

Empowering Digital Literacy through Low-Tech-First Mentoring: A Kampus Mengajar Initiative

Lena Magdalena¹, Mesi Febima², Muhammad Hatta³

^{1,2,3}Information Systems, Faculty of Technology Information, Catur Insan Cendekia University, Cirebon, Indonesia

Email: lena.magdalena@cic.ac.id¹, mesi.febima@cic.ac.id², muhammad.hatta@cic.ac.id³

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Corresponding Author:

Author Name*:

Lena Magdalena

Email*:

lena.magdalena@cic.ac.id

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Abstract. This study reports a Kampus Mengajar implementation at SMAN 8 Cirebon City targeting classes XIII IPS 1–3 and XII IPA 3. A sequenced method guided the work: (i) verifying contextual needs through observations, brief interviews, and baseline diagnostics; (ii) mapping teaching loads and timetables with school leaders; and (iii) aligning instruction to current cohort profiles. Teaching emphasized disciplinary literacy and numeracy via tight lesson arcs (activator–task–exit ticket–feedback), flexible grouping for remediation, and weekly co-planning with host teachers. Digital literacy advanced through a low-tech-first design with optional extensions (rotating device use; entry-level 3D workflows), while administrative streamlining—templated lesson plans, shared repositories, and hybrid archiving—reduced teacher workload. Results indicate more intentional engagement with reading-to-learn and problem-solving tasks, incremental digital habits among students and teachers, and clearer back-end processes. Constraints included compressed instructional time and uneven device access. Practical implications include protecting small-group blocks, formalizing device-sharing, scheduling micro-PD, and using lightweight parallel assessments. The model demonstrates a feasible, context-responsive pathway for strengthening foundational skills and operational capacity in resource-variable schools.

Keywords: Kampus Mengajar; Merdeka Belajar–Kampus Merdeka (MBKM); disciplinary literacy and numeracy; digital literacy; educational administration.

1. INTRODUCTION

Education is a timeless social institution that transmits knowledge, skills, values, and cultural capital across generations while adapting to each society's worldview and socio-cultural realities, including those of Indonesia [1]. Beyond classroom instruction, education equips individuals to participate meaningfully in an inclusive, sustainable future by cultivating cognitive competence, social attitudes, and ethical orientations aligned with national development goals [2]. In this regard, higher education serves as a strategic engine for strengthening human resources (HR), with teaching–learning processes functioning as the primary arena for cultivating academic excellence and professional readiness. In the Indonesian Dictionary (KBBI, 2021), mahasiswa (students) are defined as learners enrolled in higher education institutions; they are positioned as emerging scholars capable of advancing national HR quality. Anchored in the Tri Dharma of higher education—education, research, and community service—lecturers and students alike act as agents of change who collaborate with communities and government to identify social challenges and co-create solutions, particularly in the education sector [1], [2].

In recent years, Indonesia's educational transformation has been shaped by the "Merdeka Belajar" (Freedom to Learn) vision introduced by the Minister of Education and Culture, Nadiem Makarim. This policy reframes learning around autonomy, relevance, and learner agency, steering HR management toward more personalized, outcomes-oriented pathways [9], [10]. Operationally, the Merdeka Belajar Kampus Merdeka (MBKM) framework broadens the ecosystem of learning by encouraging authentic, real-world experiences that strengthen both disciplinary mastery and transversal skills needed for the future of work [2], [3]. Within this framework, Kampus Mengajar emerges as a flagship program that enables students to study outside their primary program for up to three semesters, sharpening soft skills (e.g., collaboration, communication, leadership) and hard skills (e.g., digital literacy, instructional design) to meet contemporary societal and industrial demands [3], [4], [5].

Kampus Mengajar specifically deploys university students to schools—particularly public senior high schools and vocational high schools—to support instruction across subjects with a strong emphasis on literacy, numeracy, digital adaptation, and basic school administration. Evidence from prior implementations indicates that such placements can

bolster students' foundational competencies while simultaneously nurturing character and leadership through service-learning models [4], [6], [7], [8]. The program thus functions as both a bridge and a proof point of higher education's civic mission: it connects academic knowledge with community needs, and it demonstrates the dedication of lecturers and students in advancing national educational goals through collaborative, field-based interventions [6], [7].

