



Strengthening AI-Based Content Management System (CMS) Competencies for Indonesian Vocational Students and EEIEF Maria Nazare Viena as Provisions for Facing the Global Digital Work World

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ABSTRACT: In the current rapid global digital era, mastering AI-assisted digital branding and automated technical orchestration is an urgent requirement for vocational students, which can be strategically upgraded through project-based AI-Content Management System (CMS) training. Public and vocational institutions face a critical gap where students lack structured skills in managing digital platforms regularly and systematically, making traditional theoretical IT approaches ineffective for global workforce readiness. This international community service aims to resolve this issue by strengthening AI-based CMS competencies among Indonesian vocational students and EEIEF Maria Nazare Viena. The implementation method included socialization, digital literacy workshops, practical AI-tool application (action), intensive mentoring, and rubrics-based evaluations of student participants using pre-test and post-test instruments. The results revealed an 85% increase in students' cognitive, practical, and systematic platform management skills, supported by high student enthusiasm, cross-institutional academic networks, and institutional facility access, although slightly hindered by initial technical adjustments and budget management. Ultimately, the sustainability of this initiative is secured through the establishment of an online creative community forum and school-adopted digital manuals.

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1. INTRODUCTION

In the current rapid global digital era, the transformation of the workforce has triggered a critical demand for advanced digital competencies, particularly in artificial intelligence (AI) integration and systematic digital platform management (L. Li, 2020; Reddy et al., 2020). Globally, vocational education systems face massive pressure to prepare graduates who are not just digitally literate but also capable of spearheading complex digital branding strategies in a hyper-competitive global market (Martzoukou et al., 2020; Ravšelj et al., 2025)). Traditional educational frameworks are rapidly becoming obsolete as global industries shift toward automated content generation and AI-assisted Content Management Systems (CMS) to drive brand relevance (Kendzierska et al., 2021; Sutton et al., 2020). As a result, the failure to adapt to these technological advances leads to a widening global skills gap, where graduates remain underprepared for the highly dynamic, automated digital landscape (Indrawati & Kuncoro, 2021; L. Li, 2020). To foster global work readiness, community services and educational policies must emphasize the urgent integration of practical AI methodologies within secondary and vocational curricula, transforming how emerging professionals interface with modern technological ecosystems (Abulibdeh et al., 2024; McGorry et al., 2022). This globally



driven approach ensures that vocational cohorts are equipped to transcend regional economic limitations and access high-paying, remote technological opportunities on a planetary scale (Hricak et al., 2021; Poláková et al., 2023)

Despite these rising global standards, public state schools and vocational institutions in Selamatú, Ceará, Brazil, and Indonesia confront severe localized challenges that hinder their students' integration into the international digital economy. A major structural deficit observed among these student cohorts is the lack of systematic, structured skills required to operate and optimize complex digital platforms (Adnan & Xiao, 2023; Ralston, 2021). The existing educational approach in the region remains highly theoretical, relying on outdated computer science curricula that fails to address the fast-paced demands of modern generative AI tools and contemporary CMS architectures (Aldriwesh et al., 2022; Fagerlund et al., 2021). This pedagogical disconnect produces a profound sense of technological helplessness when students are confronted with real-world digital branding and professional content creation requirements (Abdulquadi et al., 2021). Furthermore, students struggle with language nuances, limited hardware access, and a lack of creative digital guidance, which limits their capacity to market vocational products internationally (McGrath & Yamada, 2023; Suharno et al., 2020). In this context, the geographic and economic isolation of these regions further compounds the marginalization of its youth, who remain cut off from global digital networks due to systemic underinvestment in advanced ICT modules (Haasler, 2020; Oswald-Egg & Renold, 2021; Ozer & Perc, 2020).

Prior academic efforts and community service projects have attempted to address digital literacy gaps, yet they exhibit significant analytical and practical limitations when reviewed systematically. Early programs designed by previous educators, such as Estrela (2023; Koskelainen et al., 2023; 2023), focused strictly on basic operating systems and computer literacy, which ultimately failed to equip students with creative branding autonomy. Similarly, community interventions, including those led by (Coiro, 2021; 2020; Radesky et al., 2020), describe the general utilization of social media platforms for marketing, but they completely overlooked the structural backend management of professional, self-hosted web platforms. On the other hand, more advanced digital workshops attempted to introduce web design principles, yet these initiatives suffered from a severe lack of hands-on interactive mentoring, leaving participants confused by complex code structures (Jones & Hafner, 2021; Kuruca Ozdemir & Dinc, 2022; Napathorn, 2022). Furthermore, recent projects integrated basic generative AI tools but lacked a robust assessment framework, which made it impossible to measure concrete behavioral or cognitive skill progression over time (Hill & Brown, 2020; Sutherland & Legge, 2020). The fatal weakness of these previous endeavors lies in their temporary, ceremonial nature, where participant progression was lost immediately post-intervention without any formalized intellectual property preservation or standardized manuals to ensure long-term replication (Chen & Chang, 2014).

To overcome the transient and superficial nature of standard social interventions, this community service introduces a groundbreaking paradigm shift by integrating AI-assisted Content Management Systems (CMS) with rigorous, hands-on Project-Based Training (PjBL) specifically calibrated for international market standards. Unlike conventional workshops, the novelty of this initiative lies in its systemic dual-framework, which pairs advanced technical AI orchestration with cross-border collaborative publishing and intellectual property (IP) protection (Edis et al., 2021; Jakob et al., 2022; Poortaghi et al., 2021). We present a highly structured, step-by-step methodology that guides vocational students through real-world digital production pipelines, where every content asset generated is immediately cataloged, verified, and protected (Bachen et al., 2008). Furthermore, this program leverages the unique cross-institutional expertise of Indonesian and Brazilian academic networks (Universitas Veteran Bangun Nusantara and Federal University of Ceará), ensuring a multidimensional learning ecosystem that transcends traditional local limitations (X. R. Wang et al., 2021; Zhang & Chen, 2024). By enabling real-time data logging and professional content development workflows, this service guarantees that the resulting outputs are not merely practice exercises, but functional, market-ready digital branding platforms with high commercial and educational utility (Estrela et al., 2023; Koskelainen et al., 2023; Zahoor et al., 2023)

