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International Community Engagement in Generative AI-Assisted Teaching: Strengthening Digital Pedagogical Competence among Malaysian Prospective English Teachers

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Abstract

This international community-engagement programme aimed to strengthen generative artificial intelligence literacy and digital pedagogical competence among eight prospective English teachers at Universiti Tun Hussein Onn Malaysia. Grounded in Indonesia's Tridharma framework, the programme employed presentations, demonstrations, guided practice, collaborative assignments, mentoring, verification exercises, and participant presentations. Its content addressed prompt construction, material development, output validation, digital ethics, academic integrity, and human-centred pedagogy. The average score increased from 57.70 in the pre-test to 84.20 in the post-test, representing a 26.50-point improvement. Participants developed learning materials, media products, sample prompts, presentations, responsible-use guidelines, and verification procedures. These outcomes indicate improvement in participants' capacity to formulate context-sensitive prompts, evaluate generated content, and retain responsibility for instructional decisions. Nevertheless, the small participant group, single setting, and short duration restrict generalisation. Continued mentoring, microteaching, portfolio development, longitudinal evaluation, and Indonesia–Malaysia collaboration are recommended to consolidate learning and support adoption in teacher education.

Keywords: artificial intelligence literacy; digital pedagogical competence; generative artificial intelligence; international community engagement; prospective English teachers.

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1. INTRODUCTION

1.1 Tridharma and Community Engagement in Indonesian Higher Education

Indonesian higher education positions education, research, and community engagement as interconnected responsibilities under the Tridharma framework. Teaching disseminates disciplinary knowledge, whereas research generates evidence, innovation, and solutions that can be applied through community programmes. Nelly et al. (2024) maintain that lecturers' performance should reflect competence across these three institutional functions. Christwardana et al. (2022) demonstrate that community engagement can simultaneously support experiential learning, collaborative projects, and student competence development. Community engagement should therefore extend beyond ceremonial knowledge dissemination towards reciprocal problem identification and solution development. Chandra et al. (2022) emphasise that adaptive programme design is essential for maintaining the relevance and sustainability of university-led engagement. Harjatanaya et al. (2025) further show that participatory approaches can connect academic learning with societal and sustainability challenges in Indonesia. International scholarship likewise positions universities as agents of social transformation whose educational and research resources should benefit wider communities (Sporn et al., 2024). Accordingly, international community engagement represents an appropriate extension of lecturers' Tridharma obligations.

1.2 Internationalisation of Community Engagement

The internationalisation of community engagement expands academic cooperation beyond student mobility, institutional branding, and transnational recruitment. It enables universities to apply teaching and research expertise to shared social and educational concerns across national boundaries. Jones et al. (2021) conceptualise this orientation as internationalisation of higher education for society, through which international activities intentionally benefit communities. Ramaswamy et al. (2021) similarly associate socially oriented internationalisation with collaborative responses to the Sustainable Development Goals. Cross-border engagement can facilitate reciprocal knowledge transfer, intercultural learning, professional networking, and institutional capacity development. Cai et al. (2024) argue that contemporary internationalisation should incorporate social responsibility and broader societal contributions rather than prioritising competitive advantage alone. Virtual and blended cooperation can also widen participation among institutions with limited mobility resources. Yousef et al. (2024) connect internationalisation with global competence, institutional development, and graduate readiness. Nevertheless, Hou et al. (2025) caution that international partnerships must address ethical asymmetries and contextual differences. International community engagement should consequently be reciprocal, culturally responsive, needs-based, and sustainably governed (Merina, Suhud, Sihotang, Hidayah, et al., 2026).

1.3 Generative AI in Teacher Education

Generative artificial intelligence offers teacher education new mechanisms for producing reading passages, dialogues, vocabulary exercises, lesson plans, instructional media, assessment questions, rubrics, and formative feedback. Kasneci et al. (2023) explain that large language models can support personalised explanation, content generation, and adaptive learning when guided by pedagogical objectives. Tlili et al. (2023) identify opportunities for conversational assistance and immediate educational support, although generated content requires human oversight. Farrokhnia et al. (2024) similarly show that generative AI may improve efficiency and creativity while creating risks involving reliability, bias, and learner dependence. In language education, Jeon and Lee (2023) position teachers as orchestrators who align AI-generated resources with communicative objectives and learners' linguistic needs. Lo (2023) stresses that educational benefits depend on assessment redesign, digital competence, and critical evaluation. Within Indonesian and Malaysian teacher education, generative AI can therefore enrich English-language learning materials, but teachers must contextualise vocabulary, cultural representations, difficulty levels, feedback, and learning activities rather than accepting automated outputs uncritically (Sihotang, Suhud, & Wibowo, 2025).