Building on this policy and programmatic backdrop, the present study documents and analyzes the activities undertaken during the Kampus Mengajar program at SMAN 8 Kota Cirebon. The discussion highlights the forms of support provided—spanning classroom facilitation, literacy and numeracy enrichment, digital learning integration, and administrative assistance—and assesses the program's contributions to school improvement and student outcomes. By situating local practices within the broader MBKM transformation, the study offers insights into how experiential learning can strengthen school ecosystems and produce more adaptive, future-ready human resources in Indonesia [3], [6], [9], [10].

1. METHODS

2.1. Setting and Participants

The Kampus Mengajar activities were implemented at SMAN 8 Cirebon City. The core academic focus was the strengthening of literacy and numeracy across target classes—XIII IPS 1, XIII IPS 2, XIII IPS 3, and XII IPA 3—through classroom assistance, small-group tutoring, and enrichment tasks. The implementing team comprised university lecturers (program supervisors) and student facilitators (when available) who collaborated with school leadership, subject teachers, and administrative staff.

2.2. Timeline and Design

The program followed a pragmatic, school-based implementation design with clearly sequenced phases. Initial program activation occurred on September 8, 2023 (program launch and high-level alignment). A follow-up operational cycle, including on-site coordination and structured observation for refinement and scale-up, was carried out on April 16–17, 2025. This allowed the team to (a) verify contextual needs, (b) map teaching

loads and timetables, and (c) align interventions with current cohorts. The details activities as shown Table 1.

Table 1. Program Activities

Phase	Activity	Date(s)	Primary Outputs
0	Program activation & macro-planning	Sept 8, 2023	Initial agreement, roles, deliverables
1	Pre-deployment briefing	Prior to school entry	Role clarity, materials, evaluation plan
2	School entry & coordination	Apr 16, 2025	Stakeholder alignment, access & schedule
3	Baseline observation & needs assessment	Apr 16–17, 2025	Class profiles, literacy/numeracy gaps
4	Class assignment & timetabling	Apr 17, 2025	Finalized teaching roster (XIII IPS 1–3; XII IPA 3)
5	Instructional implementation	Weekly, per schedule	Lessons, tutorials, formative checks
6	Teacher support & admin strengthening	Rolling	Co-planning, digital tools, records
7	Monitoring, evaluation, & reflection	Rolling + endline	Progress data, lessons learned

2.3. Verifying Contextual Needs

This stage establishes a precise picture of the school's conditions so that support is targeted rather than generic. The team triangulates multiple evidence sources—recent achievement data, teacher lesson plans, assessment calendars, and brief classroom observations—to surface patterns in engagement, pacing, and recurring error types. Short, structured conversations with school leaders, counselors, and subject teachers clarify priorities (e.g., examination readiness, remedial needs, digital access) and operational constraints (room availability, testing windows, extracurricular commitments). Student voices are intentionally included via quick polls or exit slips to capture perceived difficulties—such as vocabulary load in social science texts or graph interpretation in science—and to note access constraints (device sharing, connectivity, study time at home). These inputs are synthesized into a concise needs profile that (a) prioritizes specific literacy and numeracy gaps, (b) inventories available resources and bottlenecks,

and (c) defines contextualized objectives and success indicators. The resulting profile becomes the anchor for lesson design, grouping strategies, and formative assessment choices throughout implementation.

2.4. Mapping Teaching Loads and Timetables

Translating priorities into a deliverable plan requires careful scheduling with the vice principal for academics and class teachers. The team overlays the school's master timetable with the proposed support blocks to avoid clashes with core subjects, examinations, and school events. Teaching loads are distributed across lecturers to ensure every target class receives consistent touchpoints for whole-class instruction and small-group remediation. A predictable weekly rhythm is set—co-planning early in the week, instructional delivery midweek, and rapid data review at week's end—so feedback loops remain tight. Each session is slotted with room assignments, duration, and resource needs (projector, printed materials, manipulatives), and contingency provisions are documented (backup rooms, offline alternatives for connectivity disruptions, and make-up slots during advisory periods). The output is a detailed duty roster and timetable that make the plan feasible within real-world constraints while preserving stability for teachers and students.

