challenges in implementing digital-based learning. Uneven distribution of technological infrastructure, limited internet connectivity in certain areas, and low digital competence among high school students are factors influencing the quality of technology-based learning. Data from the Bangka Belitung Communication and Information Office (Ayu, 2024) show that low digital literacy among students contributes to the province's low Gross Enrollment Ratio (GER) in higher education. This indicates that the skills to utilize digital media, which should ideally be nurtured from secondary education, have not yet developed optimally. This condition deserves serious attention, especially given that digital competence has now become an essential prerequisite for success in both education and the workforce (Fadila et al., 2025).

Various national and international studies have emphasized the importance of developing PAI learning models that are responsive to technological advancements. The use of interactive multimedia, virtual reality, and digital modules in PAI learning has been proven to enhance student motivation, engagement, and comprehension (Saprullah & Sirozi, 2024). The experience of Khairun University, for instance, shows that the use of digital course books can increase student learning scores by 16.44% (Umar et al., 2024). Moreover, mobile learning offers high flexibility, allowing students to access materials whenever they need them, thus expanding learning opportunities beyond formal classroom hours (Sa'idah & Saefudin, 2024). The integration of ICT in contextual teaching and learning has also been found to foster critical and creative thinking skills, making the learning process more meaningful (Hakim et al., 2023).

Despite the significant potential of digital technology in PAI, existing obstacles cannot be overlooked. Challenges such as infrastructure limitations, inadequate teacher digital competence, and resistance to changing traditional teaching methods are still frequently encountered (Masruri & Andika, 2024; Shofiah et al., 2025). These challenges not only affect the effectiveness of learning but also hinder the sustainability of innovations. Therefore, strategies for developing digital-based PAI learning need to consider human resource readiness, infrastructure sustainability, and adequate policy support.

To examine the effectiveness of digital-based learning, the CIPP Evaluation Model (Context, Input, Process, Product) developed by Stufflebeam offers a comprehensive evaluation framework. This model facilitates a thorough assessment, starting from policy and needs context, input in the form of resources and infrastructure, learning process implementation, to the products or outcomes achieved (Babadi et al., 2024; Fadli et al., 2024; Khan et al., 2024; Zhao et al., 2024). The use of the CIPP model in various studies has demonstrated its ability to identify program strengths and weaknesses while providing strategic recommendations for continuous improvement (Burke & Hennessy, 2021).

Experiences from various countries illustrate the flexibility of the CIPP model in evaluating digital-based learning in diverse contexts. For example, in dental education in Iran, the CIPP model successfully revealed weaknesses in the process aspect that required immediate improvement (Babadi et al., 2024). In Indonesia, its application in primary school mathematics learning highlighted strong contextual support as well as effective learning processes (Fadli et al., 2024). Even in nursing education in China, the CIPP model was used to develop a blended teaching quality evaluation scale, enabling holistic measurement of learning effectiveness (Zhao et al., 2024). These findings show that the CIPP model is highly relevant for evaluating digital-based PAI learning, especially in regions with geographical challenges such as Bangka Belitung.

Based on this background, this study focuses on evaluating the effectiveness of digital-based PAI learning at the secondary education level in the Bangka Belitung Islands Province using the CIPP model. The evaluation covers four main aspects: (1) the context of policies and digital learning needs, (2) input in the form of human resources, infrastructure, and learning media, (3) the process of learning implementation, and (4) the product in terms of student learning outcomes. This approach is expected to produce a comprehensive picture of the strengths and weaknesses of digital-based PAI learning implementation in the region.

The significance of this research lies in its contribution to providing empirical data and in-depth analysis regarding the effectiveness of digital-based PAI learning in archipelagic areas. The results are expected to serve as a reference for local governments, schools, and PAI teachers in designing more effective, relevant, and sustainable learning programs. Furthermore, this study has the potential to enrich the literature on the application of the CIPP model in PAI learning evaluation, while offering strategic input for the development of Islamic education policy in the digital era. Thus, this research not only holds academic relevance but also high

practical value in supporting the transformation of Islamic education in Indonesia toward adaptive, inclusive, and future-oriented learning. More importantly, this study is expected to encourage the emergence of technology-based learning innovations that not only utilize digital advancements technically but also preserve the spiritual and moral values that form the essence of Islamic Religious Education.