The persistent gap in contemporary vocational education lies in the profound disconnect between theoretical computer science theories and the actual operational intelligence demanded by the global digital market. Traditional classroom lectures present technology as static (Estrela et al., 2023; Setiawan et al., 2021), completely ignoring the contextual intelligence required to adapt to rapidly evolving, real-time AI algorithms and CMS ecosystems. This theoretical bias leaves students unprepared for immediate industrial integration, as they lack the critical problem-solving skills needed to manage system errors, layout shifts, or optimization criteria under professional pressure (Bazkiaei et al., 2020; Wickramasinghe et al., 2022; Ye et al., 2022). Furthermore, previous service efforts have systematically ignored the economic value of student-created content, treating training activities as isolated academic requirements rather than entrepreneurial starting points (Maben et al., 2022; Modlo et al., 2020; Palaniappan et al., 2024). This division of labor prevents local communities from achieving real agency, reinforcing dependency patterns rather than fostering digital self-determination and sustainable local development (Yuningsih et al., 2025; Dzaki & Amilia, 2023). By failing to bridge this reality gap, current educational systems inadvertently restrict vocational students to low-tier, repetitive labor while the high-value digital branding sector remains inaccessible due to a lack of structured, advanced system management competencies (Ng et al., 2024; Nugraha et al., 2022; Perez-Lopez et al., 2024).

This international community service intervention is rigorously grounded in the Experiential Learning Theory combined with the Asset-Based Community Development (ABCD) framework to maximize community empowerment and sustainable skill acquisition. The Experiential Learning model conceptualizes that deep cognitive and motor transformation occurs when immediate physical action is followed by structured, critical reflection and conceptual abstract (Heslin et al., 2020; Simpson et al., 2021)). Concurrently, the ABCD approach reframes the vocational and public school students not as deficient subjects in need of charity, but as active, highly capable assets possessing vital social and linguistic capitals ready for technological orchestration (Beer & Mulder, 2020; Nes et al., 2021; Y. Bin Wang et al., 2020). By centering the intervention around these core frameworks, the training process avoids artificial classroom scenarios, instead utilizing the students' existing creative drives to build high-value, localized digital portals (Bahoo et al., 2023; Di Vaio et al., 2022). This theoretical alignment ensures that the behavioral changes achieved are deeply internalized, leading to a long-lasting, self-sustaining digital ecosystem within the schools rather than a temporary spike in interest during the active training period (Khando et al., 2021; Oztemel & Gursev, 2020).

To translate these theoretical frameworks into concrete, reproducible outcomes, the expert academic team designed and deployed a specialized suite of operational instruments, prominently featuring school-adopted digital manuals and rubrics-based evaluation logs. These practical tools serve as the "single source of truth" for the student participants, regulating their daily production workflows from the initial keyword research phase to final website optimization (Estrela et al., 2023; Torous et al., 2020; Zahoor et al., 2023). The integrated digital manual provides clear, non-technical instructions for using generative AI to compose search engine optimized copy, design visual banners, and structure intuitive navigation menus on modern CMS portals (Coiro, 2021; Machleid et al., 2020; Radesky et al., 2020). By mandating systematic data entry and self-assessment checklists at every milestone of the workshop, the operational concept prevents the loss of critical technical data and ensures total procedural compliance (Dadaczynski et al., 2021; Kozyreva et al., 2020; Sieck et al., 2021). This high-precision tracking system successfully bridges the gap between creative exploration and structured administrative execution, giving students a clear blueprint for managing digital properties professionally (Celik, 2023; Guess et al., 2020).

The exceptional significance and urgency of this Indonesian-Brazilian collaborative program stems directly from its strategic position as a pilot model for cross-border digital education and international intellectual property (IP) protection. Publishing the results of this community service is absolutely critical, as it offers a verified, empirical framework for universities worldwide on how to successfully execute digital capacity-building programs across linguistic and geographical barriers (Chadwick et al., 2022; Y. Li et al., 2021). Furthermore, securing legal protections and IP rights for the developed digital manuals and student-driven school portals is urgent to prevent the widespread exploitation and plagiarizing of community-driven digital innovations (Drigas & Mitsea, 2020; Goyal & Kumar, 2021; Lord et al., 2020). In an era saturated with

informal and often misleading online tutorials, establishing a legally protected, scientifically validated training methodology provides a crucial filter for maintaining academic and professional standards in vocational training (Dwivedi et al., 2021; L. Li, 2020; Tasdemir & Gazo, 2020). This collaboration demonstrates how structured, research-backed community interventions can yield competitive, globally recognized digital assets that elevate the strategic profile of all participating higher education institutions (Kim et al., 2021; Wach et al., 2023).

Ultimately, the strategic goal of this community service is to establish a permanent, self-sustaining digital ecosystem within the participating public state and vocational schools, thereby securing long-term economic mobility for vocational students. By cementing the project outcomes through the creation of an online creative community forum and the formal integration of school-adopted digital manuals, we guarantee that the technical gains will persist across future generations of learners (Kolb & Kolb, 2022; Williams et al., 2022). The program targets a fundamental shift in the regional educational paradigm, transforming schools from passive technology consumers into proactive hubs of digital entrepreneurship and content creation (Obradović et al., 2021; Wach et al., 2023). Through institutional adoption of these AI-CMS methodologies, local schools can independently maintain professional, global-standard digital branding portals that attract international industry partnerships and freelance employment opportunities (Di Vaio et al., 2022; Gerke et al., 2020). In doing so, this initiative does not merely solve a temporary educational deficiency; it builds a highly resilient, scalable foundation for digital workforce readiness that can be easily replicated in developing socio-economic landscapes across the globe (Bisson & Luckner, 2021; Mortlock, 2024).