2.5. Aligning Interventions with Current Cohorts

Interventions are calibrated to the actual learners present—not merely to syllabus expectations—by using baseline diagnostics and teacher insights to set appropriate text complexity, problem difficulty, and pacing for each class. For example, XII IPA cohorts may receive graph-heavy scientific readings guided by claim-evidence-reasoning routines, while XIII IPS cohorts focus on argument analysis with deliberate vocabulary frontloading and data-in-text interpretation. Grouping remains flexible: students exhibiting similar misconceptions are scheduled for short, targeted pull-out sessions, whereas advanced learners receive extension tasks to prevent ceiling effects. Materials are adapted to cohort characteristics by selecting familiar contexts, embedding bilingual glossaries when helpful, and sequencing tasks from concrete representations to more abstract reasoning. Formative checks (exit tickets, mini-quizzes) are aligned to these adaptations; their results feed directly into subsequent lesson adjustments for each cohort. This alignment ensures instruction remains relevant, equitable, and measurably impactful for the specific learners currently in the room.

2. RESULTS AND DISCUSSION

The Kampus Mengajar implementation at SMAN 8 Cirebon City—targeting classes XIII IPS 1–3 and XII IPA 3—was executed in line with the program’s intent to strengthen literacy, numeracy, digital adaptation, and basic administrative capacity. Activities were conducted offline on campus, with health protocols applied per school policy. Consistent with the method, the team (a) verified contextual needs through structured observations and stakeholder dialogues, (b) mapped feasible teaching loads and timetables with school leadership, and (c) aligned interventions with the characteristics of the current cohorts. This sequence ensured that support was targeted (e.g., vocabulary frontloading for social science texts, graph reading in science), deliverable within the master schedule, and developmentally appropriate for each class. In parallel, capacity-building elements—co-planning with teachers, routine formative checks, and micro-professional development—were embedded to enhance sustainability, reflecting the MBKM ethos of authentic, field-based learning that directly contributes to school improvement [2], [3], [4].

3.1. Program Implementation

1) Teaching

Teaching assistance focused on whole-class support and targeted small-group sessions that directly addressed literacy and numeracy priorities surfaced during the baseline observation. In XIII IPS classes, lecturers modeled argument analysis, text-structure awareness, and vocabulary frontloading to help students unpack expository passages typical of social science subjects. In XII IPA 3, the team emphasized claim–evidence–reasoning routines, graph interpretation, and unit analysis to connect reading-to-learn practices with quantitative reasoning required in science courses. Each session followed a consistent arc—brief activator, core task, exit-ticket check, and feedback/next steps—so that pacing and expectations were predictable and data-use cycles remained tight.

Qualitatively, lesson observations indicated more students attempting higher-order prompts when provided with scaffolded question stems and worked examples. Exit-ticket evidence suggested fewer surface-level responses in reading tasks when annotation codes (e.g., main idea, evidence, inference) were modeled first, and numeracy warm-ups helped surface—and then address—recurring misconceptions (e.g., ratio language, interpreting scales on axes). Collaboration with host teachers occurred through weekly

co-planning, enabling alignment with the syllabus and upcoming assessments and ensuring that co-teaching moments (station or parallel teaching) were feasible within timetable constraints. These actions are consistent with national priorities that situate education as a central driver of human resource quality and social progress, and with MBKM's design to bridge academic learning and real-world problem-solving [2]–[4].

Despite overall progress, time constraints—including compressed lesson blocks and mobility limitations around school events—restricted the breadth of content coverage. To mitigate this, the team prioritized depth over breadth, concentrating on high-leverage routines (e.g., vocabulary preview + guided reading + structured summarization; fluency drills + problem deconstruction + error analysis) and scheduling pull-out sessions for students showing convergent error patterns. This trade-off maintained instructional quality while respecting the school's calendar realities.



Figure 1. Lecturers teach in Science Class 1 (IPA 1).

