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Strengthening Industry 4.0 vocational digital competence for local product marketing

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ABSTRACT

Vocational institutions in Indonesia face a persistent gap between digital marketing competence and Industry 4.0 demands. SMK and LKP An-Nur Ibum in Bandung Regency exemplified this gap: local flagship products were marketed conventionally, with no branding and no managed digital channels. This Community Service (PkM) program aimed to strengthen the vocational digital competence of 45 teachers, tutors, and learners across six areas (vocational digital literacy, digital marketing, branding and value proposition, digital content and AI tools, marketplace management, and affiliate marketing) and to activate an integrated digital marketing channel through the wanojmart.com marketplace and linked social media. We used a one-group pretest-posttest design, with Hake's normalized gain and a Wilcoxon signed-rank test for quantitative evaluation, and thematic analysis for qualitative data. Competence improved significantly across all six areas (Wilcoxon $Z = -5.84$, $p < .001$, $r = 0.87$), with a mean normalized gain of $g = 0.68$ (medium, approaching high), largest in affiliate marketing ($g = 0.71$) and digital content and AI tools ($g = 0.75$); output indicators averaged 97.3% of targets. The model integrating competence strengthening, AI-tools transfer, and marketplace activation within a Teaching Factory scheme shows promise as a replicable empowerment approach for vocational institutions with limited market access.

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ABSTRAK

Lembaga vokasi di Indonesia menghadapi kesenjangan persisten antara kompetensi pemasaran digital dan tuntutan Industri 4.0. SMK dan LKP An-Nur Ibum di Kabupaten Bandung mencerminkan kesenjangan tersebut: produk unggulan lokal dipasarkan secara konvensional tanpa branding dan tanpa kanal digital yang dikelola. Program Pengabdian kepada Masyarakat (PkM) ini bertujuan menguatkan kompetensi digital vokasi bagi 45 guru, tutor, dan peserta didik di enam area (literasi digital vokasi, pemasaran digital, branding dan value proposition, konten digital dan AI tools, manajemen marketplace, serta affiliate marketing), sekaligus mengaktifkan kanal pemasaran digital terintegrasi melalui marketplace wanojmart.com dan media sosial yang terhubung. Desain pra-pasca satu kelompok digunakan dengan gain ternormalisasi Hake dan uji Wilcoxon untuk evaluasi kuantitatif serta analisis tematik untuk data kualitatif. Kompetensi meningkat secara signifikan di seluruh enam area (Wilcoxon $Z = -5,84$; $p < 0,001$; $r = 0,87$), dengan rerata gain ternormalisasi $g = 0,68$ (sedang mendekati tinggi), tertinggi pada affiliate marketing ($g = 0,71$) serta konten digital dan AI tools ($g = 0,75$); capaian indikator luaran rerata 97,3% dari target. Model yang mengintegrasikan penguatan kompetensi, transfer AI tools, dan aktivasi marketplace dalam skema Teaching Factory menunjukkan potensi sebagai pendekatan pemberdayaan yang dapat direplikasi oleh lembaga vokasi dengan keterbatasan akses ke pasar.

Kata Kunci: affiliate marketing; Industri 4.0; kompetensi digital vokasi; marketplace lokal; pemasaran digital

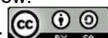
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INTRODUCTION

The digital transformation of the Industry 4.0 era has fundamentally changed patterns of production, distribution, and marketing across many sectors, including vocational education and community-based enterprises. The convergence of cyber-physical systems, the Internet of Things (IoT), artificial intelligence, and automation is shifting the work landscape from mechanical routines to data analysis and smart automation, positioning digital transformation as a catalyst for sustainable development and open innovation (Astuti et al., 2021; Robertsons & Lapiņa, 2023). This shift demands human resources who not only master technical skills but also possess digital competence to support effective product marketing through digital platforms. This requirement connects innovation systems to vocational education outcomes (Lewis, 2025).

Vocational High Schools (Sekolah Menengah Kejuruan/SMK) and Course and Training Institutions (Lembaga Kursus dan Pelatihan/LKP) play a strategic role in producing skilled labor in this era. However, studies show that vocational educators' digital competence in Indonesia remains at a low to intermediate level due to limited access to infrastructure, institutional support, and self-confidence (Rahmawati et al., 2025). Determinants of vocational teachers' digital competence include personal characteristics and the school context, such as accreditation status and leadership support (Mulyanti et al., 2024). A cross-country systematic review affirms that digital competence in the education sector has become increasingly central in the post-pandemic period, and that institutional support and structured learning experiences are key factors strengthening vocational students' digital competence (Barboutidis & Stiakakis, 2023; Zhao et al., 2025).

Redecker (2017), in a study titled “*European Framework for the Digital Competence of Educators*” stated that educators' digital competence is a prerequisite for transferring the same competence to learners, and teachers' digital learning identity shapes technology adoption in instruction (Caena & Redecker, 2019; Zimmer et al., 2021). The gap between vocational educators' digital competence and industry demands causes genuinely high-quality vocational products to go unrecognized in wider markets because marketing remains conventional. Digital technology creates new opportunities to address this gap. Social media, marketplace platforms, and the affiliate-marketing model have been shown to increase brand awareness and expand market reach for micro, small, and medium enterprises, with positive effects on local economic growth (Sasongko et al., 2020; Yolanda & Hasanah, 2024).

However, technological, organizational, and individual determinants shape e-commerce adoption among Indonesian micro, small, and medium enterprises and require systematic intervention (Ausat & Peirisal, 2021). Affiliate marketing, a performance-based model that compensates affiliates for verified conversions, expands promotional reach without large advertising budgets and has been shown to influence purchase decisions, particularly among Generation Z, through short-video commerce platforms (Caballero et al., 2024). Separately, the use of generative AI tools for promotional content production is expanding because of its capacity for message personalization, campaign automation, and content-production efficiency (Prasetya et al., 2025).

