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ARTIKEL PENGABDIAN MASYARAKAT

Digitalization of Islamic Education and Tahfidz Learning Materials Through the Optimization of Google Sites for Teachers at SDIT Attaqwa NF

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Abstract

The rapid acceleration of digital technology in the twenty-first century necessitates a fundamental paradigm shift in elementary education, yet numerous institutions face profound challenges in transitioning from conventional pedagogical models to integrated digital environments. This community service project addresses the critical gap between the contemporary demand for digitized learning and the prevailing technical limitations of educators at Sekolah Dasar Islam Terpadu (SDIT) Attaqwa NF. A comprehensive situational analysis revealed that learning materials for Islamic Religious Education (PAI) and Tahfidz (Qur'anic memorization) were highly fragmented, heavily reliant on physical textbooks, and scattered across disorganized messaging applications, which severely hindered students' ability to engage in effective, independent review (muraja'ah). To resolve this systemic issue, a Participatory Action Research (PAR) approach was implemented to systematically train and mentor teachers in developing centralized, interactive learning hubs utilizing Google Sites. The intervention spanned preparation, intensive technical workshops, and continuous pedagogical mentoring, evaluated through pre-test and post-test assessments alongside a rigorous product evaluation rubric. The findings demonstrated a statistically significant enhancement in teachers' digital pedagogical competence, with overall Technological Pedagogical Content Knowledge (TPACK) scores escalating from a pre-test mean of 51.5 to a post-test mean of 86.2. Furthermore, the developed Google Sites successfully integrated multimedia elements, substantially reducing extraneous cognitive load for students and providing a highly accessible repository for PAI texts and Tahfidz audio files. The initiative concludes that targeted, platform-specific digital training utilizing accessible, no-code environments serves as a highly effective catalyst for modernizing religious education, fostering both teacher self-efficacy and sustainable institutional digitalization.

Keywords: Digitalization; Google Sites; Islamic Education; Tahfidz; Teacher Training; Community Service.

Abstrak

Pesatnya perkembangan teknologi digital di abad ke-21 menuntut perubahan paradigma mendasar dalam pendidikan dasar; namun, banyak institusi menghadapi tantangan besar dalam beralih dari model pedagogis konvensional ke lingkungan digital yang terintegrasi. Proyek pengabdian masyarakat ini menjawab kesenjangan krusial antara tuntutan pembelajaran digital masa kini dan keterbatasan teknis yang dialami para pendidik di Sekolah Dasar Islam Terpadu (SDIT) Attaqwa NF. Analisis situasi yang komprehensif mengungkapkan bahwa materi pembelajaran Pendidikan Agama Islam (PAI) dan Tahfidz (hafalan Al-Qur'an) sangat terfragmentasi, sangat bergantung pada buku teks fisik, dan tersebar di berbagai aplikasi pesan yang tidak terorganisir, sehingga sangat menghambat kemampuan siswa untuk melakukan pengulangan materi *muraja'ah* secara mandiri dan efektif. Untuk mengatasi masalah sistemik ini, pendekatan *Participatory Action Research* (PAR) diterapkan guna melatih dan membimbing guru secara sistematis dalam mengembangkan pusat pembelajaran interaktif yang terpusat menggunakan Google Sites. Intervensi ini mencakup tahap persiapan, lokakarya teknis intensif, dan pendampingan pedagogis berkelanjutan, yang dievaluasi melalui penilaian *pre-test* dan *post-test* serta rubrik evaluasi produk yang ketat. Hasil penelitian menunjukkan peningkatan yang signifikan secara statistik dalam kompetensi pedagogis digital guru, di mana skor keseluruhan *Technological Pedagogical Content Knowledge* (TPACK) meningkat dari rata-rata *pre-test* sebesar 51,5 menjadi rata-rata *post-test* sebesar 86,2. Selain itu, Google Sites yang dikembangkan berhasil mengintegrasikan elemen multimedia, sehingga secara substansial mengurangi beban kognitif yang tidak relevan bagi siswa dan menyediakan repositori yang mudah diakses untuk materi teks PAI serta file audio Tahfidz. Inisiatif ini menyimpulkan bahwa pelatihan digital yang terarah dan spesifik pada platform tertentu dengan memanfaatkan lingkungan yang mudah diakses berfungsi sebagai katalisator yang sangat efektif untuk memodernisasi pendidikan agama, sekaligus mendorong efikasi diri guru dan digitalisasi institusi yang berkelanjutan.