1.4 Problems and Partner Needs

Prospective English teachers require more than basic familiarity with generative AI applications because effective educational use depends on prompt quality, critical verification, pedagogical judgement, and ethical awareness. Lee et al. (2025) demonstrate that prompt engineering requires clearly defined tasks, contextual information, output specifications, and iterative refinement. Hsu et al. (2024) observe that prospective teachers can employ generative AI for lesson planning, although their decisions remain influenced by limited experience and uncertainty about classroom application. Karaduman and Akşit (2025) further identify uneven AI literacy and professional readiness among prospective EFL teachers. Generated responses may contain inaccurate information, fabricated references, inappropriate language levels, or culturally unsuitable examples. Cotton et al. (2024) therefore emphasise the need for transparent academic-integrity practices that distinguish legitimate assistance from misrepresentation. Privacy risks also arise when personal, institutional, or learner information is entered into commercial systems. Yan et al. (2024) underline the importance of human accountability, data protection, and ethical governance. These competencies constitute pressing developmental needs within the Malaysian partner context.

1.5 Programme Objectives

The programme aimed to strengthen prospective English teachers' AI literacy and digital pedagogical competence in developing English-language learning materials critically, creatively, ethically, and responsibly. AI literacy encompasses understanding system capabilities, constructing purposeful prompts, evaluating generated outputs, recognising limitations, and making accountable decisions. Laupichler et al. (2022) argue that AI literacy programmes should combine conceptual knowledge with practical and ethical competence. Kong et al. (2023) further associate AI literacy with learners' ability to understand applications, evaluate consequences, and participate responsibly in AI-mediated environments. The programme also sought to connect technological proficiency with pedagogical and linguistic objectives. Polak et al. (2022) emphasise that teacher preparation must move beyond technical operation towards meaningful instructional integration. Walter (2024) similarly maintains that generative-AI competence requires critical, creative, collaborative, and reflective engagement. As language-teaching decisions affect communication, identity, and cultural representation, responsible adoption must preserve human agency. Moorhouse et al. (2023)

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accordingly recommend explicit guidance concerning accuracy, authorship, disclosure, and appropriate educational use. The programme therefore positioned AI as pedagogical support rather than a substitute for teacher judgement.

2. CONCEPTUAL AND PROGRAMME FRAMEWORK

2.1 AI Literacy for Prospective Teachers

AI literacy for prospective teachers encompasses the knowledge and capabilities required to understand, operate, evaluate, communicate about, and ethically employ artificial intelligence. Ng et al. (2021) conceptualise this literacy through knowing and understanding AI, applying it, evaluating its outputs, and recognising ethical concerns. Sperling et al. (2024) explain that teacher AI literacy must extend beyond operational proficiency towards professional knowledge concerning instructional relevance and technological limitations. Teachers must consequently understand how generative systems produce probabilistic responses, formulate contextually precise prompts, compare outputs with reliable evidence, and identify hallucinations or embedded bias (Sihotang, 2027). Southworth et al. (2023) maintain that AI education should combine foundational understanding with practical experience and critical reflection. Casal-Otero et al. (2023) similarly associate AI literacy with problem-solving, social awareness, and responsible participation. Shi et al. (2025) further integrate technological proficiency, pedagogical compatibility, professional development, and ethical-risk awareness within teacher competence. In Indonesian teacher education, these competencies are essential for ensuring pedagogically purposeful rather than merely convenient AI adoption.

2.2 Digital Pedagogical Competence

Digital pedagogical competence refers to the purposeful integration of technological knowledge, pedagogical knowledge, and disciplinary content knowledge when designing instruction. Celik (2023) extends the established technological pedagogical content knowledge framework by incorporating teachers' capacity to interpret AI outputs and maintain ethical responsibility. Hava and Babayiğit (2025) confirm that digital proficiency provides an important foundation for developing AI-related TPACK competence. Nevertheless, technological familiarity alone cannot ensure meaningful instruction because tools must be aligned with learning objectives, assessment strategies, learner characteristics, and classroom interaction. Ning et al. (2024) demonstrate that AI-TPACK includes knowledge concerning technology, pedagogy, content, their intersections, and ethical practice. Chai et al. (2023) emphasise that teachers must understand how AI affordances can support particular instructional decisions rather than adopting applications indiscriminately. In English-language education, this competence covers selecting suitable applications, developing culturally appropriate texts, adjusting linguistic difficulty, facilitating communication, and evaluating learning (Sihotang, Suhud, Handaru, & Lestari, 2027). Moorhouse and Kohnke (2024) consequently position language teachers as designers who critically mediate relationships among AI capabilities, pedagogical purposes, English-language content, and learner needs.