2. Methodology

This study employs a qualitative approach using a case study method aimed at evaluating the effectiveness of digital-based Islamic Religious Education (PAI) learning at the secondary education level in the Bangka Belitung Islands region. The qualitative approach was chosen because this research focuses on gaining an in-depth understanding of phenomena occurring in the field, particularly regarding the implementation of digital-based PAI learning, which involves complex interactions among teachers, students, school environments, and prevailing educational policies. The case study method was selected to enable the researcher to conduct an in-depth analysis of the context and dynamics occurring in a number of selected schools, thereby producing a comprehensive picture of both the successes and challenges in the implementation of digital-based learning in PAI subjects.

The evaluation model used in this study is the CIPP model (Context, Input, Process, Product) developed by Stufflebeam. This model is considered relevant as it provides a comprehensive evaluation starting from the planning, implementation, and outcomes of a program or activity. The context aspect is used to assess the background, needs, and objectives of digital-based PAI learning; input is used to analyze the resources, strategies, and planning applied; process is used to evaluate the course of the learning process; and product is used to assess the results or impacts obtained from the implementation of the learning.

The research was conducted in 20 secondary schools, consisting of Senior High Schools (SMA), Vocational High Schools (SMK), Islamic Senior High Schools (MA), and Islamic boarding schools (pesantren) in the Bangka Belitung Islands region. The selection of schools considered the diversity of educational institution types and geographical distribution, to reflect the actual conditions of digital learning implementation in the archipelago region. The research subjects consisted of PAI teachers as implementers of the learning process and students as recipients, ensuring that the collected data encompasses perspectives from both parties.

Data collection was carried out using three main techniques: observation, interviews, and documentation study. Observation was conducted directly in classrooms to examine the implementation of digital-based PAI learning, including the use of technological devices, learning media, methods of material delivery, teacher-student interaction, and student engagement during lessons. In-depth interviews were conducted with PAI teachers and students. Interviews with teachers aimed to explore information related to teaching strategies, technical challenges, resource readiness, and teachers' perceptions of digital learning effectiveness.

Meanwhile, interviews with students aimed to understand their learning experiences, motivation levels, comprehension of materials, and challenges encountered in technology-based learning. The documentation study was used to collect secondary data such as lesson plans, Learning Implementation Plans (RPP), digital learning materials, student learning outcome reports, and school policies regarding digital-based PAI learning. These documents provided an objective overview and complemented the data obtained from observations and interviews.

The research instruments included learning observation sheets, interview guides for teachers and students, and a documentation checklist. The observation sheets were designed to record various aspects of digital learning implementation, from preparation and execution to evaluation. The interview guides were systematically developed to ensure that the questions asked were relevant to the research objectives and allowed for in-depth exploration of responses. The documentation checklist was used to assess the completeness and quality of documents related to digital-based PAI learning.

Data analysis was conducted using the CIPP evaluation model, focusing on its four main components. The analysis process began with data reduction, namely selecting and simplifying raw data obtained from the field so that only relevant information was analyzed further. The next step involved presenting the data in the form of narratives, tables, and matrices to help the researcher identify patterns or relationships between data points. The final stage was drawing conclusions, taking into account the interconnection among the four CIPP aspects to provide a complete evaluation of the effectiveness of digital-based PAI learning.

To ensure data validity, several validation strategies were applied: source triangulation, technique triangulation, member checking, and peer debriefing. Source triangulation was carried out by comparing data obtained from teachers, students, and official documents. Technique triangulation was conducted by comparing the results of observations, interviews, and documentation studies. Member checking involved confirming the initial research findings with the research subjects to ensure that the researcher's interpretation matched their experiences and perspectives. Peer debriefing was conducted through discussions with colleagues to review the analysis process and ensure that the research results possessed objectivity and analytical rigor.

Through this methodological approach, the study is expected to provide a comprehensive, in-depth, and valid depiction of the effectiveness of digital-based PAI learning in the Bangka Belitung Islands region, while also offering strategic recommendations for the development of technology-based learning in the future (Figure 1).