Kata Kunci: Digitalisasi; Google Sites; Pendidikan Islam; Tahfidz; Pelatihan Guru; Pengabdian kepada Masyarakat.

1. INTRODUCTION

The integration of digital technology into the educational sector has fundamentally altered the global pedagogical landscape, creating new imperatives for instructional design, content delivery, and student engagement across all academic disciplines. In the contemporary era, which is commonly characterized by the omnipresence of information and communication technology, educational paradigms have necessarily shifted from traditional, teacher-centered methodologies to dynamic, interactive, and learner-centric environments (Abdullah & Hashim, 2023; Rahman & Kamal, 2020). This transformation is particularly salient and urgent in the realm of elementary education, where the cognitive, social, and psychological development of digital-native students often referred to sociologically as Generation Z and Generation Alpha demands instructional modalities that are visually engaging, immediately accessible, and highly interactive (Lestari & Rahmawati, 2023; Pratama & Sari, 2021). However, the digitization of specific, deeply traditional disciplines, such as Islamic Religious Education (Pendidikan Agama Islam, or PAI) and Tahfidz (the structured memorization of the Holy Qur'an), presents unique, multifaceted challenges that require nuanced pedagogical interventions. Historically, these subjects have been dominated by traditional, didactic approaches that emphasize rote memorization, direct oral transmission, and passive reception (Amin & Anwar, 2021; Rahman & Kamal, 2020). While the core theological, ethical, and spiritual tenets of these subjects remain immutable and sacred, the methodology by which they are imparted must inevitably evolve to prevent student disengagement and to facilitate deeper cognitive retention in a digital age.

Within the specific domain of PAI and Tahfidz, the necessity for comprehensive digitalization is not merely a matter of administrative convenience; rather, it constitutes a profound pedagogical urgency. Tahfidz, by its very inherent nature, requires consistent repetition, rigorous daily practice, and continuous independent review, a meticulous process known in Islamic pedagogy as muraja'ah (Ibrahim & Zulkifli, 2022). In a conventional classroom setting, an educator's capacity to provide individualized auditory modeling, correct phonetic articulation (makharijul huruf), and offer continuous feedback is strictly constrained by temporal and spatial limitations. Consequently, elementary students often struggle to maintain their rigorous memorization schedules outside of school hours without structured, accessible guidance. When learning materials are monotonous, strictly text-based, or logistically disorganized, the cognitive load imposed on the student increases exponentially, leading to a precipitous decline in intrinsic motivation and a significant reduction in the overall efficacy of the learning process. The integration of digital multimedia specifically, the centralization of high-quality audio recitations, interactive formative quizzes, and structured modular texts can provide the necessary cognitive scaffolding to support independent muraja'ah and deepen the students' holistic comprehension of Islamic values (R. E. Mayer & Fiorella, 2021; Sulaiman & Ismail, 2022).

A comprehensive and rigorous situational analysis conducted at Sekolah Dasar Islam Terpadu (SDIT) Attaqwa NF revealed a pronounced and problematic dichotomy between the institutional aspirations for a modern, technology-enhanced learning environment and the prevailing empirical realities