SMK An-Nur Ibun and LKP An-Nur Ibun, located in Ibun District, Bandung Regency, West Java Province, are two institutions under the An-Nur Foundation that share infrastructure, including a joint Computer Laboratory. According to the national education database “*Data Pokok Pendidikan (Dapodik)*” (tautan: <https://dapo.kemendikdasmen.go.id/>) by Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi (2024), SMK An-Nur Ibun is accredited A with 19 teachers and 404 students, while LKP An-Nur Ibun is active with an integrated tutor team. Preliminary mapping showed that although both partners had produced various vocational products such as handicrafts, clothing, bedsheets, and sarongs, their product marketing remained conventional and limited to the foundation's internal scope and the nearest

community. The partners lacked a strong product-branding model, a consistently managed professional business account, and strategic use of digital marketplaces.

Analysis of these conditions identified competence gaps across eight areas: vocational digital literacy, digital marketing, branding and value proposition, digital media and content production, use of AI tools for promotional content, affiliate marketing, digital entrepreneurship and digital-platform management, and learning-to-industry integration. This profile is consistent with findings that low digital competence among vocational educators in Indonesia is shaped by both external factors, including infrastructure and training access, and internal factors, including beliefs and self-confidence (Rahmawati et al., 2025), as well as with the broader need to address digital-literacy skill gaps comprehensively (Reddy et al., 2023). Because several of these aspects overlap conceptually, we consolidated them into six measurable core competence areas used in the evaluation instrument, with detailed mapping presented in the Methods section.

Conceptually, this activity is grounded in three complementary foundations, namely educator digital competence (DigCompEdu), adult learning andragogy, and the Teaching Factory (TEFA) model, which are further elaborated in the Literature Review. However, prior community-service programs have generally addressed these components separately. Implemented by the lecturer team of the Office Management Education Study Program, Faculty of Economics and Business Education (Fakultas Pendidikan Ekonomi dan Bisnis/FPEB), Universitas Pendidikan Indonesia, this Community Service (Pengabdian kepada Masyarakat/PkM) Field-of-Science Scheme aimed to: 1) Strengthen Industry 4.0-based vocational digital competence among teachers, tutors, and learners; 2) Introduce and practice AI tools and affiliate marketing to produce promotional content for local flagship products; and 3) Activate an integrated digital marketing channel through the wanojamart.com marketplace and social media. The novelty of this activity lies in integrating AI tools and affiliate marketing within a vocational Teaching Factory scheme supported by a locally owned marketplace, wanojamart.com. This article reports the implementation results up to the monitoring cut-off of 5 September 2026, providing empirical evidence for community-service practices at the intersection of vocational education and digital marketing.

Literature Review

Theoretical foundations of the intervention model

The intervention model rests on three foundations that operate at different layers. First, the European Framework for DigCompEdu, written by Redecker (2017), maps educator digital competence into six domains: professional engagement, digital resources, teaching and learning, assessment, empowering learners, and facilitating learners' digital competence. The framework's role in this activity was as a competence architecture: it provided the basis for deriving the six measured competence areas, with two areas outside DigCompEdu—AI tools for content production and affiliate marketing added to capture the applied marketing demand faced by the partners (Caena & Redecker, 2019).

Second, the andragogy of adult learning, as stated by Knowles (1984) in a book titled *“Andragogy in action: Applying modern principles of adult learning”*, determined how the sessions were structured: adult participants set their own learning targets, worked on their own products, and learned through immediate application, an approach that reflects core adult learning philosophies operationalized in the Indonesian community-education context through digital-based andragogy (Fahimah et al., 2023; Scholtz, 2023). Third, the TEFA model bridges learning and work readiness by linking classroom activity to real production and service units (Rosidah & Sutirman, 2023; Wijanarka et al., 2023). Together, DigCompEdu provides the competence architecture, andragogy provides the learning process, and TEFA provides the institutional vehicle through which the competence is sustained after the program ends.

Synthesis of prior community-service work and the remaining gap

Previous community-service programs in digital marketing have generated consistent but partial improvements. Training in packaging, branding, product documentation, social media, and marketplaces strengthened micro-enterprise marketing capacity but remained limited to conventional digital channels and did not incorporate AI tools (Sasongko et al., 2020). Branding and business-identity programs for village enterprises through logo, packaging, and banner design improved product presentation yet did not address the marketing channels themselves (Hendarmin & Sari, 2024; Magdalena et al., 2023). TikTok affiliate marketing training enhanced participants' understanding of platform algorithms and creator collaboration. However, implementing it within a micro-enterprise community rather than a vocational SMK and LKP ecosystem meant the acquired competence was not institutionalized into a learning unit.

Village-level branding digitalization also remains constrained by the absence of a sustained managing actor (Callistasari et al., 2025). Overall, prior programs have addressed competence development, content technology, and marketing-channel activation separately. However, no reported program has integrated all three within a vocational Teaching Factory scheme supported by a marketplace owned and managed by the partner institution. This integration constitutes the gap addressed by the present activity.

Affiliate marketing and AI tools in the vocational and micro-enterprise context

Affiliate marketing is a performance-based model that compensates affiliates for verified conversions, enabling promotional reach to expand without upfront advertising costs. In short-video commerce, affiliate content influences purchase intention because recommendations come from individuals perceived as fellow users rather than from brands, with this effect particularly pronounced among Generation Z, who are active users of short-video social media platforms (Caballero et al., 2024; Lan & Tung, 2024). This model is especially suitable for SMK and LKP because learners are part of the target demographic and are already familiar with digital platforms, allowing affiliate roles to convert existing habits into productive activities while expanding the school's distribution capacity without advertising expenditure.