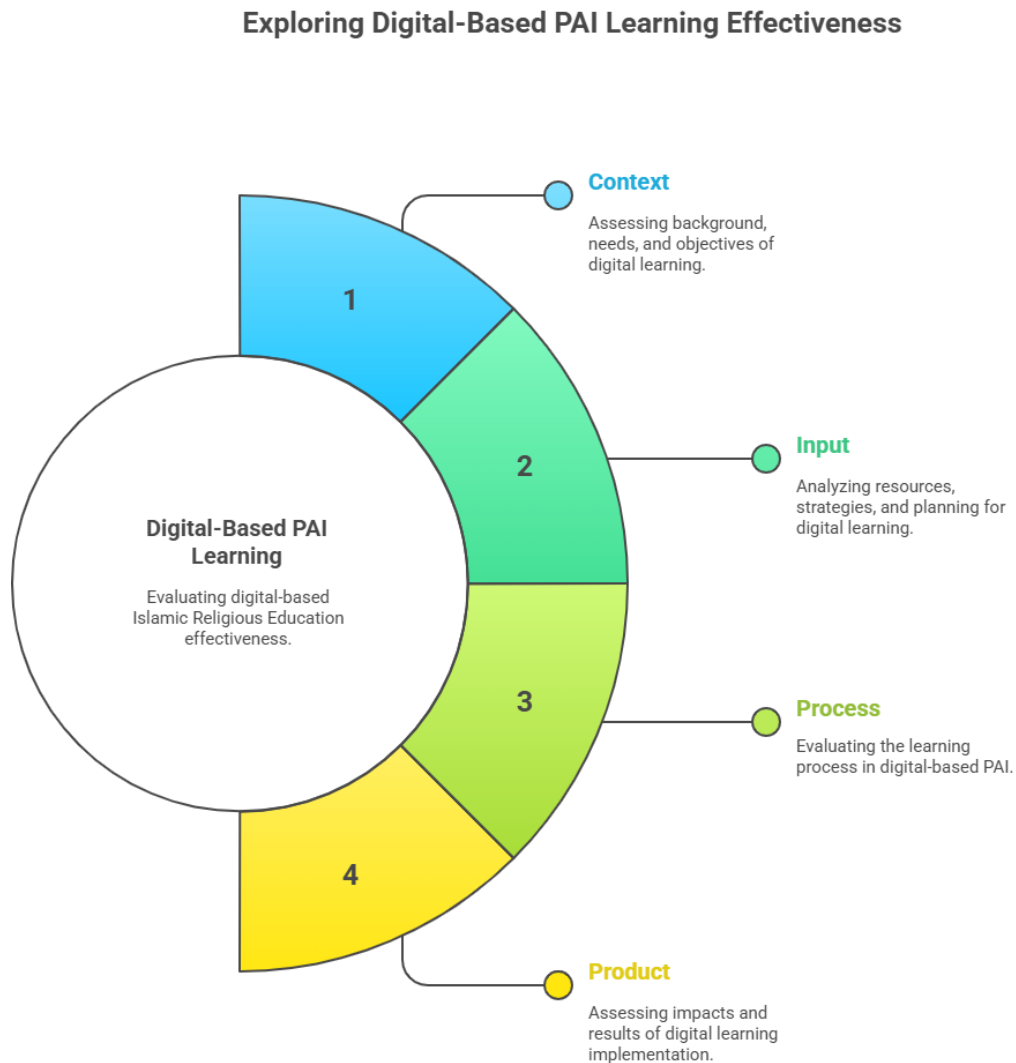


Figure 1. Exploring Digital Based PAI Learning

3. Results and Discussion

CIPP Evaluation of Digital-Based Islamic Religious Education (PAI): A Comprehensive Assessment of Readiness, Implementation, and Impact

Prior to presenting the evaluation results, it is important to clarify the research process, particularly the interview data collection that forms a central component of this qualitative study (Table 1). The interview process was conducted simultaneously with classroom observations and document analysis to ensure data triangulation. Semi-structured interviews were carried out with PAI teachers and students across 20 secondary education institutions in the Bangka Belitung Islands, including senior high schools, vocational schools, madrasahs, and Islamic boarding

schools. The interviews aimed to explore participants' experiences, perceptions, and challenges related to the implementation of digital-based PAI learning within the framework of the CIPP evaluation model. Data obtained from these interviews were transcribed, categorized according to context, input, process, and product dimensions, and subsequently integrated into the analysis presented in the following sections.