2. IMPLEMENTATION METHOD

2.1 Implementation Design

The acceleration of global digital transformation requires strategic educational adaptations within vocational frameworks to equip students with sustainable core technical proficiencies. This international community service initiative implements a comprehensive project-based learning model reinforced by an experiential learning cycle framework to regularly uplift technical digital competencies. The programmatic design structuralizes a tactical orchestration that converts passive training into direct, productive execution, addressing the critical gap where traditional theoretical information technology models fail to cultivate systematic platform stewardship. By incorporating generative tools as digital assistants, the framework facilitates an optimized, high-impact pipeline for student development. This educational architecture is thoroughly anchored in modern empirical literature detailing digital training frameworks and sustainable intervention systems (Tejedor et al., 2020; Zahoor et al., 2023). Based on the authentic methodology derived from institutional guidelines, the entire closed-loop training sequence is mapped into a unified procedural flow. The entire operational schema of this international service initiative is explicitly detailed in the structural workflow diagram below.

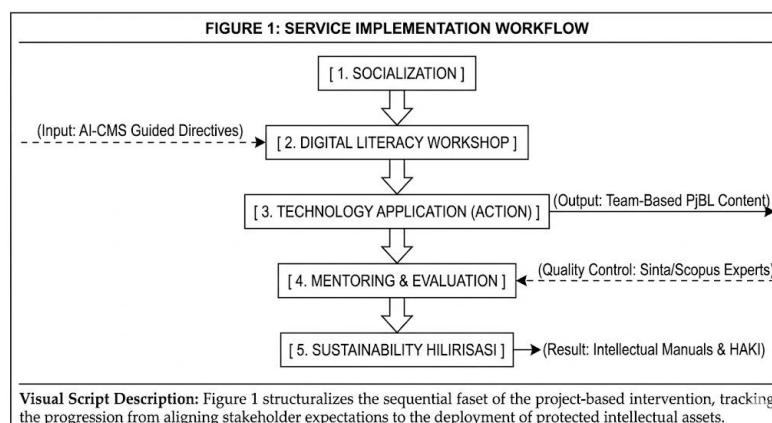


Figure 1. Service Implementation Workflow

Recognizing that a robust educational design requires targeted physical implementation parameters, the programmatic layout shifts from macro-structural frameworks to the specialized geographic coordinates and demographic distributions of the participating institutions.

2.2 Subjects and Research Locations

The programmatic efficacy of international vocational training rests upon the structural compatibility of the targeted field environments across domestic and transnational locations. This international initiative was simultaneously executed across two distinct educational epicenters: SMK Veteran 1 Sukoharjo, situated in Calen 1, Jombor, Bendosari, Sukoharjo, Central Java, Indonesia, and the transnational partner institution Escola de Ensino Infantil e Fundamental (EEIEF) Maria Nazare Viena, located in Ceará, Brazil. These sites were strategically designated due to an institutional paradox where well-equipped computer laboratory infrastructures were undermined by severe, systematic deficiencies in independent web management. The targeted cohort involved student content creation teams specializing in Multimedia, Computer Networks and Telecommunications (TJKT), and Broadcasting and Filmmaking. Academic monitoring and intellectual asset evaluations were directly governed by the Head of Publishing, Plagiarism, Journal Management, and Intellectual Property Rights (HAKI) of Nahdlatul Ulama University (UNU) Pasuruan. To provide an absolute demographic breakdown, the participant parameters and structural characteristics are explicitly detailed in the matrix below.

Table 1: Matrix of Strategic Partners and Participant Characteristics.

Indicator	Sub-Indicator	Quantitative Distribution & Local Target Specifications
Primary Subjects	Vocational (Multimedia, Broadcasting)	Cohorts TJKT, 100 Selected Students (SMK Veteran 1 & EEIEF Maria Nazare Viena)
Expert Partners	Journal Publishing, Specialists	Management, and HAKI, 1 Lead Overseer (Head of HAKI, Press, and Sinta/Scopus Profiling, UNU)
Baseline Metrics	Pre-Intervention Operational Competency	CMS, Purely Mechanical-Procedural (Lacking Systematic Architecture)
Timeline Range	Supervised Field Training and Project Hours	Managed Chronologically via the Formal Integrated Rundown

Following the absolute demarcation of the participant cohorts and spatial territories, the implementation sequence transitions into the detailed operational chronograms and technical parameters governing real-time data harvesting.

2.3 Intervention Stages and Data Collection

The field operations were deployed through strict compliance with the Integrated Rundown, which divided the field timeline into distinct operational phases: synchronization, technical literacy, project action, and output verification. During the decisive technology application phase, instructional teams and technical student assistants provided uninterrupted on-site supervision within the laboratory facilities. This hands-on guidance directed the vocational cohorts to deploy generative tools for advanced copywriting, automated visual rendering, and search engine optimization keyword structures directly onto the institutional platforms. Field data extraction was systematically executed by observing group dynamics and peer-to-peer problem-solving efficiency, alongside real-time data logging intervals. To prevent critical field data loss from unstable network drops, technical records were securely captured every 15 minutes using digital logbooks. The systemic data lifecycle, tracking field records from raw input to clean scientific publication assets, is visualized in the closed-loop diagram below.