Meanwhile, generative AI lowers the barriers to producing high-quality promotional content through personalization and automation, and its integration into vocational education fosters an adaptive technological mindset alongside technical skills (Kshetri et al., 2024; Prasetya et al., 2025). These two components complement each other: AI tools produce the content, while affiliate marketing distributes it. Both, however, require a partner-controlled marketing channel to ensure sustainability, making marketplace activation an essential component that completes the scheme (Ausat & Peirisal, 2021; Cumming et al., 2023).

METHODS

Design and Approach

This PkM activity employed a one-group pretest–posttest pre-experimental design by Campbell & Stanley (2015) in a book titled *“Experimental and quasi-experimental designs for research”*, embedded within a participatory, andragogy-based engagement framework by Knowles (1984) in a book titled *“Andragogy in action: Applying modern principles of adult learning”*. The one-group design was selected because the program operated at a single partner site with no available comparison group under the same institutional conditions; the Discussion explicitly acknowledges its principal limitation: score gains cannot be causally attributed to the intervention. Partners were involved at four concrete points: leadership jointly set activity targets during the April 2026 coordination meeting; teachers, tutors, and learners identified product and

marketing problems in the FGD; participants selected the flagship products used as practice material; and partner staff co-managed the marketplace during mentoring.

Quantitative data on changes in competence scores across six core areas were complemented by qualitative data from observation, a reflective FGD, and structured interviews with six informants (the foundation head, the SMK principal, the LKP head, two teachers, and one tutor). The qualitative component supports the quantitative pattern rather than serving as an equally weighted strand. The study does not make a full mixed-methods claim. The main activities took place in the joint Computer Laboratory of the An-Nur Ibun Foundation, Ibun District, Bandung Regency, West Java Province, from April to September 2026, covering coordination, needs mapping, material development, the main training workshop (11 May 2026), platform activation, and subsequent mentoring, monitoring, and evaluation.

Subjects, Sampling, and Ethics

Partner institutions were selected based on three criteria: having vocational products with digital-marketing potential, being located in an area with limited access to modern marketing infrastructure, and demonstrating institutional commitment to program sustainability. Based on these criteria, SMK An-Nur Ibun (NPSN 20271836) and LKP An-Nur Ibun (NPSN K9990217) were selected. Participants were enrolled through total sampling (census) of the reachable population, defined as all teachers, tutors, and targeted learners of both institutions present and available on the training day; those absent were away on teaching duty or industrial placement. Because the exact institutional denominator at the time of the activity was not recorded, the 45 participants are reported as the achieved census of the reachable population rather than a coverage rate. They comprised 12 SMK teachers, 7 LKP tutors, 18 SMK students, and 8 LKP learners. All participated voluntarily after receiving an explanation of the activity's purpose, procedures, and data use, and gave written consent for the use of photographic documentation in which they may be identifiable. The team maintained individual data confidentiality and used all data exclusively for program evaluation and reporting.

Intervention Framework and Implementation Stages

The intervention was structured as an input–process–output logic model across five stages: coordination and program socialization with the Foundation, SMK, and LKP leadership (April 2026); condition mapping through interviews, observation, and FGD to identify partners' problems and potential (April–May 2026); development of modules, slides, and affiliate-marketing video tutorials (May 2026); the main training workshop with hands-on practice (11 May 2026); and activation of and mentoring for the wanojamart.com marketplace and social-media accounts (May 2026 onward). The two core workshop sessions addressed vocational digital competence for Industry 4.0-based SMK graduates and the use of AI and affiliate competence in creating digital content for marketing local products. The claim is deliberately limited to outputs because the program period did not include attitudinal or socio-economic outcome indicators; outcome measurement is proposed as a follow-up. A summary of implementation stages is presented in **Table 1**.

Table 1. Implementation Stages of the PkM Activity

No	Stage	Activity	Status
1	Coordination & Socialization	Program socialization with the leadership of the An-Nur Ibun Foundation, SMK, and LKP	Completed (April 2026)
2	Mapping & FGD	Interviews, observation, and FGD to identify partners' problems and potential	Completed (April to May 2026)

No	Stage	Activity	Status
3	Material Development	Preparation of modules, slides, and affiliate-marketing video tutorials	Completed (May 2026)
4	Main Training	Workshop and practice on vocational digital competence plus digital content and AI tools	Completed (11 May 2026)
5	Platform Activation	Activation and mentoring for the wanojamart.com marketplace and social media accounts	Completed (May 2026)

Source: Primary data from the PkM activity (2026).

Instruments and Instrument Validity

Data were collected through four instruments: an activity-implementation observation sheet; pre-test and post-test questionnaires measuring six core competence areas (vocational digital literacy, digital marketing, branding and value proposition, digital content and AI tools, marketplace management, and affiliate marketing); a structured interview guide for reflective discussion with partner leaders; and a participant attendance and participation documentation sheet. The pre-test and post-test are identical 30-item instruments, five items per competence area, combining dichotomous knowledge items (correct = 1, incorrect = 0) and four-point self-assessment items, with raw scores converted to a 0–100 scale for comparability across areas with different item weights.

The six competence areas were derived from DigCompEdu as follows: professional engagement and digital resources were merged into vocational digital literacy; teaching and learning together with facilitating learners' digital competence were reframed and absorbed into vocational digital literacy and marketplace management; and digital content creation was distributed across digital content and AI tools, digital marketing, and branding and value proposition. Assessment and empowering learners were not carried forward, as they address classroom evaluation and learner agency rather than product-marketing competence. Two areas lie outside DigCompEdu and were added from the partners' needs mapping: AI tools for content production and affiliate marketing- to capture the applied marketing demand the framework does not cover.