The evaluation of digital-based Islamic Religious Education (PAI) using the CIPP model (Context, Input, Process, and Product) that provides a systematic analytical framework for understanding the effectiveness, readiness, and outcomes of educational digitalization initiatives. The increasing integration of digital technology into learning after the COVID-19 pandemic has transformed pedagogical practices globally, including in Indonesian schools within the Bangka Belitung Islands. Amid geographical challenges, uneven technological distribution, and varied teacher competencies, the implementation of digital learning in PAI becomes an essential subject of study. Through a CIPP-based evaluation, this research reveals not only the current condition of digital learning but also its strategic implications for the quality of Islamic education in the digital era.

Table 1. Interview Questions for Evaluating Digital-Based PAI Learning Using the CIPP Model

CIPP Aspect	Interview Questions
Context	How do school policies support the implementation of digital-based PAI learning?
Context	What are the main reasons for adopting digital learning in PAI subjects at your school?
Context	How do students respond to the shift from conventional to digital-based PAI learning?
Input	What digital facilities and infrastructure are available to support PAI learning?
Input	How would you describe teachers' readiness and digital competence in implementing digital PAI learning?
Input	What types of training have teachers received related to digital learning?
Process	How is digital technology integrated into daily PAI teaching practices?
Process	What digital platforms or media are most frequently used in PAI learning?
Process	What challenges are encountered during the implementation of digital-based PAI learning?
Product	How does digital-based PAI learning affect students' understanding and motivation?
Product	What changes have been observed in students' learning behavior after implementing digital PAI learning?
Product	What improvements are expected for future digital-based PAI learning?

a. Context Evaluation: Policy Alignment, Needs Identification, and Institutional Readiness

Based on interview data with PAI teachers and students, complemented by classroom observations and document analysis, the context evaluation reveals strong alignment between school policies and the national digital education agenda. Context evaluation focuses on macro-level conditions shaping the implementation of digital learning. The results indicate strong alignment between school policies

and the national digital education agenda. Approximately 85% of schools have established internal regulations supporting digital learning, including guidelines on device use, digital content standards, and digital classroom management. These policies are part of Indonesia's broader digital transformation movement, including programs such as the "Digital School Initiative" and government support for cloud-based educational platforms.

Local governments in Bangka Belitung have also contributed significantly through infrastructural and administrative support. This includes improving network access, supplying digital tools, and providing subsidies for teacher training. Such alignment between national and local policies underscores that digital education is no longer a supplementary initiative but has become an integral component of the broader educational ecosystem. The needs analysis further strengthens the justification for digital transformation. Findings reveal that 90% of PAI teachers express urgent needs for digital transformation due to limitations of conventional pedagogical approaches in accommodating post-pandemic students. The pandemic created a generation of learners accustomed to flexible, multimedia-driven environments; thus, static instructional methods appear less engaging and less relevant.

Meanwhile, 78% of students demonstrate a strong preference for digital-based learning. This preference is not merely aesthetic but rooted in cognitive and behavioral adaptation to digital content consumption. Students reported that digital platforms offer clarity, accessibility, and interactivity, which are three characteristics that are difficult to achieve consistently through traditional textbooks. The convergence between teacher needs, student preferences, and policy alignment shows that contextual readiness is strong. However, the context evaluation also identifies potential risks, including digital divides among schools located on islands, socioeconomic disparities affecting device ownership, and inequality in access to learning platforms. These contextual complexities must be acknowledged as they shape the subsequent stages of program implementation.

b. Input Evaluation: Infrastructure, Human Capital, and Institutional Capacity

Drawing on interview findings from PAI teachers and school stakeholders, the input evaluation examines the adequacy of infrastructure, human resources, and institutional support for digital-based PAI learning. Input evaluation examines whether schools possess adequate resources, including technical, human, and organizational aspects, to support digital learning. In terms of infrastructure, the data shows that 60% of schools have adequate internet facilities. This includes stable Wi-Fi networks, basic IT equipment, and operational computer laboratories. However, the remaining 40% face significant limitations, especially schools located in the archipelagic regions of Bangka Belitung. Unstable connections, lower bandwidth, and limited access to digital devices hinder the equitable integration of technology into the classroom.

