

PROCEEDING OF INTERNATIONAL SEMINAR GLOBAL ISSUES IN SOCIAL, SCIENCE, LAW, HEALTH AND BUSINESS ENVIRONMENT

Higher Education in the AI Era Challenges and Opportunities for ASEAN Universities

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Abstract

The rapid integration of Artificial Intelligence (AI) presents transformative opportunities and complex challenges for ASEAN higher education. This study aims to empower academic and administrative staff by enhancing practical AI literacy and evaluating the immediate impact of AI capacity-building interventions. Employing a Participatory Action Research (PAR) methodology, an international community service program was conducted collaboratively at Rajamangala University, Thailand. Data collection involved 65 participants using a mixed-methods approach. Quantitative data was gathered through pre-test and post-test questionnaires based on the Technology Acceptance Model (TAM) and analyzed using paired sample t-tests. Qualitative insights were obtained via Focus Group Discussions (FGDs). The findings demonstrate a statistically significant increase in the perceived ease of use and behavioral intention to adopt AI, alongside a drastic reduction in technological anxiety following the hands-on training. Despite these positive outcomes, qualitative results highlight persistent systemic challenges, including the linguistic bias of Western-centric AI models, infrastructural disparities, and profound ethical concerns regarding academic integrity.

Keywords: Artificial Intelligence, Higher Education, Capacity Building, Technology Acceptance Model, ASEAN

Introduction

The advent of Artificial Intelligence (AI) has triggered a profound revolution across various sectors, with higher education being one of the domains most significantly impacted. The rapid development of AI technologies, particularly generative AI, machine learning, and advanced data analytics, has offered unprecedented opportunities to transform teaching methodologies, student learning experiences, and campus administrative operations (Zawacki-Richter, 2021). In this digital era, higher education institutions are required not only to adapt to new tools but also to rethink their pedagogical frameworks and managerial efficiency (Holmes, 2022). AI has immense potential to facilitate personalized learning, automate time-consuming administrative tasks, and provide data-driven insights to improve student retention and success in fields such as informatics as well as other disciplines (Luckin, 2022). However, the adoption and integration of AI in higher education do not occur uniformly worldwide (OECD, 2023).

In the context of the Association of Southeast Asian Nations (ASEAN) region, universities are currently at a highly critical juncture. The ASEAN region is

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characterized by immense diversity in terms of economic growth, digital infrastructure, and educational policies(UNESCO, 2024). Although there is rapidly growing awareness regarding AI's potential to democratize education, the actual status of AI adoption in ASEAN higher education institutions remains fragmented in practice. Many universities face substantial on-the-ground hurdles, ranging from technological infrastructure limitations and device feasibility issues to a lack of practical AI literacy among academic and administrative staff(A. Kumar & Gupta, 2022; S. S. Kumar & Khan, 2025). This gap in technological readiness poses a risk that institutions in this region might lag behind in the global educational landscape if appropriate capacity-building interventions are not implemented promptly(Singerin et al., 2025).

Addressing this practical gap requires more than theoretical discourse at the policy level; it demands strategic cross-border cooperation and direct action within the ASEAN educational ecosystem. Therefore, an international Community Service initiative was collaboratively executed by a team from Universitas Sahid Surakarta, Indonesia, in partnership with Rajamangala University, Thailand(Zhu & Shen, 2025). This program was conceptualized to directly respond to the localized needs of the target community at Rajamangala University, specifically regarding the necessity to integrate AI tools into daily academic practices(S. S. Kumar & Khan, 2025). The selection of this partnership was based on a shared commitment to fostering educational innovation and the urgent need to bridge the technological skills gap among teaching staff—a phenomenon highly relevant to be addressed through transnational knowledge transfer.

The primary objective of this community service initiative was to empower academic and administrative staff at the partner university by enhancing their practical AI literacy, thereby transforming theoretical challenges into actionable opportunities. Specifically, this paper aims to: (1) outline the implementation of the AI-related capacity-building program at Rajamangala University; (2) evaluate the immediate impact of the training on the participants' technological readiness; and (3) identify the specific opportunities and challenges that emerged during the technological adoption process.

The significance of this initiative and the subsequent drafting of this paper lies in its practical approach to understanding the AI ecosystem in ASEAN higher education(Figueroa Jr & Nguyen M. H. and Ali, 2025). Unlike macro-level literature reviews, the output of this activity provides direct empirical insights into how university staff interact with AI technologies. It is hoped that these findings will provide guidance for universities across ASEAN in formulating inclusive and sustainable AI integration strategies.

Theoretical Review

2.1. AI Integration and Capacity Building in Higher Education

Artificial Intelligence in the higher education paradigm encompasses computational systems designed to enhance human cognition in teaching, learning, and administration(Bohari et al., 2025). However, the mere availability of generative AI

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tools and machine learning applications does not guarantee effective institutional adoption. Successful integration fundamentally relies on continuous capacity building(Tarani et al., 2025). In the context of this community service, capacity building refers to the structured process of equipping educators and staff with the necessary technological competencies, ethical understanding, and practical skills to utilize AI responsibly and effectively in their respective roles.