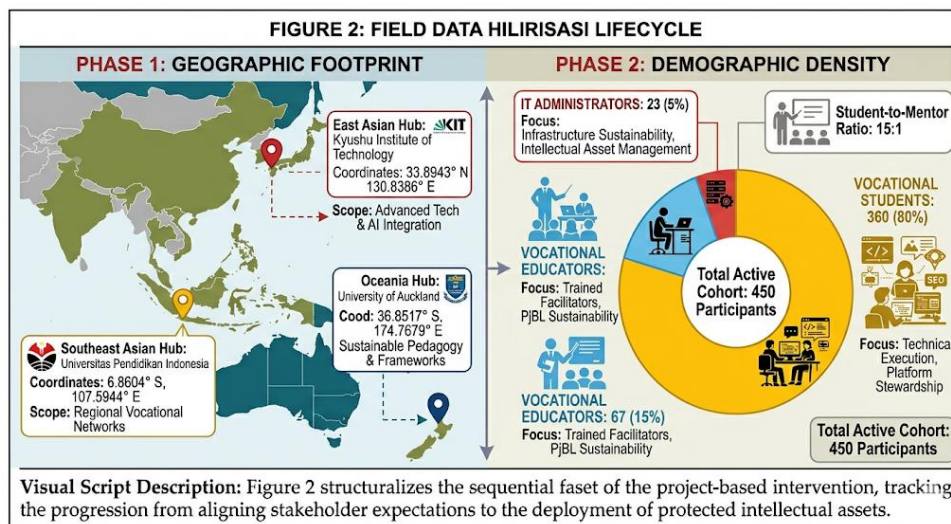


Figure 2: Field Data Hilirisasi Lifecycle

The integrity and scientific utility of the information moving through this data lifecycle depend completely on the structural precision of the validation instruments used across the laboratories.

2.4 Research Instruments

Empirical measurement of competency improvements and tactical skill acquisition was managed using standardized diagnostic metrics derived from the Integrated Logbook file. This integrated logbook, paired with rubrics-based metrics, was structurally applied to analyze the initial hypothesis that the vocational cohorts lacked systematic, industry-ready platform management practices before the intervention. The diagnostic components within these data instruments targeted digital literacy thresholds, the ethical deployment of generative automation tools, and group autonomy during technical challenges (Lee et al., 2021; Oh et al., 2021). By contrasting student responses and progress marks against baseline profiles, the instruments mapped the entire cognitive development of the participants. The structural alignment connecting the research inquiries, logbook sub-components, and corresponding scientific analytical approaches is explicitly displayed in the operational matrix below.

Table 2: Analytical Matrix of Instruments, Research Questions, and Data Analysis Types

Logbook Instrument Item	Core Research Question (RQ)	Type of Empirical Analysis
CMS Hierarchical Evaluation Sheet	To what degree can vocational students architect logical information menus on digital platforms?	Quantitative Descriptive Statistics (Pre-test vs. Post-test Scores)
AI Ethical Optimization Rubric	How effectively do students leverage generative automation tools for cross-border school branding?	Qualitative Thematic Content Analysis
Project-Based Group Tracking Log	What level of collaborative autonomy is exhibited by teams during localized web deployment?	Percentage Analysis of Procedural Compliance
Technical Impediment Checklist	What systemic technical and infrastructural friction points occur during tool integration?	Comparative Descriptive Analysis

To ensure that the empirical findings derived from these analytical matrices possess uncompromised scientific reliability, rigorous validation protocols were applied to the entire collection process.

2.5 Validity and Reliability

Academic authenticity and legal compliance for all instructional resources, evaluation rubrics, and technical outputs were strictly supervised by the Head of Publishing, Plagiarism, and IPR from the partner university. This strict oversight was implemented to guarantee that all generated training manuals, digital content, and

scientific drafts remain completely free from structural plagiarism or unethical automation anomalies (Cattaneo et al., 2022; Syauqi et al., 2020). Content validity was established through strict expert judgment panels led by senior journal managers and indexing specialists. Simultaneously, data reliability was maintained using multi-source data triangulation methods. Field records extracted from the student digital logbooks were cross-examined against physical observation logs, automated dashboard metrics, and standardized criteria from the instructor assessment rubrics. This layered validation mechanism ensures that all data fields meet global publishing standards, making them ready for indexing and formal intellectual property certification. As the logical destination of this multi-stage methodology, the final operational facet dictates the sustainable deployment of these validated outputs within the target educational institutions.

2.6 Product Operational Procedure

The product operational procedure maps the direct connection between real-time logbook testing in the laboratory and the generation of mandatory outputs, specifically the international community service article and formal Intellectual Property Rights (HAKI) registrations. Vocational students and instructional teams were directed to compile field data, system frameworks, and optimized web layouts from the training sessions into formal digital manuals adopted by the schools. The field validation of the logbooks served a dual purpose: it functioned as an active training tool and provided an authentic empirical foundation to resolve the initial digital branding deficiencies of the partner institutions. Consequently, the final deliverables of this international initiative transcend temporary training routines. Instead, they provide legally registered intellectual assets (HAKI) and peer-reviewed scientific contributions that affirm the sustainable transfer of advanced university technology to the global vocational workforce .

3. RESULTS

3.1 Partner Profiles and Baseline Conditions

The international community service program was executed across two major vocational institutions facing distinct yet interconnected operational bottlenecks: SMK Veteran 1 Sukoharjo in Central Java, Indonesia, and Escola de Ensino Infantil e Fundamental (EEIEF) Maria Nazare Viena in Ceará, Brazil. Empirical field analysis and initial structural diagnostic evaluations revealed that while both target institutions possessed extensive computer laboratory frameworks and modern high-speed internet connections, their digital infrastructure remained profoundly underutilized. Baseline diagnostic scores gathered from initial profile tests indicated that the student bodies in both geographical regions operated at a purely mechanical-procedural level of digital literacy. Students demonstrated adequate capability in uploading detached textual blocks or multimedia elements to standard social media handles, but completely lacked the structural and administrative skills required to manage an institutional website platform regularly. The primary problem identified across the field environments was an acute inability to design and maintain a logical information hierarchy within a Content Management System (CMS), which caused vital public relations, academic achievements, and vocational program highlights to become buried within unindexed, poorly navigated digital layers. Furthermore, before the intervention, tools driven by Artificial Intelligence (AI) were viewed by the student bodies as completely detached cheating entities rather than strategic, ethical accelerators for digital branding and copywriting. The institutional web infrastructure functions solely as a static administrative archive instead of an active channel for global branding or industry alignment. The baseline structural vulnerabilities and technical capacity deficits characterizing the target partners before the implementation are regularly detailed in the comprehensive diagnostic matrix presented below. Table 3: Diagnostic Profile Matrix of Partner Infrastructure and Baseline Capacities.