The seventh need aspect, digital entrepreneurship and digital-platform management, was absorbed into marketplace management, consistent with evidence that digital-entrepreneurship competence in vocational students is expressed through digital marketing, business management, and brand development rather than as a separate domain (Mahmudah et al., 2023). Content validity was examined through expert judgment by three lecturers in office management and vocational education; the reliance on qualitative expert judgment without a formal content-validity index (e.g., Aiken's V) is acknowledged as an instrument limitation. Internal consistency, estimated with Cronbach's alpha on the post-test administration (n = 45), ranged from $\alpha = .68$ (digital marketing) to $\alpha = .79$ (digital content and AI tools); all values are acceptable for five-item scales, with digital marketing marginally below the .70 convention. Because the instrument is multidimensional by design, consistency is reported per area rather than for the full instrument.

Success Indicators and Their Measurement

Program success was assessed against six output indicators, with targets set jointly with the partners during the April 2026 coordination meeting, using the partners' baseline condition as the reference point (zero active digital platforms, no standardized product documentation, and no training module). The competence target, at least 80% of teachers and tutors mastering five or more of the six areas, follows the minimum mastery convention used in the partners' own internal training. Data sources include post-test

scores, marketplace and social-media dashboards, product documentation files, and the module repository, all verified during monitoring on 5 September 2026.

Data Analysis

Quantitative pre-test and post-test data were analyzed using descriptive statistics and Hake's normalized gain (g), computed as $g = (\text{Post-test} - \text{Pre-test}) / (100 - \text{Pre-test})$, with categories of low ($g < 0.30$), medium ($0.30-0.70$), and high ($g > 0.70$) (Hake, 1998). We tested the statistical significance of the pre-post difference with the Wilcoxon signed-rank test, as the Shapiro-Wilk test indicated non-normality in gain scores ($W = 0.91$, $p = .002$). Effect size was computed as $r = Z / \sqrt{N}$ ($r = 0.87$), indicating a large effect. Qualitative data were analyzed thematically through data reduction, data display, and conclusion drawing, with two coders independently open-coding interview transcripts and field notes, followed by consensus on theme labels. Triangulation was operationalized by comparing each quantitative finding with the corresponding interview statement and implementation documentation, retaining only themes supported by at least two of the three sources.

$$g = (\text{Post-test} - \text{Pre-test}) / (\text{Maximum score} - \text{Pre-test}) (1)$$

Where g is the normalized gain, the post-test is the score obtained after the training, the pre-test is the score obtained before the training, and the maximum score is the highest attainable score (100).

RESULTS AND DISCUSSION

Participant Profile and Attendance

The activity drew 45 participants representing all elements of the partners' vocational-education ecosystem, with a balanced distribution between educators (42.2%) and students or learners (57.8%). This composition reflects an intervention strategy targeting both facilitators (teachers and tutors) and direct learners. The average attendance rate reached 96.4% across all sessions, with the highest attendance in the first material session (100.0%) and a slight decline in the Quick Workflow Affiliate practice session (95.6%). Table 2 presents the participant distribution.

Table 2. Distribution of Activity Participants by Category

No	Participant Category	Number (people)	Percentage
1	Teachers of SMK An-Nur Ibun	12	26.7%
2	Tutors of LKP An-Nur Ibun	7	15.6%
3	SMK Students	18	40.0%
4	LKP Learners	8	17.8%
Total		45	100.0%

Source: Participant attendance list, 11 May 2026.

Documentation of the workshop and the laboratory practice sessions on 11 May 2026 is presented in Figure 1.



Figure 1. Implementation of the workshop and hands-on practice: (a) an explanation about entrepreneurial competencies; (b) the participant pays attention to the instructor; (c) practice participants make affiliates with AI; (d) a presentation about AI Affiliate
Source: Author documentation (2026).

Improvement in Vocational Digital Competence

Quantitative evaluation demonstrated consistent improvement in vocational digital competence across both target groups. The educator group (teachers and tutors, $n = 19$) entered with a mean pre-test score of 41.4 and reached a mean post-test score of 80.3 ($SD = 4.50$), a gain of 94.0% with a normalized gain of $g = 0.66$ (medium category). Their largest gains were in Digital Content and AI Tools ($g = 0.70$) and Digital Marketing ($g = 0.70$). The learner group (students and learners, $n = 26$) began with a lower baseline of 35.2, reflecting predominantly consumptive prior device use, and reached 81.2 ($SD = 4.90$) post-intervention, a gain of 130.7% with a normalized gain of $g = 0.71$ (high category), with the largest gains in Digital Content and AI Tools ($g = 0.79$) and Affiliate Marketing ($g = 0.72$). For all 45 participants combined, the total mean score rose from 37.4 to 79.8 (Wilcoxon $Z = -5.84$, $p < .001$, $r = 0.87$, large effect), with a mean normalized gain of $g = 0.68$ ($SD = 0.07$, medium category approaching the high threshold) and no single participant recording a decline. The small dispersion of the normalized gain indicates that improvement was consistent across the full range of entry levels rather than concentrated among the most-prepared participants. Table 3 presents detailed results by competence area and group.