The device-to-student ratio remains suboptimal, recorded at 1:8, indicating that one digital device is shared among eight students. This ratio signals constraints in

implementing synchronous digital activities, such as interactive assessments and real-time digital tasks. Moreover, disparities in device conditions, with some being outdated or poorly maintained, further amplify implementation challenges. Human resource competence constitutes another critical input component. Although 65% of PAI teachers have participated in digital learning training, competence levels remain uneven. Only 45% exhibit adequate digital pedagogical competence, including skills in creating digital content, using learning management systems, and designing interactive multimedia-based PAI materials. The gap between training participation and actual competence suggests that many training programs focus on technical tutorials rather than didactic integration, which refers to the ability to embed technology meaningfully into lesson design and PAI pedagogy.

School-level IT support, however, is relatively strong. 80% of schools have IT support teams, although their responsibilities vary from basic troubleshooting to more advanced tasks such as maintaining digital learning platforms, optimizing networks, and assisting teachers in managing digital classrooms. The presence of IT units indicates institutional readiness but also highlights the need to elevate their role from operational maintenance to pedagogical support. Evaluating the inputs reveals that while the foundation for digital PAI implementation exists, it is characterized by disparities in access, uneven competence distribution, and infrastructural inconsistencies. These disparities must be systematically addressed to ensure equity and sustainability in digital learning.

From an evaluative standpoint, the imbalance observed in input components does not necessarily imply immediate program failure, but rather signals differential readiness levels across institutions. The presence of relatively strong institutional support, such as IT teams and policy alignment, appears to mitigate infrastructural shortcomings by enabling schools to prioritize functional rather than ideal technological solutions. This condition illustrates that within the CIPP framework, input adequacy should be interpreted relationally in connection with process adaptability. However, overreliance on such adaptive strategies may pose sustainability risks if infrastructural and competency gaps remain unaddressed in the long term.

c. Process Evaluation: Implementation Quality, Pedagogical Integration, and Learning Dynamics

Interview data indicate that the integration of digital media into PAI learning has progressed through various instructional practices, as discussed in the following analysis. Process evaluation investigates how digital learning initiatives are implemented in real classroom contexts. The findings show that 70% of PAI teachers have integrated digital media into their instructional activities. This shift from traditional methods toward a blended or fully digital approach is a significant milestone within PAI pedagogy, which has historically relied heavily on text-based or lecture-oriented instructional styles.

Teachers used various forms of digital media to enhance instructional delivery. Instructional videos are used by 85% of teachers, enabling visual representation of

conceptual PAI content, including historical narratives of Islamic civilization, procedural steps of worship practices, and moral-ethical case studies. Video-based learning is particularly impactful in teaching topics that require visualization for deeper understanding. Furthermore, 60% of teachers use interactive applications, including Quizziz, Kahoot, Wordwall, and Google Forms-based assessments. These platforms serve as tools for real-time feedback and formative assessment. Their gamified features enhance student engagement and motivate participation, especially among students who are initially less active in traditional settings.

The use of e-books and digital modules (55%) reflects a shift toward digital literacy within PAI instruction. Digital texts provide hyperlinked explanations, integrated Quranic verses, animations, and embedded assessments, offering richer learning experiences compared to printed textbooks. However, process evaluation also identifies significant challenges. 40% of teachers report connectivity issues, particularly during synchronous activities such as livestreamed classes or real-time quizzes. These disruptions reduce instructional efficiency, create frustration for learners, and limit teachers' flexibility in planning pedagogical strategies.

In terms of learning interaction, digitalization has produced notable improvements. 75% of students report enhanced ease of accessing learning materials, whether through LMS platforms, WhatsApp groups, or cloud-based repositories. Additionally, digital platforms foster participatory cultures, where students engage in discussions, peer reviews, and collaborative tasks more actively than in conventional classrooms. Nonetheless, monitoring and evaluation challenges persist. Teachers reported difficulties in ensuring academic integrity, tracking progress comprehensively, and assessing students' affective and moral development, which are two important components of PAI learning that are not easily digitized. Process evaluation thus reveals that while implementation is substantially effective, it requires more systemic support to address technical disruptions, monitoring challenges, and pedagogical constraints.

d. Product Evaluation: Learning Outcomes, Behavioral Improvements, and Long-Term Impact