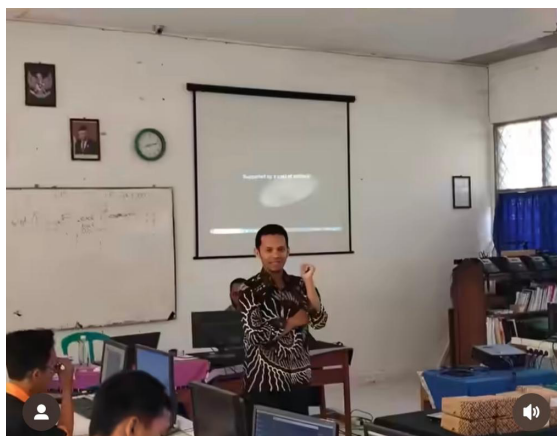


Figure 2. Lecturers teach in Science Class 2 (IPA 2).

2) Digital Literacy

Digital literacy was framed as a broader competence than merely operating devices: it included locating, evaluating, creating, and sharing information responsibly using digital networks and tools [5]. In practice, this meant pairing low-bandwidth tools (slide templates, offline worksheets) with selected platforms to enhance engagement and workflow (e.g., smartphones, video-conferencing for review sessions, and shared folders for materials). Given that digital literacy underpins competitiveness and intellectual growth at both individual and national levels, strengthening these skills through

schooling aligns with Indonesia's strategic agenda and contemporary curriculum emphases on ICT integration [6], [7].

In this setting, the team introduced applied design tasks to connect digital skills with curricular goals. Where resources permitted, students experimented with Adobe Dimension for product/brand visualization and Substance 3D for basic modeling, texturing, and rendering—used not as ends in themselves but as contexts for literacy and numeracy (e.g., reading technical instructions, calculating proportions, interpreting render settings) [5]. For classes with limited device access, the same learning objectives were supported through analog alternatives (storyboards, hand-sketched mock-ups, paper-based planning matrices), with rotating device use to ensure equitable participation. Teachers were oriented to entry-level workflows, and quick-reference sheets were produced to help them manage classes with mixed access levels. These choices reflect the dual mandate of MBKM: building transferable competencies while remaining responsive to on-the-ground constraints [2], [3], [7]



Figure 3. Utilization of Digital Literacy

3) Assisting Teachers and School Administration

Administrative support was designed to lighten operational burdens so teachers could focus on instruction while also improving the consistency and traceability of learning artifacts. In line with education administration principles—coordinating people and resources toward agreed goals—the team assisted with (i) preparing Lesson Plans (RPP),

teaching materials, and media aligned to class needs; (ii) updating student and school data in the Data Pokok Pendidikan system; (iii) drafting activity reports, official correspondence, and schedules for lessons/extracurriculars; and (iv) introducing basic digitization practices, such as organized cloud folders (e.g., Google Drive) and standardized templates for agendas, assessments, and feedback [8]. Where internet access was intermittent, a hybrid filing system (digital + print) ensured continuity and auditability.

These processes also served as on-the-job capacity building: teachers co-constructed unit overviews, agreed on success criteria that matched assessment blueprints, and piloted simple rubric banks for routine tasks. Over time, this reduced duplication of effort and made co-teaching smoother, since expectations, materials, and records were shared and versioned. Practically, the administrative stream paralleled the classroom stream, with weekly snapshots summarizing sessions delivered, attendance, and emergent needs, feeding into short after-action reviews. This alignment made the program's contribution visible and sustainable beyond the team's physical presence at the school [8].



Figure 4. Group Photo with Teachers and Students of SMAN 8 Cirebon

3.2. Observation Synthesis and Contextual Alignment

Consistent with the method's emphasis on context verification, the team conducted systematic observations and short interviews with the vice principal for student affairs and the counseling unit to understand the school's academic routines, digital readiness, and administrative workflows. Findings are summarized below and were used to refine the timetable and calibrate interventions to cohort needs.