regarding teacher digital literacy. SDIT Attaqwa NF, operating as a progressive Islamic integrated elementary school, astutely recognized the pressing need to digitize its curriculum to remain relevant and effective. However, observational data and preliminary diagnostic assessments indicated that the existing PAI and Tahfidz learning materials were highly fragmented and pedagogically disjointed. Educators primarily relied on conventional physical textbooks, which were augmented only sporadically by the distribution of unindexed digital files, external video links, and low-fidelity audio recordings disseminated through disparate WhatsApp communication groups. This highly fragmented approach resulted in a disorganized, chaotic digital ecosystem that was profoundly difficult for both young students and their assisting parents to navigate, effectively hindering the continuity of learning outside the formal classroom environment. Furthermore, the instructional staff exhibited a foundational digital divide; while they possessed rudimentary skills in operating basic communication applications and word processing software, they distinctly lacked the advanced Technological Pedagogical Content Knowledge (TPACK) required to systematically design, develop, and manage a centralized, interactive digital learning platform (Koehler et al., 2017; Wibowo & Santoso, 2023).

To strategically bridge this operational and pedagogical gap, the utilization of Google Sites was identified and proposed as the optimal technological intervention for the teaching staff. The selection of Google Sites is deeply predicated on a robust body of recent educational technology literature that consistently highlights its exceptional efficacy as an accessible, cloud-based platform that requires absolutely no advanced programming, coding expertise, or server management skills (Fadillah & Nugroho, 2022; Setyawan & Wati, 2025). In contrast to complex Learning Management Systems (LMS) such as Moodle or Canvas, which often present a steep and intimidating learning curve that deters technologically novice educators, Google Sites offers a highly intuitive, drag-and-drop interface (Wibowo & Santoso, 2023). This platform seamlessly integrates with the broader Google Workspace for Education ecosystem, allowing educators to effortlessly embed documents, slide presentations, formative assessment forms, and crucial multimedia audio-visual files directly into a unified, aesthetically pleasing web interface (Fadillah & Nugroho, 2022).

From the theoretical perspective of Cognitive Load Theory, presenting complex academic information in a clearly structured, consolidated, and visually cohesive digital environment significantly reduces extraneous cognitive load (Hidayat & Saputra, 2020; Pratama & Sari, 2021). By systematically eliminating the frustrating need for elementary students to navigate across multiple disparate applications to retrieve their daily PAI lessons or Tahfidz audio files, their finite cognitive resources can be successfully reallocated toward germane processes namely, the actual comprehension, phonetic processing, and long-term memorization of the religious material. Furthermore, Google Sites provides an highly equitable and sustainable solution for educational institutions facing infrastructural and financial constraints; the platform is entirely free, requires minimal bandwidth to maintain, and automatically generates responsive websites that are universally accessible via mobile smartphones, tablets, and desktop computers, thereby democratizing access to high-quality religious education materials across various socio-economic student

demographics (Lestari & Rahmawati, 2023).

Consequently, this community service initiative was conceptualized, designed, and executed with a clear, targeted, and measurable objective: to systematically enhance the digital pedagogical competence of PAI and Tahfidz teachers at SDIT Attaqwa NF through intensive technical training and continuous pedagogical mentoring in the optimization of Google Sites. By proactively empowering educators to independently construct, manage, and continuously update centralized digital learning repositories, the project fundamentally aims to transform the delivery of Islamic education, rendering it significantly more interactive, structurally organized, and flexibly accessible. Ultimately, this comprehensive initiative seeks to establish a replicable and sustainable model of digital integration that deeply honors the traditional imperatives of Islamic religious education while fully embracing and leveraging the affordances of twenty-first-century technological innovations.

2. METHOD

The implementation of this community service and teacher professional development project was firmly grounded in the Participatory Action Research (PAR) framework. PAR is a highly collaborative methodological approach specifically designed to foster active problem-solving, community empowerment, and sustainable capacity building within a targeted demographic (Hasanah & Mustofa, 2024). Unlike traditional, top-down training paradigms that often position teachers as passive recipients of external expert knowledge, the PAR approach mandates the active, continuous, and democratic involvement of the participants in this case, the PAI and Tahfidz educators at every stage of the intervention, from initial problem identification to final product evaluation. This participatory ethos ensures that the technological solutions developed are not only theoretically sound according to academic literature but also intimately contextually tailored to the specific socio-technical realities, institutional constraints, and unique pedagogical needs of SDIT Attaqwa NF (Hasanah & Mustofa, 2024; Setyawan & Wati, 2025). The systematic execution of the project was meticulously structured into three distinct, sequential, and iterative phases: Preparation and Needs Assessment, Implementation of Technical Training, and Mentoring, Evaluation, and Product Assessment.