Table 3. Participants' Pre-Test, Post-Test, and Normalized Gain Results ($n = 45$)

No	Competence Area	Group	Pre (M)	SD (Pre)	Post (M)	SD (Post)	Δ	% Increase	g	Category
1	Vocational Digital Literacy	Teachers/Tutors ($n=19$)	55.6	-	86.1	-	+30.5	54.9%	0.69	Medium
		Students/Learners ($n=26$)	49.3	-	86.0	-	+36.7	74.4%	0.72	High
		Total score ($n=45$)	52.0	-	86.0	-	+34.0	65.4%	0.71	High
2	Digital Marketing	Teachers/Tutors ($n=19$)	43.5	-	82.9	-	+39.4	90.6%	0.70	High
		Students/Learners ($n=26$)	39.2	-	81.3	-	+42.1	107.4%	0.69	Medium
		Total score ($n=45$)	41.0	-	82.0	-	+41.0	100.0%	0.69	Medium
3	Branding & Value Proposition	Teachers/Tutors ($n=19$)	42.1	-	77.2	-	+35.1	83.4%	0.61	Medium
		Students/Learners ($n=26$)	35.0	-	78.6	-	+43.6	124.6%	0.67	Medium
		Total score ($n=45$)	38.0	-	78.0	-	+40.0	105.3%	0.65	Medium

No	Competence Area	Group	Pre (M)	SD (Pre)	Post (M)	SD (Post)	Δ	% Increase	g	Category
4	Digital Content & AI Tools	Teachers/Tutors (n=19)	39.2	-	82.0	-	+42.8	109.2%	0.70	High
		Students/Learners (n=26)	32.0	-	85.5	-	+53.5	167.2%	0.79	High
		Total score (n=45)	35.0	-	84.0	-	+49.0	140.0%	0.75	High
5	Marketplace Management	Teachers/Tutors (n=19)	37.3	-	75.5	-	+38.2	102.4%	0.61	Medium
		Students/Learners (n=26)	29.9	-	76.3	-	+46.4	155.2%	0.66	Medium
		Total score (n=45)	33.0	-	76.0	-	+43.0	130.3%	0.64	Medium
6	Affiliate Marketing	Teachers/Tutors (n=19)	30.9	-	78.3	-	+47.4	153.4%	0.69	Medium
		Students/Learners (n=26)	25.8	-	79.5	-	+53.7	208.1%	0.72	High
		Total score (n=45)	28.0	-	79.0	-	+51.0	182.1%	0.71	High
	Overall Total Score	Teachers/Tutors (n=19)	41.4	3.80	80.3	4.50	+38.9	94.0%	0.66	Medium
		Students/Learners (n=26)	35.2	2.90	81.2	4.90	+46.0	130.7%	0.71	High
		Total (n = 45)	37.4	3.36	79.8	4.89	+42.4	113.4%	0.68	Medium, approaching the high threshold

Source: Participants' pre-test and post-test results (n = 45), May 2026. Note: M = mean; Δ = score difference; g = Hake's normalized gain; categories follow Hake (1998).

Activation of the Wanojamart.com Digital Marketplace

One of the three components of this PkM was activating the wanojamart.com digital marketplace as a channel for marketing the flagship products of SMK and LKP An-Nur Ibun. The platform provides a product-catalog feature, a simple order-management system, locality-based branding, and social media integration to amplify promotional content. Product onboarding progressed gradually, starting with four early-stage flagship product categories: handicrafts, clothing, bedsheets, and sarongs. By the monitoring cut-off of 5 September 2026, four additional flagship products had been onboarded through continued mentoring, bringing the total marketed products to eight categories. Figure 2 shows the storefront with the onboarded product categories.

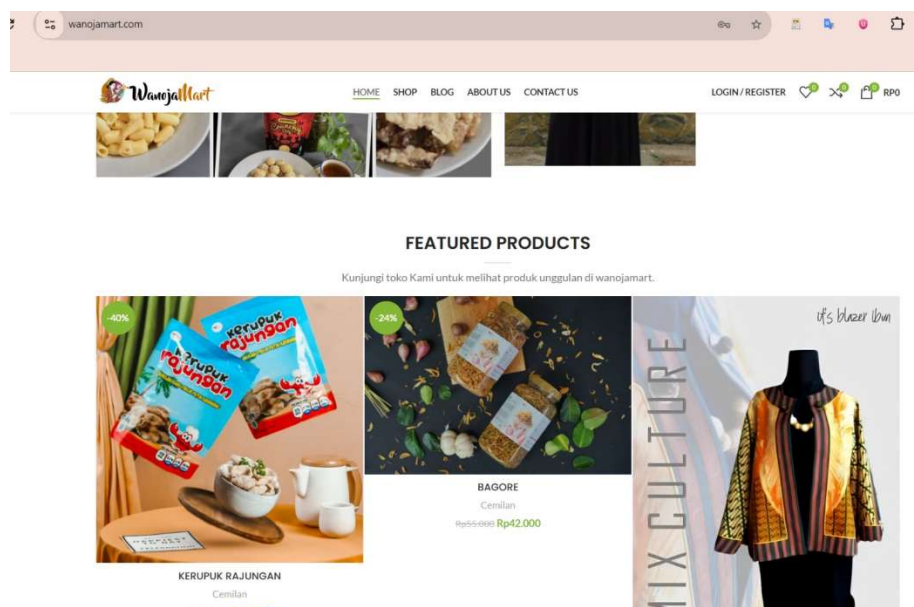


Figure 2. Storefront of the wanojmart.com Marketplace Showing the Onboarded Product Categories
Source: Screenshot of wanojmart.com (2026).

Use of AI Tools in Promotional-Content Production

AI tools training was one of the activity's main attractions. Participants were trained to use: 1) Canva (Teams access) for graphic design of packaging and digital posters; 2) Leonardo.ai for prompt-based promotional-image generation; 3) Google AI Studio and Gemini for copywriting, social-media captions, and short video scripts; and 4) an integrated workflow for producing simple affiliate videos. The choice of tools was based on three criteria: low cost (many free features or team access), easy access from devices partners already own (laboratory computers and smartphones), and a short learning curve so participants could become productive within hours.



Figure 3. Examples of session outputs: (a) AI-generated promotional poster; (b) a participant presenting an affiliate video produced during the session

Source: Participants' work and author documentation (2026)

Practice observation showed that participants could produce simple promotional content (posters and short affiliate videos) within minutes. Every participant group produced at least one poster and one short affiliate video during the session, and these artifacts were subsequently used as the first promotional content on the activated channels. Examples of these session outputs are presented in **Figure 3**.