Table 1. Observation Summary and Implications

Aspect	Observed Status	Implications for Intervention
Learning	Science (IPA) included Information Systems components; Social Studies (IPS) covered Accounting. Class sizes and pacing varied across cohorts.	Emphasize reading-to-learn in disciplinary texts; integrate data interpretation in IPS and graph/units in IPA; adopt predictable session arcs with exit tickets.
Digital Literacy	Limited facilities; often a single device shared alternately; uneven teacher facility with tech-enhanced learning.	Use low-tech-first designs with optional digital extensions; rotate device use; provide quick-start guides and micro-PD for teachers; maintain offline backups [5], [7].
Administration	Administrative work focused on Dapodik updates; limited digitized repositories for lesson materials.	Standardize templates, organize shared folders, and align RPP/media with class profiles; hybrid digital–print archiving for continuity [8].

These findings validated the needs profile constructed during the baseline stage and directly informed (a) schedule mapping—to avoid clashes and preserve small-group slots—and (b) cohort alignment, such as elevating vocabulary routines in XIII IPS and embedding claim–evidence–reasoning in XII IPA.

3.3. Challenges and Mitigation

The principal constraint was time. Compressed periods and occasional mobility limitations (e.g., clashes with school events) curtailed the breadth of content coverage, sometimes forcing a faster instructional pace. To protect learning quality, the team implemented a priority narrowing strategy: concentrate on a short list of high-yield routines; schedule pull-out remediation for convergent error patterns; and use exit-ticket data to decide what to reteach versus defer. In digital activities, access inequities were mitigated by rotating devices, pairing students strategically, and keeping offline equivalents ready. Administrative demands were managed via templating and batch-processing (e.g., preparing weekly packets in advance), which reduced friction for teachers. While these

steps did not eliminate all constraints, they preserved instructional coherence and kept the program on track with the MBKM-aligned goals of relevance, agency, and capacity building [2], [3], [7], [8].

3.4. Discussion

This discussion interprets the implementation results at SMAN 8 Cirebon City through the lens of the study's aims—strengthening literacy, numeracy, digital adaptation, and administrative routines—while situating the findings within the Merdeka Belajar–Kampus Merdeka (MBKM) policy rationale. Three themes dominate: (i) the value of sequenced implementation (context verification → timetable mapping → cohort alignment), (ii) the promise and constraints of school-based digital literacy, and (iii) the role of administrative streamlining in sustaining instructional gains.

The move from generic assistance to cohort-aligned routines—frontloading vocabulary and text structure in XIII IPS; claim–evidence–reasoning and graph interpretation in XII IPA—appears to be the decisive mechanism behind observed improvements in participation and quality of responses during reading-to-learn and problem-solving tasks. This aligns with the national vision that positions education as the driver of human resource development and with MBKM's emphasis on authentic, field-based learning that is responsive to local contexts [2], [3], [4]. Literature on Kampus Mengajar similarly points to measurable gains when supports are embedded in routine lessons and calibrated to specific learner needs (e.g., strengthening foundational literacy/numeracy through targeted, high-leverage practices) [6]. In our setting, a tight lesson arc (activator → core task → exit ticket → feedback) enabled rapid data use and timely reteach, a practice consistent with formative assessment principles that improve day-to-day learning efficiency.

Two trade-offs are noteworthy. First, time compression forced prioritization of depth over breadth; while this limited content coverage, concentrating on high-yield routines likely produced more durable skill gains—a common recommendation in improvement-focused studies [6]. Second, flexible grouping for remediation protected struggling learners from falling further behind but required careful timetable mapping to avoid clashes—underscoring the importance of the method's second stage (scheduling feasibility). Overall, the instructional approach is congruent with prior evidence that

MBKM initiatives can elevate soft skills (collaboration, communication) alongside academic outcomes when field activities are structured and iterative [2].

Findings confirm that digital literacy must be framed as more than device operation—it encompasses search, evaluation, creation, and responsible sharing of information [5]. Given resource constraints (limited devices, uneven teacher facility), a low-tech-first approach with optional digital extensions proved practical: analog storyboards and paper-based matrices were paired with rotating device use, while teachers received quick-start guides for simple workflows. This design choice is consistent with national aspirations for digital competence as a competitive asset and with curriculum trends emphasizing ICT integration as a vehicle for intellectual growth and employability [6], [7]. Where feasible, applied tasks using Adobe Dimension and Substance 3D functioned as contexts for literacy and numeracy (reading technical prompts, calculating proportions, interpreting parameters), not as isolated “tech for tech’s sake” activities—an approach that mirrors calls to anchor digital skills in disciplinary learning rather than treat them as add-ons [5], [7].