2.3 Human-Centred AI Pedagogy

Human-centred AI pedagogy positions artificial intelligence as cognitive and instructional support while retaining human agency at the centre of education. Molenaar (2022) proposes hybrid human–AI learning technologies in which automated capabilities complement rather than displace educators' expertise. Ouyang and Jiao (2021) similarly distinguish learner-centred intelligence amplification from models in which technology controls educational decisions. A human-centred approach therefore begins with learning needs and concludes with teacher evaluation, contextualisation, and accountability. Alfredo et al. (2024) emphasise that human-centred educational AI should incorporate stakeholder participation, explainability, agency, and sensitivity to learning contexts. Fu and Weng (2024) add fairness, privacy, security, autonomy, transparency, and beneficence as essential design principles. These considerations are especially important in teacher education because excessive automation may weaken creativity, critical reasoning, professional judgement, and meaningful interaction. Gouseti et al. (2025) consequently argue that educational AI should preserve empathy and human values. Within Indonesian and Malaysian classrooms, prospective teachers should use AI to generate possibilities while retaining authority over objectives, relationships, cultural appropriateness, feedback, and final instructional decisions.

2.4 Academic Integrity and Responsible AI

Responsible generative-AI use requires clear principles concerning authorship, disclosure, plagiarism, references, copyright, bias, privacy, and accountability. Bozkurt (2024) explains that AI-assisted production complicates conventional understandings of authorship and intellectual ownership because generated content emerges through human–machine co-creation. Lund et al. (2024) indicate that academic integrity policies must therefore clarify acceptable assistance, attribution requirements, verification responsibilities, and prohibited substitution of genuine intellectual work. Generative systems may produce persuasive but inaccurate claims or invented references, making source checking indispensable. Kofinas et al. (2025) demonstrate that authentic-looking assessments cannot automatically guarantee authentic student authorship. Gonsalves et al. (2025) further show that disclosure mechanisms require explicit expectations and supportive institutional cultures rather than reliance upon detection. Privacy protection is equally important because prompts may disclose personal, learner, or institutional information to external platforms. Fu and Weng (2024) place transparency, security, fairness, and human accountability at the centre of responsible educational AI. Prospective teachers should consequently document AI assistance, verify every output, respect copyright, minimise sensitive-data input, and accept responsibility for submitted or distributed materials.

2.5 International Community-Engagement Framework

International community engagement should operate as reciprocal knowledge exchange rather than one-directional delivery from an allegedly knowledgeable provider to a passive recipient. Visser et al. (2025) define reciprocity as active collaboration that generates mutual benefit for universities and community partners. Such an approach requires Indonesian facilitators and Malaysian participants to contribute disciplinary knowledge, contextual understanding, classroom experience, cultural perspectives, and critical feedback. Sors et al. (2023) argue that sustained university–community collaboration depends on relational commitment, shared goals, and recognition of different forms of expertise. Tijsma et al. (2023) similarly emphasise co-creation and institutional structures that connect education with societal challenges. Lee and Choi (2023) show that meaningful service-

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learning develops through identifying recipients' actual needs, collaborative problem-solving, responsibility, and reflection. Collins et al. (2022) further demonstrate that cross-border virtual collaboration can encourage intercultural learning and reconsideration of established assumptions. Accordingly, the programme should treat Malaysian participants as co-developers who adapt AI-supported English instruction to their institutional context, while Indonesian facilitators acquire insights that strengthen teaching, research, Tridharma implementation, and future regional partnerships.

3. PROGRAMME IMPLEMENTATION METHOD

3.1 Programme Setting and Participants

The international community-engagement programme was implemented at Johor Business School, Universiti Tun Hussein Onn Malaysia, and involved eight English Literature students preparing for careers as English teachers. The setting provided an appropriate environment for connecting linguistic knowledge, teacher preparation, and responsible educational technology use. Kohnke et al. (2023) argue that language teachers require specialised digital competencies to integrate conversational artificial intelligence into meaningful learning. Crompton and Burke (2023) similarly emphasise that educators' readiness determines whether artificial intelligence supports or disrupts instructional practice. Because prospective teachers are still developing professional identities, training should relate technological experimentation to pedagogical judgement. Blonder et al. (2025) recommend embedding prompt engineering, output evaluation, and ethical decision-making in teacher preparation. Law (2024) demonstrates that generative AI can support language learning when applications correspond with instructional objectives. Campbell et al. (2022) further emphasise that teacher development should be contextualised within participants' institutional environments. Accordingly, the programme treated participants as prospective professionals rather than merely technology users.