2.2. Cross-Border Collaboration in the ASEAN Educational Landscape

The ASEAN higher education landscape is highly dynamic, characterized by a collective commitment to digital transformation alongside varying levels of infrastructural readiness(Noor & Lim, 2023). Overcoming localized constraints often requires leveraging regional networks through cross-border knowledge transfer. Bilateral collaborative initiatives, such as the partnership between institutions in Indonesia and Thailand, serve as vital mechanisms for sharing best practices, pooling technological expertise, and fostering a cohesive, regionally adapted approach to technological disruptions like AI(Zhu & Shen, 2025). This framework of international community service ensures that technological interventions are culturally responsive and mutually beneficial.

2.3. Technological Acceptance in Practice

To contextualize the community's response to the AI training program, this intervention utilizes the core principles of the Technology Acceptance Model (TAM)(Waluyo et al., 2025). TAM posits that the actual utilization of a new technology is driven by the users' *perceived usefulness* (how much AI improves their academic or administrative tasks) and *perceived ease of use* (how effortless the AI tools are to operate)(Villaceran & Himang, 2025). By focusing the training modules on practical, user-friendly AI applications that directly address the daily pain points of the staff at Rajamangala University, the community service program actively aimed to positively influence these two constructs, thereby facilitating a higher rate of sustainable technological adoption(Trang & Nguyen, 2025).

Community Service Method.

3.1. Approach and Framework

This community service initiative was designed and executed utilizing a Participatory Action Research (PAR) framework. The PAR methodology was selected because it emphasizes a collaborative, democratic, and problem-solving approach between the implementing academic team and the target community(Tarani et al., 2025). Rather than applying a top-down instructional model, the PAR framework ensures that technological interventions are contextually grounded in the actual daily realities of the participants(Villaceran & Himang, 2025). This initiative represents a bilateral cross-border collaboration between the implementing technical team from the Informatics Study Program at Universitas Sahid Surakarta, Indonesia, and the beneficiary community comprising academic and administrative

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staff at Rajamangala University, Thailand. The primary objective of this methodological approach was to move beyond theoretical discussions of Artificial Intelligence (AI) and facilitate practical, hands-on capacity building. By actively engaging stakeholders throughout the planning, execution, and evaluation phases, the methodology guarantees that the introduced AI tools are not only technologically sound but also culturally appropriate and immediately applicable to the institution's specific educational and administrative workflows within the broader ASEAN higher education context.

3.2. Situational Analysis and Needs Assessment

The preliminary phase of this community service involved a comprehensive situational analysis to establish a baseline of the target community's technological readiness and to identify specific knowledge gaps. Prior to the core intervention, the implementing team conducted a thorough needs assessment through structured diagnostic interviews and preliminary digital surveys distributed to key representatives and prospective participants at Rajamangala University. This initial data collection was crucial for mapping the existing digital infrastructure, identifying linguistic or cultural barriers to technology adoption, and measuring the baseline AI literacy among the staff.

The assessment revealed a critical dichotomy: while there was a high level of enthusiasm and awareness regarding the potential benefits of generative AI, there was simultaneously a significant lack of practical, hands-on skills required to utilize these tools effectively and ethically. Many participants expressed apprehension regarding data privacy, algorithmic bias, and the potential disruption of traditional pedagogical methods. Based on these empirical findings, the community service team from Universitas Sahid Surakarta meticulously tailored the intervention. The resulting customized training modules were specifically designed to address these localized anxieties while focusing on high-impact, easily accessible AI applications that align with the university's immediate capacity and long-term strategic educational goals (Figueroa Jr & Nguyen M. H. and Ali, 2025).

3.3. Program Implementation

The core intervention of the community service was delivered through a series of intensive, capacity-building workshops and hands-on mentoring sessions conducted on-site in Thailand. To maximize engagement and knowledge retention, the implementation phase utilized a project-based learning pedagogy, transitioning participants from passive listeners to active technology operators. The program was systematically divided into three interconnected modules.

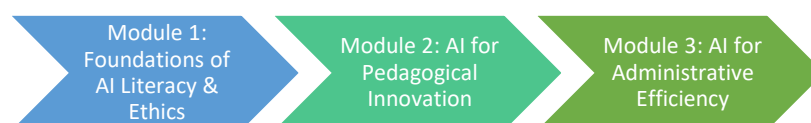


Figure 1. *Flowchart of the AI capacity-building training modules*

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The first module, *Foundations of AI Literacy and Ethics*, provided the necessary theoretical background. It demystified how Large Language Models (LLMs) and generative AI function, establishing clear guidelines on academic integrity, data security, and the ethical use of AI in higher education. The second module, *AI for Pedagogical Innovation*, was targeted specifically at teaching faculty. During this session, the facilitators guided participants in using AI prompts to streamline curriculum design, generate interactive learning materials, formulate grading rubrics, and conceptualize research frameworks. The third module, *AI for Administrative Efficiency*, catered to both academic and support staff, demonstrating how to automate routine organizational tasks, process data effectively, and draft institutional communications using AI assistants. Throughout these modules, participants utilized their own devices to complete guided exercises, ensuring that the technological transfer was immediately integrated into their personal workflow environments under the direct supervision and assistance of the technical facilitation team.