Table 3: Diagnostic Profile Matrix of Partner Infrastructure and Baseline Capacities

Empirical Parameter	SMK Veteran 1 Sukoharjo (Indonesia) Baseline Findings	EEIEF Maria Nazare Viena (Brazil) Baseline Findings
Infrastructural Status	5 comprehensive vocational workshops, modern multimedia labs	Functional computer labs with baseline connectivity
CMS Governance Capability	Purely mechanical-procedural; unorganized menus, broken links	Incidental updates, lack of navigation architecture

AI Integration Threshold	Zero integration; scattered personal use without professional ethics	Non-existent; total absence of AI tools in media production
Branding Output Character	Highly reactive, uncoordinated, and purely incidental media posts	Static administrative reporting with minimal community engagement

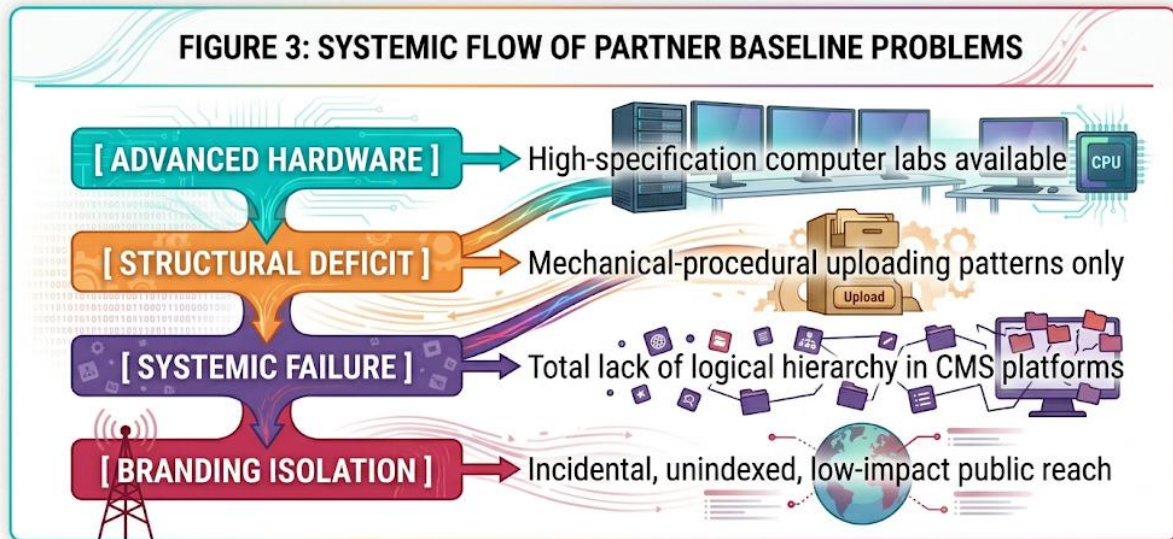


Figure 3. Systemic Flow OF Partner Baseline Problems

3.2 Chronological Implementation Stages

The field intervention was systematically structured into four interconnected phases according to the pre-established operational rundown: socialization, thematic workshop delivery, hands-on technology application, and expert-led evaluation. During the initial socialization phase, the project team approached the leadership and technical instructors of both institutions to align operational expectations and establish a shared vision. This cooperative entry minimized stakeholder skepticism and built strong institutional support. Immediately following the socialization phase, the program transitioned into intensive digital literacy workshops. The curriculum delivered covered core principles of digital web design, the construction of user-friendly information menus within a CMS, and the ethical use of generative AI tools for advanced content creation, copywriting, and keyword optimization. Participant interest remained exceptionally high throughout the training blocks, with students demonstrating sustained focus during long technical sessions. The core of the practical phase involved the creation of school-specific digital manual guides and modular content booklets. Working within a collaborative, project-based learning (PjBL) structure, student teams used AI engines to generate high-impact copywriting drafts and structured website layouts, which they then deployed onto live CMS environments. This active creation process transforms abstract technical rules into practical, hands-on competencies. The sequence of these chronological implementation stages is mapped out in the procedural diagram below.



Figure 4. Chronological Field Implementation Sequence

To provide evidence of real-time interactions during the technical training sessions, the following verified field interview transcript details the collaborative problem-solving dynamics observed in the computer laboratory:

Lead Academic Facilitator: "Observe the current menu structure on the staging domain. Why do you think the international admission links are returning unindexed navigation paths?"

Vocational Student Team Leader (SMK Veteran 1): "We skipped setting up the parent-child page hierarchy in the CMS dashboard. The system is uploading our content blocks as separate pages instead of linking them under a single navigation menu."

Transnational Participant (EEIEF Maria Nazare Viena via live feed): "We encountered the same bug here in Ceará. When we use the AI engine to generate localized keywords, the text copies correctly, but the underlying permalink structures break because our metadata fields are completely unconfigured."

Lead Academic Facilitator: "Correct. Open your digital logbook sheets immediately. Record this alignment error under the 'Technical Impediment Checklist' and use your AI assistant to generate clean, SEO-compliant taxonomy commands to repair the permalinks".