3.2 Participatory Training Approach

The programme employed a participatory training approach combining presentations, application demonstrations, interactive discussions, guided practice, group assignments, mentoring, and participant presentations. This combination enabled conceptual explanation to be followed immediately by experimentation, peer dialogue, application, and reflection. Ramos et al. (2022) show that technology-focused teacher development becomes more meaningful when workshops incorporate modelling, dialogue, and classroom-oriented practice. Bendtsen et al. (2022) similarly emphasise collaboration, sustained facilitation, and professional agency in continuing teacher development. Guided activities allowed facilitators to demonstrate prompt construction and verification before participants independently developed educational materials. Hennessy et al. (2022) indicate that technology-mediated teacher development benefits from active participation and context-sensitive support. Group assignments encouraged collaborative decision-making regarding language level, learning objectives, activity design, and ethical risks. Ghamrawi (2024) associates collaborative professional development with stronger teacher leadership and collective learning. Abakah (2023) further maintains that professional learning becomes sustainable when participants contextualise newly acquired knowledge. Participant presentations therefore functioned as opportunities for explanation, peer review, and formative improvement.

3.3 Preparation and Needs Identification

Programme preparation involved coordination with the Malaysian partner institution concerning participant characteristics, implementation arrangements, scheduling, facilities, and expected learning products. Needs identification focused on prospective teachers' familiarity with generative AI, perceived instructional challenges, preferred English-learning activities, and concerns about accuracy, ethics, and academic integrity. Ansyari et al. (2022) demonstrate that teacher-development programmes should consider participants' professional preferences, technological conditions, and learning priorities. Awodiji et al. (2023) similarly position needs assessment as a foundation for aligning professional development with emerging technological demands. Institutional coordination also clarified the respective responsibilities of Indonesian facilitators and Malaysian partners. Kennedy (2023) argues that professional learning should respond to problems of practice rather than present decontextualised techniques. Coppe et al. (2024) further stress that teacher development is shaped by professional trajectories, working environments, and interactions with colleagues. Richter et al. (2024) recommend evaluating programme quality through coherence, relevance, active engagement, and perceived usefulness. Consequently, the preparation stage established realistic programme boundaries and ensured that anticipated outputs corresponded with participants' educational backgrounds and prospective teaching responsibilities.

3.4 Training Materials and Activities

Training materials covered foundational generative-AI concepts, educational opportunities and limitations, prompt components, learning-material development, output verification, ethical risks, and academic integrity. Initial activities distinguished generative systems from conventional information-retrieval tools and explained why generated responses may be plausible but inaccurate. Zawacki-Richter et al. (2024) argue that educational engagement with generative AI requires critical understanding rather than unreflective adoption. Lee and Palmer (2025) show that effective prompts should establish purpose, context, constraints, expected format, and evaluation criteria (Wibowo et al., 2026). Practical activities therefore required participants to define learner proficiency, instructional objectives, language focus, activity duration, and output characteristics. Kohnke and Moorhouse (2026) emphasise that prospective teachers must also understand privacy, bias, transparency, and system limitations. Tassoti (2024) demonstrates that structured prompting can support learning when outputs are subsequently questioned and evaluated. Perkins et al. (2024) further recommend explicit boundaries for acceptable AI involvement in educational work. Accordingly, every demonstration incorporated human verification, revision, contextualisation, and disclosure rather than treating generated content as immediately suitable for classroom distribution.

3.5 Learning Product Development

Participants applied the training materials by developing reading texts, dialogues, vocabulary exercises, presentation materials, quizzes, worksheets, and assessment rubrics. Product development began with identifying intended learning outcomes, learner characteristics, linguistic levels, instructional sequences, and suitable forms of assessment. Lan and Chen (2024) maintain that

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teacher agency remains essential when pedagogical AI agents are designed or selected. Participants consequently used generative AI to propose content but retained responsibility for revising vocabulary, grammar, cultural references, instructions, and answer keys. Barrot (2023) indicates that ChatGPT can assist language learning, although its pedagogical usefulness depends on carefully designed tasks and critical mediation. Kohnke et al. (2023) similarly recommend aligning chatbot affordances with interactional and linguistic objectives. Nazari et al. (2021) show that AI-supported feedback can contribute to writing development when integrated with meaningful instructional guidance. Rudolph et al. (2023) caution that assessment materials must preserve authentic learning rather than encourage cognitive outsourcing. Each product was therefore reviewed for accuracy, accessibility, cultural suitability, instructional coherence, ethical compliance, and alignment between activities and learning outcomes.