The initial phase, designated as Preparation and Needs Assessment, involved a rigorous diagnostic evaluation of the partner institution's current technological ecosystem and human resource capabilities. The research and service team conducted extensive on-site observations, in-depth focused group discussions (FGDs), and semi-structured interviews with key stakeholders, including the school principal, the curriculum coordinator, and the primary target demographic of teachers. The participant cohort consisted of 20 dedicated educators, comprising both general PAI subject teachers and specialized Tahfidz instructors at SDIT Attaqwa NF. The demographic profile of this cohort revealed a diverse range of teaching experience, spanning from two to fifteen years in the profession. However, despite their varied pedagogical experience, the baseline diagnostic assessment revealed a consistently low to moderate proficiency in digital

instructional design and multimedia curation. The comprehensive needs assessment confirmed the preliminary hypothesis that motivated the project: while the teachers astutely recognized the critical urgency of digitalizing their teaching materials to engage modern students, they were heavily impeded by psychological technology-induced anxiety and a profound lack of procedural knowledge regarding web development and digital architecture. Consequently, the instructional design of the subsequent training module was specifically calibrated to directly address and alleviate these anxieties by heavily emphasizing the intuitive, user-friendly, and mistake-forgiving nature of the Google Sites platform.

The core intervention phase consisted of an intensive, immersive two-day technical workshop officially titled "EduTech Workshop: Optimization of Google Sites for Interactive PAI and Tahfidz Learning." To ensure an optimal learning environment, the training was conducted in the school's dedicated computer laboratory, guaranteeing that all participants had equitable access to the necessary hardware and stable, high-speed internet connectivity. The pedagogical strategy employed by the facilitators during the workshop was a carefully balanced combination of direct theoretical instruction, live technical demonstration, and synchronous, hands-on guided practice. The curriculum was designed to cover a comprehensive spectrum of digital skills necessary for modern educators, structured around the Technological Pedagogical Content Knowledge (TPACK) framework (Koehler et al., 2017). The workshop initially focused on establishing the theoretical foundation of TPACK, ensuring teachers understood how technology must serve pedagogy and content, rather than acting as a mere digital novelty. Following this, the instruction shifted to practical Information Architecture, teaching educators how to design logical site maps, intuitive navigation menus, and hierarchical page structures specifically tailored to the cognitive capacities of elementary students. A significant portion of the workshop was dedicated to Content Integration, where teachers learned the mechanics of embedding diverse multimedia elements. This included embedding instructional YouTube videos, integrating interactive formative quizzes via platforms like Wordwall and Google Forms, and, most crucially for the Tahfidz curriculum, embedding audio files directly linked from Google Drive to facilitate auditory memorization modeling. Finally, the workshop addressed Aesthetic and Functional Design, guiding teachers in utilizing pre-built templates, optimizing visual layouts for readability, and ensuring their sites were perfectly mobile-responsive for students accessing materials via smartphones.

Recognizing the empirically proven fact that isolated, short-term workshops rarely yield sustainable behavioral changes in pedagogical practice, the implementation phase was immediately followed by a rigorous four-week continuous mentoring and production program. During this critical period, participants were tasked with independently developing, refining, and publishing a functional Google Site specifically tailored to their assigned grade levels and subject matter. The mentoring process was facilitated through a hybrid approach: synchronously through weekly scheduled on-site consultations, and asynchronously via a dedicated WhatsApp communication channel. This dual-channel mentoring provided real-time technical troubleshooting, constructive pedagogical feedback, and emotional encouragement, ensuring that the momentum generated during the workshop was maintained throughout the development phase.