However, two constraints temper these gains. First, device scarcity caps the ceiling on production-heavy tasks; rotating stations help, but throughput remains limited. Second, teacher confidence with digital tools varies; micro-PDs and templated resources reduce entry barriers, yet sustained gains likely require a longer coaching horizon than a single cycle can provide. These constraints are typical in public-school contexts and suggest that future cycles should (i) formalize a device-sharing protocol and (ii) institutionalize micro-credentialed PD strands for teachers to ensure continuity and recognition [5], [7].

Administrative support—templated RPP, shared repositories, standardized agendas and rubric banks, and hybrid digital-print archiving—reduced friction for teachers and improved traceability of instructional artifacts. This resonates with education administration principles that emphasize coordinated resource use and documentation to achieve organizational aims [8]. In practice, lighter administrative burdens translated into greater teacher bandwidth for co-planning and formative follow-up, which in turn stabilized co-teaching routines. The use of weekly snapshots (sessions delivered, attendance, emergent needs) further anchored a culture of short feedback cycles and evidence-based adjustment. Such back-end coherence is frequently underreported in

MBKM narratives but appears essential for sustaining classroom improvements once the external team exits [3], [8].

The implementation logic—verify context, map feasibility, align to cohorts—tracks closely with MBKM's design principles of autonomy, relevance, and authentic performance tasks [2], [3], [4]. Reported outcomes (more intentional disciplinary literacy/numeracy practice, incremental digital habits, clearer administrative routines) echo findings from Kampus Mengajar studies that document foundational skill gains and improved classroom processes when assistance is situated within existing school workflows [6]. Moreover, the character-building spillovers (leadership, collaboration) noted in co-teaching and student group work parallel arguments that MBKM strengthens transferable competencies crucial for workforce readiness [2], [7].

Several limitations warrant caution. (i) Time-on-task was constrained, limiting the ability to attribute outcomes to specific routines versus general maturation or concurrent school initiatives. (ii) Access inequities (devices, connectivity) shaped which digital tasks were possible, potentially biasing results toward classes with better access. (iii) Measurement relied heavily on short, curriculum-embedded checks; while appropriate for formative purposes, they are not substitutes for standardized assessments. (iv) The absence of a comparison group restricts causal inference. These threats are typical in naturalistic school settings and suggest that future iterations should embed parallel forms for baseline–endline checks with external moderation and explore staggered roll-outs to approximate comparative designs [6], [8].

3. CONCLUSION

The Kampus Mengajar implementation at SMAN 8 Cirebon City demonstrates that a sequenced, context-responsive approach—verifying needs, mapping feasible schedules, and aligning interventions to current cohorts—can translate policy aspirations of Merdeka Belajar–Kampus Merdeka into tangible classroom improvements. Through co-taught lessons and targeted small-group support, students engaged more intentionally with disciplinary literacy and numeracy routines; low-tech-first digital activities, paired with optional extensions, cultivated pragmatic digital habits despite device constraints; and templated administrative processes lightened teachers' workload while improving

traceability of instructional artifacts. Although limited time-on-task, intermittent access to devices, and naturalistic measurement conditions constrained the breadth of coverage and strength of inference, the overall pattern of results is consistent: coherence preceded impact. Prioritizing high-leverage routines, embedding rapid formative checks, and institutionalizing shared repositories and templates produced gains that are feasible to sustain within existing school workflows. For subsequent cycles, extending protected small-group blocks, formalizing device-sharing and micro-PD pathways, and adopting lightweight parallel assessments will deepen learning effects and strengthen monitoring. In sum, the program offers a practical model for school-based, MBKM-aligned support that advances foundational skills, nurtures transferable competencies, and builds operational capacity—an integrated pathway for developing future-ready human resources in Indonesia.

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