Achievement of Output Indicators

The achievement of the PkM activity's output indicators reached an average of 97.3% of the set targets, with two indicators exceeding the target (standardized flagship products: 4 against a target of 3; active platforms: 3 against a target of 2), three indicators meeting the target (teacher and tutor competence mastery: 89% against a target of at least 80%; business-management model: 1 unit; training materials: 2 modules and 1 video tutorial against a target of 2 modules), and one indicator still in progress (routine promotional content: 95% of the weekly publication schedule). A summary of the output-indicator achievement is presented in **Table 4**.

Table 4. Achievement of the Activity's Output Indicators

No	Output Indicator	Target	Achievement
1	Teachers/tutors master 5 or more vocational digital competences	80% or more	89% (achieved)
2	Standardized and documented flagship products	3 or more products	4 products (achieved)
3	Simple business-management model developed	1 model	1 model (achieved)
4	Active digital platforms (marketplace + social media)	2 or more platforms	3 platforms (achieved)
5	Routine promotional content published	At least 1 post per week on each active channel	95% of the weekly schedule fulfilled (ongoing)
6	Training materials and modules available	2 modules	2 modules + 1 video tutorial (achieved)

Source: Monitoring and evaluation of the PkM activity as of 5 September 2026

Qualitative Findings and Institutional Commitment

Thematic analysis of observation, interview, and reflective-discussion data revealed four themes, each corresponding to a quantitative indicator. First, participants appreciated the hands-on approach using AI tools that are accessible for free or with team access, making the learning sustainable after the training ended, consistent with the highest gain being recorded in digital content and AI tools ($g = 0.75$). Second, teachers and tutors acknowledged that they had previously only read about AI and affiliate marketing without ever practicing them. Hence, these sessions bridged knowledge and action, matching the near-zero baseline in affiliate marketing (pre-test 28) and its largest relative rise (+182.1%). Third, students showed high enthusiasm in the Quick Workflow Affiliate Video session, which nevertheless recorded the lowest attendance (95.6%) because it ran at the end of the day. Fourth, the Foundation's leadership expressed a commitment to making digital-marketing activities part of the TEFA at SMK An-Nur Ibun, which corresponds to achieving the business-management model indicator (1 unit) and activating three platforms.

Discussion

Taken together, these results demonstrate that the triple-track intervention model-competence strengthening, AI-tools transfer, and marketplace activation-shows promise as a comprehensive empowerment package for vocational partners with limited market access. The single-group design constrains the causal interpretation of these gains; they should be read as consistent with the intervention rather than attributable to it in a strict experimental sense. That all 45 participants improved, with no single case of decline (Wilcoxon $Z = -5.84$, $p < .001$, $r = 0.87$), indicates the intervention worked across the whole range of entry levels. The two areas that started nearest to zero, Affiliate Marketing (pre-test $M = 28$) and

Digital Content and AI Tools (pre-test $M = 35$), showed the largest absolute and relative gains, because the training converted total inexperience into first productive use, where instruction yields the steepest returns. Vocational Digital Literacy is the instructive counter-case: its percentage increase (65.4%) is the lowest in the table, yet its normalized gain ($g = 0.71$) is among the highest, because the normalized gain accounts for the narrower headroom remaining from a high baseline (Coletta & Steinert, 2020).

Interpreted through the vocational digital-competence maturity framework, participants moved toward the capability and creativity levels where competence is used to produce something, rather than merely adding knowledge at the literacy level (Astuti et al., 2021). Activating wanojamart.com enabled the marketplace to serve a dual function: it became both the platform on which participants practiced and the channel through which their products reached buyers. This approach extends the proposing team's prior research on the role of digital technology in organizational and quality-management contexts and on digital-literacy transformation for digital-marketing competence among micro, small, and medium enterprises. It aligns with digital-based adult learning in community education, where technology functions as part of the curriculum rather than merely as a supporting tool (Fahimah et al., 2023; Rasto et al., 2024; Santoso et al., 2024; Wahyudin et al., 2024).

Compared with prior training programs that relied on third-party platforms, a partner-owned marketplace reduces platform-adoption barriers by allowing partners to operate without negotiating external participation terms, a constraint well-documented in the Indonesian MSME e-commerce context (Ausat & Peirisal, 2021). The e-commerce policy literature further underscores that institutional control over the platform is a key determinant of sustainability in international digital trade contexts (Cumming et al., 2023). The observation that participants with no design background produced usable posters and short affiliate videos within a single session is consistent with evidence that generative AI lowers the entry barrier to professional content production for actors with limited creative resources, and that AI integration in vocational education builds an adaptive technological disposition alongside technical skills (Kshetri et al., 2024; Prasetya et al., 2025).

The content produced was not merely an exercise: it was published on the activated channels within the same week, thereby closing the loop between training and the marketing objective (Robertson & Lapina, 2023). The Foundation's commitment to embed digital marketing within the TEFA of SMK An-Nur Ibun is the most consequential qualitative finding, because principal support and institutional policy are among the strongest determinants of whether digital competence adoption survives the end of external mentoring (Rahmawati et al., 2025). TEFA-based learning in production units has been shown to add measurable value to graduates' work readiness, supplying the institutional vehicle that carries the transferred competence forward. This mirrors patterns in community-service work, where competence gains persisted only when the host institution absorbed the practice into its routine operations (Rosidah & Sutirman, 2023; Wijanarka et al., 2023).