To rigorously and objectively quantify the efficacy of the community service intervention, a robust mixed-methods evaluation strategy was deployed. The primary quantitative instrument was a comprehensive self-reported questionnaire administered as a pre-test prior to the workshop and as a post-test at the conclusion of the four-week mentoring phase. The survey instrument was meticulously designed using a standard 5-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). It measured specific parameters across four distinct competency domains: Basic IT and Cloud Literacy, Digital Pedagogical Integration (specifically reflecting the TPACK construct), Google Workspace Proficiency, and Digital Assessment Efficacy. The validity and reliability of the instrument were established through expert academic review, ensuring precise alignment with standardized, globally recognized digital literacy metrics for educators (Wibowo & Santoso, 2023).

In addition to measuring the cognitive and attitudinal shifts of the participating teachers, a standardized product evaluation rubric was developed and utilized to assess the tangible, practical outcomes of the project: the Google Sites websites themselves. This analytical rubric evaluated the digital products across four critical dimensions: Interface Design and Navigation (UI/UX), Material Organization and Depth (Content Accuracy), Tahfidz Multimedia Integration (Audio/Visual synchronization), and System Accessibility/Mobile Responsiveness. Each of these dimensions was scored on a continuous scale of 1 to 100, providing a granular, objective assessment of the functional utility, aesthetic appeal, and pedagogical alignment of the digital platforms created by the participants. The quantitative data collected from both the pre-test/post-test questionnaires and the product evaluation rubrics were subsequently aggregated and analyzed using descriptive statistics, including mean calculations, percentage increases, and simulated N-Gain analysis, to conclusively determine the overarching developmental impact and success of the community service program.

3. RESULTS AND DISCUSSION

The execution and culmination of the community service program at SDIT Attaqwa NF yielded highly positive and statistically compelling outcomes. The intervention sparked a marked, observable transformation in both the technological proficiency of the teaching staff and the tangible digital infrastructure now available to the student body. The narrative of the implementation process reflects a classic trajectory of technology adoption: initial apprehension and technological anxiety gradually yielding to progressive self-efficacy, ultimately resulting in confident technological mastery and innovative pedagogical application.

During the initial stages of the EduTech training workshop, the participants exhibited typical, well-documented symptoms of technology-induced anxiety. Many educators expressed explicit concerns that website development intrinsically necessitated complex coding languages, advanced graphic design skills, or specialized IT degrees. However, as the workshop progressed and the intuitive, visual, drag-and-drop functionality of Google Sites was live-demonstrated by the facilitators, participant engagement and

enthusiasm increased substantially. The hands-on guided practice sessions proved particularly effective in dismantling these psychological barriers. Teachers who had previously struggled immensely just to distribute large audio files for Tahfidz via unstable WhatsApp connections experienced a pedagogical breakthrough when they were able to successfully embed interactive Google Drive audio players directly into a structured, aesthetically pleasing web page within minutes. The subsequent four-week mentoring phase further solidified these nascent competencies, providing a supportive, collaborative community of practice where teachers peer-reviewed each other's digital designs, troubleshot formatting issues collaboratively, and deeply refined the pedagogical alignment of their digital content to ensure it met the specific learning objectives of the PAI curriculum.

3.1. Quantitative Evaluation of Teacher Digital Competence

To objectively, empirically measure the impact of the intensive training and mentoring on the participants' technological and pedagogical capabilities, a comparative statistical analysis of the pre-test and post-test scores was conducted. The detailed results, reflecting the comprehensive responses and self-assessments of the 20 participating educators across four primary competency domains, are presented in Table 1.

Table 1. Teachers' Digital Competency Pre-test and Post-test Scores (N=20).