3.6 Monitoring and Evaluation

Monitoring and evaluation combined pre-tests, post-tests, facilitator observations, learning-product assessments, participant presentations, feedback, and written or oral reflections. The pre-test identified participants' initial understanding of generative AI, prompting, verification, and responsible educational use, whereas the post-test examined learning following the intervention. Kahmann et al. (2022) demonstrate that professional-development effectiveness should be assessed through multiple outcomes rather than participant satisfaction alone. Richter et al. (2024) likewise recommend examining programme structure, cognitive engagement, practical relevance, and collaboration. Observation documented participation, questioning, group interaction, problem-solving, and responsible-use practices during training. Cañabate et al. (2024) show that transparent rubrics can support both product evaluation and formative improvement among prospective teachers. Baroudi et al. (2023) emphasise that timely feedforward helps participants improve subsequent work instead of merely explaining previous weaknesses. Schlosser et al. (2023) further demonstrate that reflection contributes to changes in professional self-efficacy. Triangulating test performance, observed behaviour, products, presentations, feedback, and reflection provided a comprehensive evaluation of participants' conceptual, practical, pedagogical, and ethical development.

3.7 Follow-up Activities

Follow-up activities included distributing training modules, prompt examples, verification checklists, and responsible-use guidelines for independent practice. These resources were intended to help participants transfer programme learning into lesson planning, teaching simulations, coursework, and future classroom practice. Fischer et al. (2022) argue that professional programmes should assess and facilitate the transfer of newly developed skills beyond the immediate learning environment. Morina et al. (2025) show that continuing online professional development can support teacher- and classroom-level outcomes when learning remains structured and accessible. Regular mentoring was recommended to address evolving applications, institutional policies, and ethical concerns. Hussain et al. (2025) associate digital mentoring with sustained professional growth, reflective practice, and stronger instructional confidence. Chaseley et al. (2025) demonstrate that structured reflection prompts can support prospective teachers' metacognitive development and problem-solving. Tan et al. (2025) further emphasise that teachers' AI-related professional learning requires continuing technical, pedagogical, and ethical support. Subsequent Indonesia–Malaysia collaboration could therefore include online consultations, shared material repositories, peer review, lesson-design projects, microteaching, and institutional guideline development.

4. RESULTS AND DISCUSSION

4.1 Participant Engagement and Programme Implementation

Programme implementation demonstrated active participant engagement throughout the discussions, application demonstrations, guided exercises, group practice, prompt development, verification activities, and product presentations. Participants contributed questions, compared generated responses, negotiated appropriate instructional decisions, and explained their products before receiving facilitator and peer feedback. Such engagement indicates that generative-AI training becomes more meaningful when participants move beyond passive demonstrations towards collaborative experimentation and reflection. Eynon and Young (2021) emphasise that educational technology competence develops through critical participation rather than simple exposure to digital applications. Bond et al. (2021) similarly associate active engagement with behavioural, cognitive, emotional, and social involvement in technology-supported learning. Trust et al. (2023) contend that educators need collaborative spaces to examine generative AI critically. Ng et al. (2023) identify experiential activities as important components of AI-literacy development. Chiu et al. (2024) further explain that meaningful AI integration requires motivation, interaction, and pedagogical support. These findings support participatory implementation within Indonesian–Malaysian teacher development.

4.2 Improvement in AI Literacy and Pedagogical Competence

The average assessment score increased from 57.70 in the pre-test to 84.20 in the post-test, producing an improvement of 26.50 points. This result indicates substantial development in participants' understanding of generative-AI concepts, prompting, educational applications, output verification, ethical risks, and pedagogical integration. The improvement should be interpreted as evidence of immediate learning following the programme rather than proof of long-term competence, which would require delayed assessment and classroom observation (Sihotang, 2026). Ayanwale et al. (2024) explain that prospective teachers' AI literacy encompasses knowledge, application, evaluation, problem-solving, and ethical awareness. Hornberger et al. (2023) find that structured learning interventions can strengthen understanding and confidence concerning artificial intelligence. Kim and Kwon (2023) underline the importance of combining technological knowledge with pedagogical application in teacher education. Dai et al. (2023) similarly suggest that professional learning must connect AI concepts with practical instructional decisions. Celik et al. (2022) add that teachers' intelligent use of technology depends upon knowledge, confidence, ethical judgement, and institutional support.