The strength of the outputs lies in their low cost and partner ownership: the marketplace operates on infrastructure controlled by the Foundation, the AI tools were selected from free or team-access tiers, and the affiliate model requires no advertising budget. Nevertheless, several concrete vulnerabilities remain. Staffing continuity is a concern: management currently depends on a small cohort of trained teachers and students who eventually graduate, making operational knowledge vulnerable to loss unless formally incorporated into TEFA job descriptions. Connectivity in Ibun District may constrain video-content uploads, although video is the format on which affiliate performance depends most. Order fulfillment also requires attention, as no specific person is currently assigned to manage it during school holidays, a discontinuity risk consistent with findings that village-level branding digitalization loses its gains when no sustained managing actor is available (Callistasari et al., 2025).

Realistically, the marketplace can operate independently only if the TEFA commitment is translated into a clearly assigned operational role with an allocated time budget. The most difficult implementation stage was not the training but product onboarding, which required photographic standardization, price setting, and description writing for each item, work that competes with partners' teaching hours. We addressed uneven device readiness among learners by pairing participants at laboratory computers. Prior community-service programs focused on visual identity alone did not encounter this constraint precisely because they stopped before reaching the channel stage (Hendarmin & Sari, 2024; Magdalena et al., 2023). Scaling the model to other SMK and LKP therefore depends less on transferable training content than on whether the receiving institution has a production unit capable of absorbing the fulfillment load, consistent with community-service work in which durable facility establishment outperformed training-only delivery (Rahmawati et al., 2025).

Digital employability skills that convert vocational learning into workforce readiness are formed through sustained institutional practice rather than a single training event (Kholifah et al., 2025). This program achieved what prior work did not: integrating all three links in the chain within a single institutional vehicle. Prior community service raised marketing capacity (Sasongko et al., 2020), built brand identity, or trained affiliate marketing separately, and none anchored the result in a vocational learning institution. When the three links are joined inside a Teaching Factory served by a partner-owned marketplace, the students cease to be trainees and become the distribution capacity itself, an outcome unavailable to micro-enterprise-only programs, which have no standing cohort of platform-native affiliates (Hendarmin & Sari, 2024; Magdalena et al., 2023). This is the model's specific, testable contribution.

Several limitations should be interpreted carefully. The single-group design without a control group means score increases cannot be causally attributed to the intervention, given potential internal-validity threats including maturation, testing effects, and regression to the mean, as stated by Campbell & Stanley (2015) in a book titled "*Experimental and quasi-experimental designs for research*". Competence measurement relied on short-term knowledge tests and self-assessment items administered immediately after training, without capturing long-term skill transfer or economic impact; content validity rested on qualitative expert judgment without a quantitative index such as Aiken's V, and the authors did not report area-level score dispersion separately. The single partner site limits generalizability. Future research should use a quasi-experimental design with a comparison group, longitudinal measurement, and economic-impact indicators such as turnover and market reach to confirm the model's effectiveness.

CONCLUSION

The program met its three objectives. Vocational digital competence improved consistently across all six measured areas, with the largest gains where the baseline was lowest and meaningful gains where it was already relatively high. Practice with AI tools and affiliate marketing moved participants from awareness to hands-on production: teachers, tutors, and learners who had previously only read about these techniques produced and published promotional content themselves. The activity activated an integrated marketing channel through wanojamart.com and linked social media accounts, reinforced by the An-Nur Ibun Foundation's commitment to embed digital marketing within its TEFA. All 45 participants achieved a medium category, approaching the high threshold. Because the activity used a single-group design without a comparison group, these achievements are consistent with the intervention rather than causally attributable to it.

The novelty of this activity lies in linking affiliate marketing and AI tools into a vocational Teaching Factory scheme through a locally owned marketplace, rather than in delivering any of these components independently. The model suggests potential for adaptation at other SMK and LKP with similar local

flagship-product profiles, subject to testing at additional sites. Three follow-ups respond directly to the limitations identified above: 1) A quasi-experimental study with a comparison group to address the absence of a control condition; 2) A longitudinal study of economic impact including turnover and market reach to address the absence of an outcome measure; and 3) Replication across multiple partner institutions, together with the development of AI tools specific to the Indonesian vocational-education context, to address the single-site constraint.

AUTHOR'S NOTE

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REFERENCES

- Astuti, M., Arifin, Z., Mutohhari, F., & Nurtanto, M. (2021). Competency of digital technology: The maturity levels of teachers and students in vocational education in Indonesia. *Journal of Education Technology*, 5(2), 254-262.
- Ausat, A. M. A., & Peirisal, T. (2021). Determinants of e-commerce adoption on business performance: A study of MSMEs in Malang City, Indonesia. *Jurnal Optimasi Sistem Industri*, 20(2), 104-114.
- Barboutidis, G., & Stiakakis, E. (2023). Identifying the factors to enhance digital competence of students at vocational training institutes: B. George and S. Emmanouil. *Technology, Knowledge and Learning*, 28(2), 613-650.
- Caballero, M., Calvadores, N. A. D. L., & Garcia, K. (2024). The hidden gem of yellow basket: A study on consumer purchase intention through TikTok shop involved affiliate marketing. *Inclusive Society and Sustainability Studies Учредителю: Research Synergy Foundation*, 4(2), 40-50.
- Caena, F., & Redecker, C. (2019). Aligning teacher competence frameworks to 21st century challenges: the case for the European Digital Competence Framework for Educators (Digcompedu). *European Journal of Education*, 54(3), 356-369.
- Callistasari, N. P., Jannah, R., Aldi, M. R., Alie, J., Munandar, A., & Ghina, A. (2025). Digitalization strategy for tailoring UMKM branding in Mainan Village Banyuasin. *Golden Ratio of Data in Summary*, 5(4), 863-875.
- Coletta, V. P., & Steinert, J. J. (2020). Why normalized gain should continue to be used in analyzing preinstruction and postinstruction scores on concept inventories. *Physical Review Physics Education Research*, 16(1), 1-7.
- Cumming, D., Johan, S., Khan, Z., & Meyer, M. (2023). E-commerce policy and international business. *Management International Review*, 63(1), 3-25.
- Fahimah, N., Hatimah, I., Komar, O., Ardiwinata, J. S., & Saepudin, A. (2023). Implementation of digital-based andragogy in community education in Indonesia. *International Journal of Professional Business Review*, 8(4), 1-12.