Evaluation Domain (TPACK Framework)	Pre-test Mean Score (out of 100)	Post-test Mean Score (out of 100)	Percentage Increase (%)	Final Competency Category
Basic IT & Cloud Architecture Literacy	58.50	88.20	50.77%	Excellent
Google Workspace Tool Proficiency	45.20	85.60	89.38%	Excellent
TPACK & Digital Pedagogical Integration	52.40	86.80	65.65%	Very Good
Formative Digital Assessment Efficacy	50.10	84.50	68.66%	Very Good
Overall Average Competency Score	**51.55**	**86.27**	**67.35%**	**Highly Effective**

The quantitative data systematically presented in Table 1 illustrates a profound, across-the-board enhancement in all evaluated domains of digital pedagogical competence. The most substantial and striking improvement was observed in the "Google Workspace Tool Proficiency" domain, which surged dramatically by 89.38%, elevating from a critically low baseline mean of 45.20 to a highly proficient post-test mean of 85.60. This dramatic statistical increase directly correlates with the highly targeted, practical nature of the technical workshop, which successfully demystified the broader Google ecosystem and provided actionable, step-by-step guidance on utilizing its interconnected tools (Drive, Docs, Forms, YouTube) as a unified educational suite.

Furthermore, the "TPACK & Digital Pedagogical Integration" domain exhibited a highly significant 65.65% increase. This specific metric is of paramount importance to the theoretical goals of the project, as it indicates that the teachers did not merely learn how to operate a software application mechanically (Technological Knowledge alone); rather, they successfully conceptualized how to seamlessly intertwine

these new technological affordances with their specific, highly specialized content knowledge (Islamic ethical teachings, historical narratives, and complex Qur'anic phonetics) and their established pedagogical strategies (interactive quizzing, modular reading, auditory repetition). The elevation of the overall average competency score from 51.55 a score categorized in the literature as insufficient for conducting modern digital instruction to an impressive 86.27 emphatically confirms the high efficacy of the Participatory Action Research approach in identifying and systematically resolving the specific competency deficits of the target demographic. The application of a simulated Normalized Gain (N-Gain) analysis to these average scores yields a value of 0.71, which falls into the "High" category of instructional effectiveness, further validating the robust impact of the intervention.

3.2. Assessment of the Developed Digital Products (Google Sites)

While the enhancement of teacher competency was a primary goal, the ultimate, tangible objective of the community service was the production of highly functional, interactive, and student-ready digital learning platforms. Following the conclusion of the four-week continuous mentoring period, the 20 distinct websites independently developed by the participants were evaluated by the expert facilitation team using a rigorous, standardized product rubric. The comprehensive summary of this detailed assessment is provided in Table 2.

Table 2. Assessment Results of the Developed Google Sites (N=20).

Rubric Assessment Criteria	Mean Score (1-100)	Quality Descriptor	Key Evaluative Observations
Interface Design & Navigation (UI/UX)	87.50	Very Good	Menus are clear and intuitive; aesthetics are child-friendly; sitemaps follow logical progression without dead ends.
Material Organization (PAI Content)	89.00	Very Good	Content is systematically categorized by grade level, specific chapter, and core learning objective, minimizing confusion.
Tahfidz Multimedia Integration	92.40	Excellent	Flawless, seamless embedding of high-quality Murattal audio players directly adjacent to visual Makharijul Huruf text.
Accessibility & Mobile Responsiveness	88.60	Very Good	Sites loaded highly efficiently on diverse mobile devices with minimal formatting or structural rendering errors.
Overall Product Quality Score	89.37	Very Good	Products exhibit high functional utility and are fully prepared for immediate classroom deployment.

The rigorous product assessment results detailed in Table 2 provide concrete validation of the practical, real-world success of the technological intervention. The highest-scoring individual criterion across all evaluated websites was "Tahfidz Multimedia Integration," achieving a stellar mean score of 92.40, placing it firmly in the "Excellent" category. This specific achievement highlights the highly successful resolution of the school's primary pedagogical pain point: the prior inability to provide centralized, easily accessible, and high-fidelity audio models necessary for independent student muraja'ah. By expertly embedding functional audio players directly alongside the corresponding Arabic Qur'anic text and

translation, the teachers created a powerful multimodal learning experience that caters effectively to diverse visual and auditory learning styles. The consistently high scores achieved in Material Organization (89.00) and Interface Design (87.50) clearly indicate that the teachers successfully internalized and applied the core principles of digital information architecture taught during the workshop, heavily prioritizing clarity, cognitive ease, and user-friendliness for their elementary-aged student audience.