4.3 Development of Prompt-Writing Competence

Participants demonstrated improved ability to develop prompts specifying learning objectives, learner characteristics, English-language proficiency, instructional activities, duration, contextual information, constraints, and expected output formats. Rather than

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submitting brief and ambiguous commands, participants increasingly treated prompting as an instructional-design process requiring purposeful decisions before content generation. Federiakin et al. (2024) conceptualise prompt engineering as the articulation of problems, contexts, and constraints in ways that facilitate relevant responses. Knoth et al. (2024) establish an important connection between AI literacy and the ability to construct and refine educational prompts. Lo (2024) explains that effective prompting involves iterative dialogue, output evaluation, and revision rather than reliance on an initial response. Bozkurt and Sharma (2023) maintain that prompt competence should be accompanied by critical digital literacy because fluent output does not guarantee instructional quality. Sabzalieva and Valentini (2023) similarly emphasise that educational prompts must preserve human direction and contextual judgement. Prompt-writing competence therefore became an integration of technological communication, English-language knowledge, learner analysis, and pedagogical planning.

4.4 Verification and Contextualisation of AI Outputs

Participants developed greater capacity to verify and contextualise generated materials by assessing factual accuracy, source validity, linguistic difficulty, cultural appropriateness, and pedagogical relevance. Generated texts and activities were not regarded as finished learning resources; instead, they were checked, compared, simplified, corrected, and adapted before presentation. Alkaissi and McFarlane (2023) warn that generative systems can present fabricated information and references in highly convincing language. Walters and Wilder (2023) similarly demonstrate that fabricated or inaccurate citations make independent source verification indispensable. Sun et al. (2024) classify AI hallucinations as varied forms of distorted information that cannot be identified through linguistic fluency alone. Lund and Wang (2023) therefore recommend combining information literacy with critical evaluation when generative tools are used in education. Warschauer et al. (2023) further emphasise the importance of teacher mediation when AI-generated language is adapted to learner needs. Within Indonesian and Malaysian contexts, verification must consequently encompass local culture, communicative conventions, curriculum requirements, and learners' actual English proficiency.

4.5 Ethics, Transparency, and Academic Integrity

Learning development also covered the ethical and responsible use of generative AI, particularly disclosure, privacy protection, copyright, bias, fabricated references, and responsibility for final outputs. Participants were encouraged to disclose material AI assistance, avoid entering personal or institutional information into external systems, verify referenced sources, and revise content before submission or classroom distribution. Chan (2023) argues that institutional AI policies should establish clear expectations concerning transparency, privacy, accountability, and pedagogically acceptable use. Crawford et al. (2023) explain that generative AI requires renewed academic-integrity practices centred on learning rather than technological detection alone. Tang et al. (2024) identify disclosure as an essential mechanism for ensuring transparency in AI-assisted academic writing. Bittle and El-Gayar (2025) associate responsible use with explicit policy, ethical literacy, assessment redesign, and human verification. Perkins et al. (2023) further warn that AI-detection tools may be unreliable and may unfairly implicate writers. Ethical competence therefore requires informed judgement, documented assistance, careful source checking, data minimisation, and acceptance of responsibility for every final product (Cholifah et al., 2026).

4.6 AI as a Pedagogical Partner

The findings position generative AI as a pedagogical partner operating within a human-in-the-loop model. Participants first established instructional objectives, learner profiles, linguistic levels, and activity requirements; generated outputs were then evaluated, revised, contextualised, and either accepted or rejected. Memarian and Doleck (2024) explain that human-in-the-loop educational systems depend upon clearly defined relationships between human and technological actors. Fajardo-Ramos et al. (2025) similarly demonstrate that AI-supported assessment should preserve teacher interpretation and final judgement. Bearman et al. (2023) argue that educational assessment in an AI-rich environment must strengthen human evaluative expertise rather than transfer authority to automated systems. Viberg et al. (2025) place agency at the centre of responsible AI-supported learning and decision-making. Darvishi et al. (2024) further show that combining automated support with human feedback can produce stronger learning conditions than unmoderated technological assistance. Accordingly, AI expanded participants' options and production capacity, while pedagogical purpose, cultural sensitivity, professional accountability, and final decision-making remained human responsibilities.