- Hake, R. R. (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. *American journal of Physics*, 66(1), 64-74.
- Hendarmin, R., & Sari, R. (2024). Pengembangan branding dan identitas bisnis untuk UMKM Desa Petanang. *Jurdimas (Jurnal Pengabdian kepada Masyarakat) Royal*, 7(1), 19-23.
- Kholifah, N., Nurtanto, M., Sutrisno, V. L. P., Majid, N. W. A., Subakti, H., Daryono, R. W., & Achmadi, A. (2025). Unlocking workforce readiness through digital employability skills in vocational education graduates: A PLS-SEM analysis based on human capital theory. *Social Sciences & Humanities Open*, 11(1), 1-14.
- Kshetri, N., Dwivedi, Y. K., Davenport, T. H., & Panteli, N. (2024). Generative artificial intelligence in marketing: Applications, opportunities, challenges, and research agenda. *International Journal of Information Management*, 75(1), 1-10.
- Lan, D. H., & Tung, T. M. (2024). Exploring fake news awareness and trust in the age of social media among university student TikTok users. *Cogent Social Sciences*, 10(1), 1-25.
- Lewis, P. (2025). Innovation, technician skills, and vocational education and training: connecting innovation systems and vocational education and training. *Journal of Vocational Education & Training*, 77(2), 364-391.
- Magdalena, B., Wibaselppa, A., & Febriani, F. (2023). Pendampingan UMKM Kopi Aroma Gs melalui pembuatan logo, stiker kemasan, dan banner dalam upaya meningkatkan inovasi produk. *Jurnal Abdi Masyarakat Saburai (JAMS)*, 4(2), 119-127.
- Mahmudah, F. N., Baswedan, A. R., & Cahyono, S. M. (2023). Digital entrepreneurship competence of vocational students. *Jurnal Pendidikan Teknologi dan Kejuruan*, 29(2), 125-140.
- Mulyanti, R. Y., Wati, L. N., Tusminuridin, U., & Soma, A. M. (2024). Determinants of teacher digital competence: Empirical evidence of vocational schools in Indonesia. *International Journal of Data and Network Science*, 8(3), 1517-1530.
- Prasetya, F., Fortuna, A., Samala, A. D., Latifa, D. K., Andriani, W., Gusti, U. A., Raihan, M., Criollo-C, S., Kaya, D., & García, J. L. C. (2025). Harnessing artificial intelligence to revolutionize vocational education: Emerging trends, challenges, and contributions to SDGs 2030. *Social Sciences & Humanities Open*, 11(1), 1-10.
- Rahmawati, S., Prestridge, S., Abdullah, A. G., & Widiaty, I. (2025). Unpacking the digital competence challenge in vocational education: A case from Indonesia. *Social Sciences & Humanities Open*, 12(1), 1-15.
- Rasto, R., Suryadi, E., Sobandi, A., Sutarni, N., & Hernawan, Y. (2024). Digital technology in quality management: bibliometric computational mapping analysis. *Journal of Advanced Research*, 1(1), 154-170.
- Reddy, P., Chaudhary, K., & Hussein, S. (2023). A digital literacy model to narrow the digital literacy skills gap. *Heliyon*, 9(4), 1-16.
- Robertson, G., & Lapiņa, I. (2023). Digital transformation as a catalyst for sustainability and open innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(1), 1-14.
- Rosidah, R., & Sutirman, S. (2023). Added value of teaching factory learning in services production unit to prepare graduate work readiness. *Jurnal Cakrawala Pendidikan*, 42(3), 695-704.

- Santoso, B., Hufad, A., Wahyudin, U., & Inoue, H. (2024). Digital literacy transformation: Digital marketing competence for micro, small, and medium enterprises (MSMEs). *Journal of Nonformal Education*, 10(2), 332-342.
- Sasongko, D., Putri, I. R., Alfiani, V. N., Qiranti, S. D., Sari, R. S., & Allafa, P. E. (2020). Digital marketing sebagai strategi pemasaran UMKM Makaroni Bajak Laut Kabupaten Temanggung. *Jurnal Ilmiah Pangabdhi*, 6(2), 92-96.
- Scholtz, G. (2023). Leadership development perspective of adult learning philosophies. *The International Journal of Management Education*, 21(2), 1-15.
- Wahyudin, U., Purnomo, P., Sulistiono, E., & Mutamam, M. H. A. (2024). Implementation of digital-based Adult Learning Education (ALE) at Community Learning Centre (CLC). *Journal of Advanced Research in Applied Sciences and Engineering Technology*, 62(1), 98-111.
- Wijanarka, B. S., Wijarwanto, F., & Mbakwa, P. N. (2023). Successful implementation of teaching factory in machining expertise in vocational high schools. *Jurnal Pendidikan Vokasi*, 13(1), 1-13.
- Yolanda, C., & Hasanah, U. (2024). Peran Usaha Mikro, Kecil dan Menengah (UMKM) dalam pengembangan ekonomi Indonesia. *Jurnal Manajemen dan Bisnis*, 2(3), 170-186.
- Zhao, Y., Sánchez-Gómez, M. C., Pinto-Llorente, A. M., & Sánchez Prieto, R. (2025). Adapting to crisis and unveiling the digital shift: a systematic literature review of digital competence in education related to COVID-19. *Frontiers in Education*, 10(1), 1-15.
- Zimmer, W. K., McTigue, E. M., & Matsuda, N. (2021). Development and validation of the teachers' digital learning identity survey. *International Journal of Educational Research*, 105(1), 1-18.