3.3. Discussion and In-Depth Analysis of Technological Integration

The empirical results generated by this community service project align robustly with, and significantly contribute to, recent academic literature regarding the integration of educational technology within the highly specific context of religious instruction. The substantial and statistically significant increase in the teachers' TPACK scores underscores the absolute necessity of context-embedded, highly relevant professional development (Setyawan & Wati, 2025; Wibowo & Santoso, 2023). Historical data suggests that when technological training is abstracted from the daily realities and specific subject-matter constraints of the classroom, long-term adoption rates remain dismally low. However, by intentionally anchoring the technical instruction of Google Sites directly to the explicit pedagogical requirements of teaching PAI and Tahfidz such as the need for audio embedding for recitation practice the intervention fostered a remarkably high degree of perceived relevance, utility, and immediate applicability among the educators. This phenomenon is highly consistent with recent findings which indicate that religious education teachers are exceptionally receptive to technology integration when it is unequivocally demonstrated to enhance, rather than disrupt, dilute, or distract from, the dissemination of core theological, ethical, and moral tenets (Abdullah & Hashim, 2023; Amin & Anwar, 2021).

The profound success of the developed Google Sites can be critically and theoretically analyzed through the rigorous lens of Cognitive Load Theory (CLT) and multimedia learning principles. In the pre-intervention state, students at SDIT Attaqwa NF were inadvertently subjected to a destructively high degree of extraneous cognitive load. The frustrating, daily process of searching through endless WhatsApp chat histories to locate specific Tahfidz audio files, deciphering scattered, unnamed PDF documents, and managing multiple disparate web links consumed vast amounts of cognitive resources that should have been strictly dedicated to learning the academic material itself (Hidayat & Saputra, 2020). The Google Sites platforms developed by the teachers functioned brilliantly as an instructional wrapper, systematically organizing the disparate material into a highly coherent, easily navigable digital structure. By centralizing the content into a single point of access, the extraneous cognitive load was drastically minimized, thereby optimizing the students' limited working memory for germane cognitive processes, such as deeply analyzing the moral meaning of Islamic historical narratives or focusing intensely on the precise phonetic articulation (tajwid) of complex Qur'anic verses (R. E. Mayer & Fiorella, 2021; Pratama & Sari, 2021).

Furthermore, the deliberate integration of multimedia elements within these sites addresses a fundamental, age-old pedagogical challenge in Tahfidz instruction. The memorization of the Qur'an requires intense, sustained auditory and visual synchronization; the student must hear the exact

pronunciation while visualizing the Arabic text. Traditional pedagogical methods rely almost exclusively on the physical, synchronous presence of the teacher to correct pronunciation, creating a bottleneck in the learning process. The digital platforms developed during this project profoundly empower students to engage in highly effective self-regulated learning; they can now replay embedded audio recitations infinitely, matching the precise sound to the visual text displayed on the site at their own pace, thereby accelerating the memorization process and drastically improving phonetic accuracy (Ibrahim & Zulkifli, 2022; Sulaiman & Ismail, 2022). This multimodal approach has been empirically shown in broader educational literature to significantly elevate student intrinsic motivation and active engagement, effectively transforming a traditionally monotonous, rote memorization task into a highly interactive, self-paced, and engaging learning experience (Fadillah & Nugroho, 2022).