4.7 International Knowledge Exchange and Tridharma Integration

The programme facilitated international knowledge exchange by transferring Indonesian lecturers' teaching and research expertise to Malaysian prospective teachers while allowing facilitators to learn from the partner institution's educational context. This reciprocity positioned community service as collaborative academic engagement rather than unilateral knowledge delivery. Beelen and Jones (2022) explain that purposeful internationalisation should connect intercultural learning with local educational realities. De Wit and Altbach (2021) similarly call for more inclusive and socially responsible international higher education. Marinoni and de Wit (2022) associate international academic cooperation with institutional learning, shared capacity, and responsiveness to societal challenges. Koekkoek et al. (2024) demonstrate that university–community engagement can connect academic responsibilities with broader social transformation. Farnell (2022) further maintains that engagement becomes sustainable when teaching, research, and societal contribution are institutionally integrated. In the Indonesian context, these relationships embody Tridharma by connecting international community service with curriculum enrichment, teaching innovation, research problem identification, publication opportunities, and prospective comparative investigations involving Indonesian and Malaysian teacher-education environments (Merina, Suhud, Sihotang, Abdillah, et al., 2026).

4.8 Programme Outputs and Sustainability

The programme produced learning materials, AI-supported media products, sample prompts, participant presentations, responsible-use guidelines, verification procedures, and implementation documentation. These outputs provide an initial resource base for independent practice, curriculum development, mentoring, and subsequent institutional collaboration (Sihotang, Suhud, Handaru, Futuwwah, et al., 2027). Sustainability, however, depends upon continued updating because generative applications, risks, and

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institutional policies change rapidly. McGrath et al. (2023) argue that sustainable educational digitalisation requires organisational capacity, professional learning, and pedagogical purpose alongside technological access. Bozkurt et al. (2024) emphasise that institutional responses to generative AI should remain adaptive, collaborative, and attentive to human agency. Chan and Hu (2023) show that users require continuing guidance to balance perceived educational benefits against accuracy, privacy, and integrity concerns. Jin et al. (2025) identify leadership, policy, infrastructure, and stakeholder participation as important components of institutional AI adoption. Li et al. (2025) further demonstrate that generative AI can support teachers' self-directed professional learning when accompanied by self-monitoring and purposeful practice. Prospective collaboration may therefore involve mentoring, shared repositories, joint curriculum projects, research, and regular material review.

5. CONCLUSION, IMPLICATIONS, AND RECOMMENDATIONS

5.1 Conclusion

This programme aimed to strengthen generative-AI literacy and pedagogical competence among prospective English teachers through an international community-engagement initiative at Universiti Tun Hussein Onn Malaysia. Its implementation combined conceptual instruction, demonstrations, guided practice, collaborative material development, verification, and ethical reflection. Participants improved their understanding of AI-assisted teaching and produced reading materials, dialogues, exercises, quizzes, worksheets, presentations, and assessment instruments. Sperling et al. (2024) establish that meaningful teacher AI literacy combines technical, pedagogical, critical, and ethical knowledge. Ding et al. (2024) demonstrate that contextual cases can strengthen teachers' ability to evaluate and integrate AI. Luckin et al. (2022) similarly position educator judgement as central to productive human–AI collaboration. Korte et al. (2024) show that cross-cultural workshops can broaden AI understanding through collaborative learning. Daher (2025) further argues that teacher preparation must connect AI competence with equity, governance, and continuing professional learning. Overall, the programme produced immediate learning improvements and practical resources while preserving human pedagogical authority.

5.2 Practical Implications

The programme offers practical value for prospective teachers, lecturers, teacher-education institutions, and organisers of international community engagement. Prospective teachers can employ generative AI to prepare differentiated learning resources while retaining responsibility for accuracy, cultural suitability, and instructional alignment. Crompton et al. (2022) indicate that educational AI presents both pedagogical affordances and implementation challenges requiring informed teacher mediation. For lecturers, the programme provides a replicable workshop structure integrating explanation, demonstration, production, verification, and reflection. Nazaretsky et al. (2022) show that targeted professional development can cultivate more calibrated trust in educational AI. Teacher-education institutions may adapt this structure for coursework, practicum preparation, and continuing professional learning, as Ding et al. (2024) associate case-based training with improved AI literacy and integration. Cross-cultural delivery is particularly valuable because Korte et al. (2024) demonstrate that online international workshops can support collaborative AI learning. Hilliker and Loranc (2022) further show that virtual exchange develops communication, collaboration, intercultural competence, and digital capability among teacher candidates.