Product evaluation evaluates the outcomes and long-term impacts of digital learning. The findings reveal significant improvements in academic achievement. The implementation of digital PAI learning resulted in an average 15% increase in student PAI scores, indicating that digital media enhance comprehension, retention, and conceptual mastery. Despite the evident disparities in input components, particularly in infrastructure availability and teachers' digital pedagogical competence, the improvement in learning outcomes suggests the presence of compensatory mechanisms within the learning process. From a CIPP perspective, this indicates that strong process elements, such as the strategic use of accessible digital platforms, teachers' adaptive instructional practices, and students' intrinsic motivation, can partially offset limitations at the input level. In several schools, teachers relied on low-cost and widely accessible technologies, including smartphones and messaging applications, to sustain learning continuity. This

finding aligns with constructivist learning theory, which emphasizes that meaningful learning outcomes are not solely determined by material resources, but also by learner engagement, instructional design, and contextual relevance. Consequently, the observed increase in student scores and motivation should be understood as the result of effective pedagogical mediation rather than optimal infrastructural conditions.

Beyond academic gains, digital learning contributes to enhanced motivation, with 80% of students showing increased interest in PAI subjects. Digital platforms, perceived as enjoyable and flexible, support varied learning styles and encourage students to take more responsibility for their learning processes. Students also demonstrate stronger independent learning skills, a critical competency for modern learners. Many engage in voluntary digital activities, such as watching Islamic educational videos, reading online interpretations of religious texts, and participating in extracurricular digital PAI sessions.

Digital transformation has also strengthened teacher professionalism (Gibraltar & Hafidz, 2025). As teachers adopt digital tools, their digital literacy, media production skills, and pedagogical innovation improve. This transformation is not only technical but also epistemological, as PAI teachers begin rethinking instructional strategies by moving from monologic teaching to dialogic, student-centered practices. At the systemic level, the digital PAI initiative yields several significant impacts:

- 1) **Enhanced digital literacy among teachers and students**, strengthening future educational preparedness.
- 2) **Improved learning management efficiency**, including automated data tracking, digital gradebooks, and analytics-based evaluation.
- 3) **Innovation in PAI pedagogy**, integrating multimedia, virtual simulations, digital tafsir tools, and interactive assessments.

These findings underscore that digital learning in PAI is not merely a technological adaptation but a transformation of educational philosophy and practice (Figure 2).

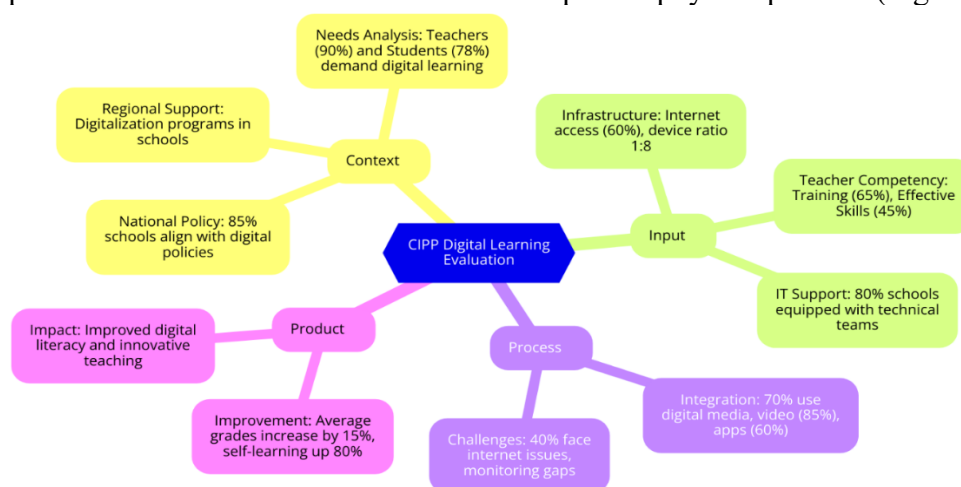


Figure 2. Results of the CIPP evaluation of the effectiveness of digital-based Islamic Religious Education (PAI) learning at the secondary education level in the Bangka Belitung Islands.

Discussion

Rather than viewing the CIPP components as isolated elements, this discussion interprets the findings as an interconnected system in which contextual readiness and process adaptability play a critical role in mediating input constraints. The evaluation of the effectiveness of digital-based Islamic Religious Education (PAI) learning requires a comprehensive approach that takes into account:

- 1) Integration of technology in PAI learning
- 2) Alignment with the local context of the archipelago region
- 3) Development of teachers' digital competence
- 4) Enhancement of students' motivation and understanding
- 5) Systematic evaluation using the CIPP model

This theoretical framework serves as the basis for analyzing the effectiveness of digital-based PAI learning in the Bangka Belitung Islands, taking into consideration the specific characteristics of the region and the needs of modern education (Figure 3).