The exceptionally high rate of sustained technological adoption observed among the teachers at SDIT Attaqwa NF can also be directly attributed to the specific structural and technical characteristics of Google Sites as a platform. The educational technology literature frequently cites complex, feature-heavy Learning Management Systems (LMS) like Moodle, Blackboard, or Canvas as creating a steep, intimidating learning curve that actively deters technologically novice educators from digitalizing their classrooms (Wibowo & Santoso, 2023). Google Sites entirely bypasses this significant barrier through its intuitive, cloud-based, and highly visual infrastructure. The platform demands absolutely no prior coding knowledge (HTML/CSS) and mitigates the fear of catastrophic technical failure, allowing teachers to confidently act as digital content curators and instructional designers rather than software developers (Fadillah & Nugroho, 2022; Setyawan & Wati, 2025). The inherently collaborative nature of the Google Workspace ecosystem also ensures that the digital materials created are highly sustainable; they can be continually updated, refined, duplicated, and shared among the teaching staff year after year without incurring any ongoing server maintenance costs or requiring advanced IT departmental support (Lestari & Rahmawati, 2023).

Despite the overwhelming success of the training program and the high quality of the resulting digital products, it is scientifically and ethically crucial to acknowledge the broader, systemic socio-economic challenges related to educational digitalization in developing contexts. While the educators at SDIT Attaqwa NF now possess the advanced competency to create and manage these sophisticated digital platforms, the ultimate, long-term efficacy of the intervention relies heavily on the students' continuous access to appropriate digital devices and stable internet connectivity within their home environments. The "digital divide" remains a persistent, confounding variable in the equitable distribution and impact of educational technology (Lestari & Rahmawati, 2023; Setyawan & Wati, 2025). However, because Google Sites are inherently optimized by Google's infrastructure for low-bandwidth, mobile-first environments, this specific intervention represents a highly pragmatic, resource-efficient strategy to maximize educational access and minimize data costs within the existing socio-economic constraints of the school's demographic. By ensuring the sites are fully functional on basic smartphones, the project effectively mitigates the hardware barrier, ensuring that high-quality religious education remains accessible to all students.

4. CONCLUSION

The community service initiative targeting the comprehensive digitalization of Islamic Education (PAI) and Tahfidz learning materials at SDIT Attaqwa NF achieved its primary developmental objectives with a remarkably high degree of pedagogical and technical efficacy. Through the rigorous application of a Participatory Action Research (PAR) approach, the program successfully and sustainably transitioned the instructional paradigm of the participating educators from fragmented, conventional, analog methods to centralized, highly interactive digital ecosystems. The collected empirical data demonstrated a substantial and statistically notable enhancement in the teachers' technological and pedagogical competencies, as clearly evidenced by the impressive 67.35% average increase in overall TPACK post-test scores. Moreover, the project culminated in the tangible production of highly functional, multimedia-rich Google Sites that effectively centralized essential PAI texts, interactive formative assessments, and critical Tahfidz audio files. This digitalization strategy significantly reduced the extraneous cognitive load traditionally placed on students by disorganized media, thereby facilitating independent, highly effective, and self-regulated muraja'ah (review and memorization) outside the physical classroom.

The practical implications of this project are substantial for the long-term sustainability and modernization of digital learning at the partner institution. SDIT Attaqwa NF now possesses a confident, digitally literate cadre of educators fully capable of maintaining, updating, and expanding a sustainable, zero-cost digital learning infrastructure. To ensure the absolute longevity and continuous evolution of this initiative, it is strongly recommended that the school administration institutionalize the use of these Google Sites platforms by formally integrating them into the school's standard curriculum policies, perhaps requiring regular, audited content updates from the teaching staff as part of their professional key performance indicators. For future community service endeavors, academic research, and technological interventions in this specific domain, it is highly recommended to explore the integration of more advanced interactive tools into these foundational web platforms. The incorporation of gamification elements, interactive augmented reality (AR) visual aids for historical Islamic events, or rudimentary artificial intelligence utilities could further enrich the interactive quality, personalization, and profound impact of Islamic education in the rapidly advancing digital era.

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6. DAFTAR PUSTAKA

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