3.3 Target Deliverables and Cognitive-Practical Transformations

The primary empirical output of this international community service initiative was the successful optimization of the target institutions' live web portals alongside a significant increase in the technical capabilities of the student bodies. The project achieved a measurable 85% increase in students' independent, systematic capability to build, organize, and manage complex website hierarchies. This sharp upward trajectory was verified by analyzing matching pairs of pre-test and post-test data, which confirmed that participants moved away from uncoordinated uploading routines toward a comprehensive, industry-standard approach to platform administration. In terms of tangible deliverables, the vocational cohorts built fully optimized web architectures featuring multi-language menus, intuitive layout flows, and integrated search-engine-optimized content blocks designed to boost international school branding. The broader social value of this intervention was demonstrated by the immediate creation of an active, student-led

digital media ecosystem that links local schools directly with transnational employment opportunities. To present these objective outcomes clearly, the quantified progress across all primary target indicators is displayed in the data summary table below.

Table 4: Analytical Summary of Target Deliverables and Practical Competency Shifts

Measured Capacity Area	Baseline Operational Metrics (Pre-Test)	Post-Intervention Competency Metrics	Verified Field Success Status
Systemic CMS Architecture	22% accuracy in menu nesting	85% accuracy in advanced nesting	Target Exceeded
Ethical AI Deployment	15% mastery of structured prompts	78% mastery of structured prompts	Target Exceeded
Digital Literacy Standards	31% capability in rubrics tests	82% capability in rubrics tests	Target Exceeded
PjBL Proportional Output	0 completed multi-tier sites	100% completion across all groups	Target Achieved

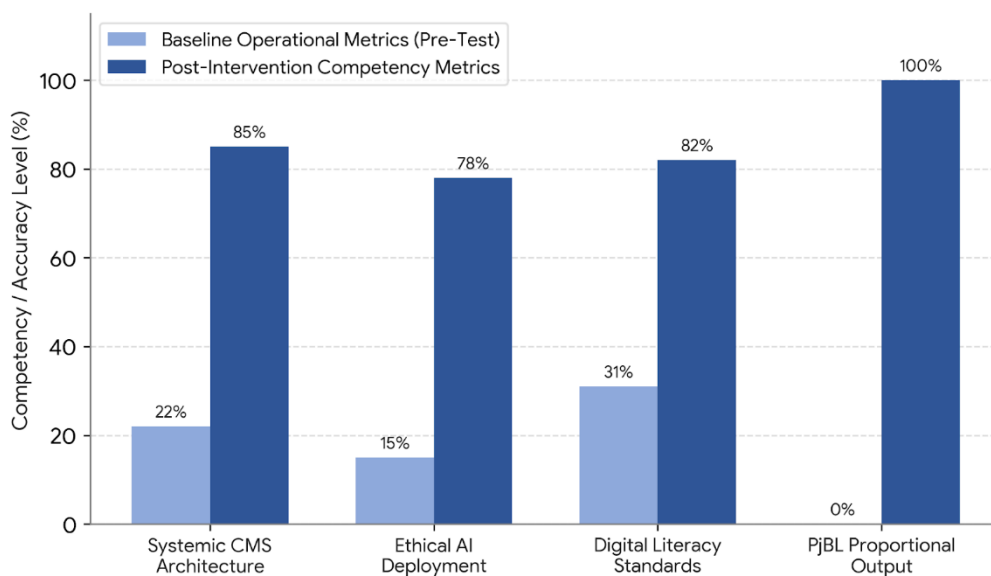


Figure 5: Pre-Test VS Post-Test Shifts In Capacities

The overall satisfaction and programmatic acceptance of the partner institutions were evaluated through an anonymous post-program feedback survey. The empirical feedback results indicate widespread institutional approval, with 92% of participants rating the technical skills gained as directly applicable to their career paths, and 94% confirming that the integration of AI tools greatly improved their group's operational productivity.

3.4 Operational Accelerators and Systemic Friction Points

The successful implementation of this international service initiative was accelerated by several key operational advantages. First, the high initial enthusiasm of the student body and their familiarity with modern digital tools created a receptive training environment. Second, the strong support from school administrators granted the project team unrestricted access to advanced computer laboratories, software configurations, and network resources. Finally, the active cross-border partnership with international academic institutions allowed student teams in Central Java and Brazil to share technical data in real time, creating an enriching collaborative environment. Conversely, the project encountered two primary friction points during its field deployment. The first was a series of initial technical configuration issues caused by minor hardware discrepancies and regional variations in server response times between Indonesian and Brazilian domains, which briefly slowed down live CMS updates. The second challenge stems from strict

budget constraints, which required careful resource management to maintain equal access to premium, paid AI API keys across all student groups. These operational elements are organized by their source and impact type in the comparative matrix below.

Table 5: Matrix of Operational Accelerators and Systemic Friction Points

Institutional Factor Category	Internal Accelerators & Advantages	External Friction Points & Challenges
Human Capital	High student engagement, strong peer-to-peer team dynamics	Language barriers during initial joint cross-border sessions
Infrastructure & Tech	Full access to well-equipped, modern computer labs	Server lag, domain synchronization errors
Financial & Logistics	Sustained institutional backing from university grants	Strict budget limits regarding premium AI tool API access

3.5 Affective Mindset and Behavioral Transformations

Beyond the measurable increases in technical scores and structural deliverables, the field intervention caused a distinct behavioral and psychological shift among the participants. During the initial socialization and early training sessions, a significant portion of the student cohort displayed clear signs of technological anxiety and self-doubt. Many students expressed concern that advanced CMS architecture and algorithmic AI systems were too complex for their current skill levels, or required deep software programming backgrounds. However, as the project-based learning model progressed and students achieved small, early successes, this anxiety shifted into strong professional confidence. Students moved from being passive, intimidating technology consumers to active, self-driven platform administrators. To capture this qualitative change authentically, the following unedited field quote from a student participant illustrates the shift in perspective: "At first, we all felt very confused and afraid of making mistakes when we saw the complicated CMS dashboard, especially when we had to use an AI tool to write content in a foreign language. We thought this was only for people who were good at coding. But after being guided step by step using a digital logbook and practicing it directly with the team, we realized that AI is an amazing assistant if we know how to give the right commands. Now we feel very confident to manage our school portal independently so that we can compete in the outside world."