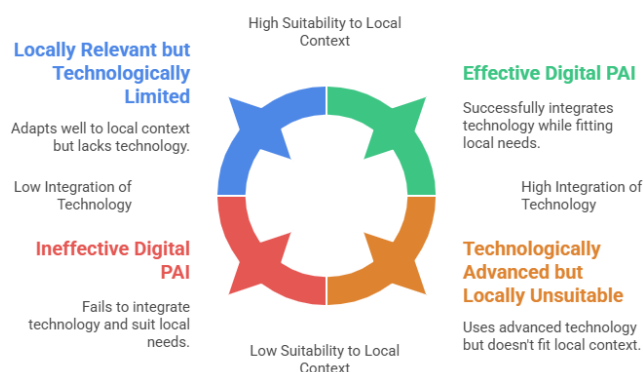


Figure 3. CIPP Theoretical Framework of the effectiveness of digital-based PAI learning in the Bangka Belitung Islands

The evaluation of the CIPP model in the context of digital education reveals significant insights into the compliance and effectiveness of digital transformation initiatives in schools. The context evaluation shows a strong alignment with national digitalization policies, with 85% of schools having internal policies that support digital learning and receiving local government support for digitalization programs (Boeskens & Meyer, 2025). This is consistent with findings from other studies that emphasize the importance of policy alignment and government support in successful digital education initiatives (Wohlfart & Wagner, 2022).

The needs analysis highlights a critical demand for digital transformation, with 90% of Islamic Education (PAI) teachers and 78% of students expressing a preference for digital-based learning, reflecting broader trends toward digital adaptation in the post-pandemic era (Zahraini et al., 2025). However, the input evaluation reveals disparities in digital infrastructure, with only 60% of schools having adequate internet facilities and a notable gap between urban and rural areas (Derder et al., 2023). This is echoed in other research that underscores the challenges of equitable digital access (Nang et al., 2024).

Although 65% of teachers received digital training, only 45% demonstrated adequate digital competence, despite 80% of schools having IT support teams (Мосъпан & Sysoieva, 2022). The process evaluation shows that 70% of teachers have integrated digital media into their teaching, using various methods such as videos and interactive applications, although 40% face technical issues such as internet connectivity (Alptekin & Taneri, 2025). This aligns with findings that highlight the importance of teacher training and infrastructure in the effective implementation of digital learning (Derder et al., 2023). The product evaluation indicates positive learning outcomes, with a 15% increase in PAI scores and 80% of students showing improved motivation and independence (Frei-Landau et al., 2023). Overall, the program has enhanced digital literacy, improved learning management efficiency, and fostered innovation in teaching methods, reflecting the transformative potential of digital education when supported by comprehensive policies and infrastructure (Derder et al., 2023; Ríos-Muñoz et al., 2025).

This study is not without limitations. As the primary data sources relied heavily on qualitative methods, particularly interviews with teachers and students, the findings may be influenced by self-report bias. Teachers may tend to emphasize successful aspects of digital learning implementation, while students' responses may reflect short-term enthusiasm rather than long-term learning impact. Although triangulation through observations and document analysis was employed to enhance data validity, these subjective perspectives should be interpreted cautiously. Furthermore, given the case study design and the specific geographical context of the Bangka Belitung Islands, the findings may not be fully generalizable to other regions with different infrastructural, cultural, or institutional characteristics. Nevertheless, the study offers valuable contextual insights that can inform similar educational settings, particularly in archipelagic and resource-constrained regions.

4. Conclusion

This study concludes that although digital-based Islamic Education (PAI) learning in the Bangka Belitung Islands shows significant potential in improving education quality, sustained support is needed in infrastructure development, teacher competency enhancement, and digital content development. Its success requires strong collaboration between the government, schools, teachers, and all educational stakeholders. These findings contribute to a better understanding of the implementation of digital-based religious education in island regions and provide a framework for developing future digital learning strategies in similar contexts. Further research is recommended to explore adaptive PAI digital learning models and the integration of advanced technologies in religious education.

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