5.3 Institutional and Tridharma Implications

Teacher-education institutions should integrate AI literacy, digital ethics, source verification, and human-centred pedagogy across curricula rather than confining them to occasional technical workshops. Sperling et al. (2024) recommend connecting AI knowledge with teachers' pedagogical and professional knowledge. Wiese et al. (2025) demonstrate that AI ethics education should address fairness, accountability, transparency, privacy, and social consequences through explicit instructional activities. Gouseti et al. (2025) further identify pedagogical appropriateness, children's rights, teacher responsibility, and AI literacy as education-specific ethical priorities. Akgün and Greenhow (2022) emphasise the need to examine surveillance, autonomy, bias, and data protection before classroom adoption. Daher (2025) proposes institutional structures combining ethical governance, continuing professional learning, collaboration, and implementation readiness. In Indonesia, these components can support Tridharma integration by connecting AI-informed teaching with research, community engagement, and international cooperation. Joint curriculum review, ethical guidelines, verification protocols, and community workshops would enable universities to translate technological development into responsible educational practice while preserving professional judgement and human relationships.

5.4 Programme Limitations

Several limitations qualify the programme's immediate outcomes. The involvement of only eight participants restricted the diversity of experiences represented and prevented broad generalisation across teacher-education populations. Implementation within one Malaysian institution also means that institutional culture, disciplinary background, technological access, and facilitator characteristics may have influenced participation and learning. Lim et al. (2023) demonstrate that prospective teachers' preparedness for AI education varies according to digital literacy and self-efficacy. Nazaretsky et al. (2022) similarly indicate that professional learning may change perceptions of AI, although transfer depends upon continuing experience and support. The short programme duration permitted assessment of immediate development but not durable competence, independent use, or classroom application. Paetsch et al. (2023) show that teachers' technology practices evolve through interactions among literacy, confidence, and accumulated experience. Sperling et al. (2024) identify a continuing shortage of evidence concerning how AI literacy transfers into pedagogical practice. Daher (2025) therefore recommends longitudinal evaluation of teacher capability, implementation quality, learner outcomes, and educational equity.

5.5 Recommendations and Programme Sustainability

Programme sustainability requires structured follow-up rather than reliance on a single training event. Continued mentoring should help participants respond to changing applications, ethical risks, and institutional policies. Nazaretsky et al. (2022) demonstrate that professional development can support informed trust when teachers examine AI critically. Microteaching observation should evaluate whether generated materials are implemented through sound pedagogy, while reflective journals should document

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decisions, errors, revisions, and emerging professional understanding. Feder and Cramer (2025) find that portfolios can strengthen reflective writing in teacher education, although their design requires appropriate guidance. Petko et al. (2024) similarly show that mobile portfolios can support reflection and learning regulation during teaching practice. Collaborative lesson development can further connect AI experimentation with curriculum objectives and peer feedback, consistent with the case-based approach discussed by Ding et al. (2024). Participation should subsequently be extended across programmes and institutions. Longitudinal evaluation should examine retained AI literacy, classroom implementation, teaching portfolios, learner responses, ethical compliance, and professional agency at several intervals following the programme.

5.6 Future International Collaboration

Future collaboration could transform the initial programme into a sustained Indonesia–Malaysia teacher-education partnership. Joint workshops may address AI-supported language teaching, assessment, digital ethics, source verification, and culturally responsive material development. Hilliker and Loranc (2022) demonstrate that international virtual exchange can cultivate communication, collaboration, and intercultural competence among teacher candidates. Symeonidis et al. (2023) show that carefully designed virtual exchange can connect internationalisation with the professional preparation of student teachers. Korte et al. (2024) further indicate that cross-cultural workshops provide valuable settings for developing AI literacy collaboratively. Lecturer and student exchanges could incorporate shared classes, microteaching, comparative curriculum analysis, and jointly supervised projects. Daher (2025) emphasises that sustainable AI integration requires unified institutional partnerships and continuing professional learning. Wiese et al. (2025) also recommend interdisciplinary cooperation when developing ethical AI education. Shared digital resources, comparative studies, collaborative publications, and institutional agreements could therefore deepen academic reciprocity while linking teaching, research, community engagement, and responsible technological innovation across both national contexts.

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