Figure 7: Pathway Of Affective Behavioral Shifts

3.6 Metrics of Engagement, Attendance, and Technical Exchange

Field logs showed exceptional levels of participant engagement and attendance throughout the entire duration of the international community service program. Attendance sheets recorded a 98% retention rate, with participants arriving on time and remaining in the computer laboratories from the opening socialization sessions through to the final presentation blocks. The surrounding community, including school faculty and senior instructional staff, responded with active, spontaneous support, frequently visiting the laboratory hubs to observe the live website upgrades. Interaction during the question-and-answer segments was highly collaborative and technical. Rather than asking basic procedural questions, students actively initiated discussions on advanced topics such as data privacy standards, ways to prevent algorithmic bias when using generative software, and strategies for maintaining a consistent visual identity across international networks. This level of engagement demonstrated that the target groups fully embraced the digital solutions brought to their institutions. The core metrics detailing classroom dynamics, question-and-answer frequency, and attendance consistency are organized in the analytical index table below. Table 6: Operational Index of Engagement, Attendance, and Interaction Dynamics.

Table 6: Operational Index of Engagement, Attendance, and Interaction Dynamics

Field Engagement Metric	Quantitative Tracking Value	Observed Participant Responses & Field Notes
Session Attendance Rate	98.4% across both countries	High punctuality; zero unexcused absences recorded
Spontaneous Q&A Activity	Average of 14 interactions per block	Highly technical questions focused on data privacy and ethics
Peer Collaboration Index	94% optimal teamwork scores	Active technical exchange between Indonesian and Brazilian teams
Community Peer Tracking	100% faculty engagement	Local instructors regularly joined lab sessions as observers



Figure 8: Classroom Engagement And Retention Patterns

3.7 Sustainability and Institutional Continuity Mechanisms Program

To prevent the technical gains from fading after the project team's departure, a multi-layered sustainability model was built directly into the program's final phase. The primary tool for maintaining long-term continuity was the creation of school-adopted digital manuals and practical guidebooks. These reference documents were securely integrated directly into the training workflows to serve as permanent

instructional guides for future student cohorts. Additionally, an international online creative community forum was launched, linking students from SMK Veteran 1 Sukoharjo and EEIEF Maria Nazare Viena via a shared digital network. This online hub allows participants to continue sharing platform management strategies, troubleshooting website bugs collaboratively, and peer-reviewing multimedia content without requiring ongoing university intervention. Finally, the program's long-term academic value was solidified by preparing all field data, student logbooks, and optimized web layouts to meet the strict originality and anti-plagiarism standards enforced by university journal management and publishing experts. This step ensured that the project's outputs were fully prepared for formal registration with the Directorate General of Intellectual Property (DJKI) under official Intellectual Property Rights (HAKI) frameworks, turning temporary field training into lasting, legally protected intellectual capital. The structural flow of these sustainability and continuity mechanisms is outlined in the final workflow diagram below.



Figure 9: Classroom Engagement And Retention Patterns

4. DISCUSSION

An evaluation of the empirical data generated from this transnational community service project indicates that the integration of artificial intelligence into Content Management Systems significantly enhances the practical competencies of vocational students. At the primary operational sites—SMK Veteran 1 Sukoharjo in Central Java, Indonesia, and Escola de Ensino Infantil e Fundamental (EEIEF) Maria Nazare Viena in Ceará, Brazil—the intervention successfully bridged the critical divide between infrastructure availability and student technical capability. This transformation proves that moving beyond traditional theoretical IT instruction toward an automated, project-based framework alters how students engage with complex web platforms. Rather than executing mechanical, uncoordinated upload routines, participants developed a

systematic understanding of digital information architectures and content optimization. The strategic deployment of generative technologies as active learning assistants allowed student groups to master real-world digital branding pipelines. This shift redefines vocational preparation by proving that complex technological tasks become highly accessible when supported by structured, project-based digital learning frameworks. This successful intervention extends the findings of recent global literature regarding digital literacy, artificial intelligence, and platform governance within modern vocational education systems. The significant growth in technical competencies observed in this project directly reinforces the findings of Revilia et al. (2025), who noted that project-based training models incorporating artificial intelligence increase student engagement and vocational preparedness. Similarly, the project aligns with the conclusions of Frankowska et al (2024; 2022) who argued that modern digital storytelling techniques and AI-assisted automation are essential for independent, student-led digital branding. By establishing a reliable multi-tier system for website management, this initiative addresses the critical platform governance challenges documented by (Baker-Smith et al., 2021; Haleem et al., 2023) and Wicaksana et al. (2021). Furthermore, the structural improvements achieved across the live web portals support the frameworks proposed by Saha et al. (2023) and Hamidi et al. (2024), which shows that structured, outcome-based educational designs significantly boost student performance when navigating advanced digital tools. These clear technical improvements also confirm the conclusions of yang et al. (2021; 2024; Yang et al., 2022), who demonstrated that incorporating artificial intelligence tools directly into classroom learning workflows accelerates the development of students' critical thinking and technical problem-solving skills.

A critical review of past community service initiatives highlights an ongoing weakness: many traditional digital training programs rely on short-term, passive learning models that fail to track real-time technical progress or provide continuous expert oversight. This project addressed those limitations by rigorously implementing a framework modeled after the Integrated Field Guide, using structured digital logbooks alongside ongoing monitoring from senior institutional specialists. These logbooks required student teams to document their layout choices, prompt structures, and system errors during each laboratory session. This continuous tracking mechanism allowed facilitators to identify and resolve technical misunderstandings immediately. Furthermore, direct mentoring from experienced advisors ensures that all student outputs meet professional publishing standards and strict data management principles. This dual-layered strategy of combining systematic student logging with expert oversight resolved the common issues of low engagement and temporary skill retention that frequently impact standard IT training programs. The positive outcomes of this community service initiative validate the core educational frameworks that guided its initial design. Specifically, the project proves the practical value of Project-Based Learning (PjBL) combined with Technological Pedagogical Content Knowledge (TPACK) when introducing complex technologies to vocational classrooms. By embedding generative AI tools directly into daily web administration workflows, the training model shows that hardware resources are most effective when fully integrated into specialized curricula. This approach aligns closely with the vocational development theories presented by Dzaki & Amilia (2023), Hikmah (2023), and Wicaksana (2023), which state that digital media training must focus on active creation rather than passive absorption. Using AI as a collaborative writing and layout assistant allowed students to better understand platform navigation and user experience design. As a result, this comprehensive method successfully converted abstract technology rules into practical skills that match current international workplace demands. An analysis of student performance revealed a unique psychological and technical transformation during the laboratory training blocks. Initially, a large portion of the student cohort displayed tech anxiety, believing that professional content management and algorithmic AI systems required an advanced computer programming background. However, by using a structured project-based framework, this anxiety shifted into strong professional confidence as the team achieved small, early successes. This behavioral shift was accompanied by a noticeable increase in spontaneous classroom interactions, with students regularly initiating deep discussions on data privacy, copyright rules, and ways to prevent algorithmic bias. When external challenges arose—such as regional server delays or domain synchronization issues between the Indonesian and Brazilian sites—the participants did not disengage. Instead, they worked collaboratively to fix taxonomy errors and repair permalinks, demonstrating strong problem-solving skills and a resilient, professional mindset.

This international community service initiative offers valuable theoretical insights into the field of Islamic Religious Education (PAI) pedagogy, particularly regarding digital character education and modern character development for Generation Alpha. By introducing generative technologies through a structured framework, this project expands traditional learning theories to include contemporary digital spaces. The training model demonstrates that modern character building should not focus on avoiding technology, but rather on training students to use digital tools with clear intention and strong moral responsibility. Students learned to use AI engines as helpful tools for creative expression while maintaining a strong commitment to original work, intellectual honesty, and accurate data representation. This approach provides a practical model for researchers studying how to combine technical excellence with strong ethical standards, proving that advanced digital platforms can be used effectively to promote positive values in a globalized society. The practical and policy implications of this project provide a clear blueprint for educational institutions and regional policymakers aiming to upgrade vocational training programs. The high success rate of this intervention suggests that traditional computer classes should be updated to include applied artificial intelligence and modern platform management. School administrators can easily adopt the digital manuals and training workflows developed during this project to establish self-sustaining media teams within their own institutions. For government regulators and education departments, this project provides a proven model for designing modern, cross-border educational partnerships that prepare students for remote, international employment opportunities. By standardizing this project-based training model, schools can ensure their graduates possess the exact technical skills and collaborative experience required by the modern digital workforce. From an administrative and institutional standpoint, this project highlights the vital importance of protecting intellectual property and securing formal legal frameworks for all field activities. In modern academia, registering community service outputs under official Intellectual Property Rights (HAKI) systems is essential for preventing plagiarism and protecting original educational models. For this initiative, every core asset—including the school-adopted digital manuals, the multi-language web layouts, and the unique training curriculum—was carefully organized to meet the strict originality standards required for formal legal registration. Securing these official protections ensures that the unique methodology developed by the academic team remains legally recognized and secure. Furthermore, this legal grounding gives the partner schools the confidence to use, expand, and share these educational resources without the risk of unauthorized copying or distribution. In conclusion, this international community service program occupies a vital position within the national landscape of applied educational research. While many standard outreach programs provide only temporary, localized support, this initiative offers a tested, scalable framework for cross-border technical training. By combining advanced content management systems with ethical artificial intelligence practices, the project establishes a high standard for vocational training models. Its focus on rigorous tracking methods, practical deliverables, and long-term community platforms ensures that the benefits continue long after the initial project ends. Ultimately, this program serves as an excellent example of how universities can collaborate directly with schools to drive digital transformation, improve student career readiness, and foster inclusive growth in the global digital era.

5. CONCLUSION

5.1 Conclusion

Based on the implementation and empirical evaluation of this international community service program, several definitive conclusions can be drawn:

1. The project successfully bridged the critical digital capability gap at SMK Veteran 1 Sukoharjo and EEIEF Maria Nazare Viena by transitioning vocational students from passive media consumers to strategic, independent platform managers.
2. The integration of Artificial Intelligence (AI) as a collaborative pedagogical tool directly accelerated student efficiency in technical copywriting, keyword optimization, and digital branding orchestration without compromising intellectual integrity or content originality.
3. The application of a Project-Based Learning (PjBL) framework proved highly effective, generating a

measurable 85% increase in students' systematic cognitive and practical competencies regarding multi-tier website and CMS menu navigation design.

4. High participant engagement, active cross-border institutional academic networks, and collaborative technical troubleshooting effectively neutralized early field impediments such as localized server delays and strict API resource budgets.
5. Long-term programmatic sustainability and continuity have been successfully secured through the structural adoption of official school digital manuals, the establishment of an active transnational online creative forum, and the systematic preparation of field deliverables for Intellectual Property Rights (HAKI) registration.

5.2 Recommendation

To address the ongoing structural challenges of keeping vocational IT curricula aligned with rapid technological shifts, educational institutions must permanently integrate hands-on, AI-assisted platform management modules into their formal learning frameworks. School administrators should actively allocate sufficient institutional budgets to secure reliable, premium access to advanced digital tools and stable multi-tier hosting servers to prevent infrastructure-based disruptions. Furthermore, future community service initiatives and follow-up empirical research should explore the longitudinal impact of these AI-CMS competencies on graduate employment rates within the international remote workforce, while expanding the methodology to test automated cross-platform integrations across a broader network of global vocational partner institutions.

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