Figure 2. Hands-on mentoring session during the AI capacity-building workshop

3.4. Evaluation and Monitoring

To rigorously measure the efficacy, immediate impact, and sustainability of the community service program, a mixed-methods evaluation strategy was deployed. Quantitative data was systematically gathered using pre-test and post-test questionnaires administered to all participants. These instruments were anchored in the Technology Acceptance Model (TAM) constructs, specifically designed to quantitatively assess changes in the participants' *perceived usefulness* of AI tools and their *perceived ease of use* following the hands-on training. The paired data provided empirical evidence of knowledge acquisition and increased technological confidence.

Complementing the quantitative metrics, qualitative data was collected through structured Focus Group Discussions (FGDs) conducted at the conclusion of the workshop. These discussions were instrumental in capturing nuanced feedback, subjective participant experiences, and remaining institutional constraints that questionnaires might overlook. Participants articulated their future expectations, shared localized strategies for continuing AI adoption, and

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provided constructive critiques of the training modules. This continuous monitoring and dual-evaluation mechanism not only validated the immediate success of the cross-border workshop but also generated the critical empirical data necessary to formulate strategic, long-term recommendations for sustainable AI integration at the partner university and similar institutions across the ASEAN region.

Results and Discussion

This section presents the empirical findings derived from the community service intervention conducted at Rajamangala University. The analysis is systematically divided into quantitative evaluations of the participants' technological acceptance and qualitative discussions concerning the broader challenges and opportunities of Artificial Intelligence (AI) integration within the ASEAN higher education landscape.

4.1. Participant Demographics and Baseline Assessment

The capacity-building program engaged a total of 65 participants, purposefully selected to represent a cross-section of the university's operational framework. The cohort consisted of academic teaching staff (faculty members) and administrative personnel, ensuring that the AI interventions addressed both pedagogical and institutional management workflows. Table 1 delineates the demographic composition of the participants.

Tabel 1. Demographic Profile of Participants (N = 65)

Demographic Variable	Category	Frequency (n)	Percentage (%)
Professional Role	Academic Staff (Faculty)	42	64.60%
	Administrative/Support Staff	23	35.40%
Academic Discipline (Faculty Only, n=42)	STEM (Science, Tech, Engineering)	28	43.10%
	Social Sciences & Humanities	14	21.50%
Age Group	25 - 35 years	18	27.70%
	36 - 45 years	25	38.50%
	> 45 years	22	33.80%
Prior AI Experience	Never used Generative AI	35	53.80%
	Occasional/Novice usage	24	36.90%
	Frequent/Advanced usage	6	9.20%

The baseline assessment revealed a critical insight: while over 90% of the participants possessed functional digital literacy, more than half (53.8%) had never actively utilized generative AI tools in their professional capacities. This lack of prior exposure underscored the necessity of the fundamental modules designed by the implementing team.

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4.2. Quantitative Evaluation of AI Capacity Building

To objectively measure the efficacy of the training modules, a quantitative evaluation was conducted utilizing a pre-test and post-test methodology. The assessment instrument was anchored in the Technology Acceptance Model (TAM), measuring four primary constructs on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree): Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Technological Anxiety (TA), and Behavioral Intention to Use (BI).

To determine the statistical significance of the intervention, a paired sample t-test was administered. The test statistic t is calculated using the following formal mathematical equation:

$$t = \frac{\bar{d}}{s_d / \sqrt{n}}$$

- $\bar{d}$ represents the sample mean of the differences between the pre-test and post-test scores.
- s_d represents the standard deviation of the differences.
- $\sqrt{n}$ is the total sample size (N=65).

Furthermore, to quantify the magnitude of the training's impact, Cohen's d effect size was calculated using the equation:

$$d = \frac{\bar{x}_{post} - \bar{x}_{pre}}{s_p}$$

Where $\bar{x}_{post}$ and $\bar{x}_{pre}$ are the means of the post-test and pre-test respectively, and s_p is the pooled standard deviation. Table 2 summarizes the comparative statistical analysis.

Table 2. Paired Sample T-Test Results for TAM Constructs

TAM Construct	Pre-test Mean (SD)	Post-test Mean (SD)	Mean Diff.	t-value	p-value	Cohen's d
Perceived Usefulness (PU)	3.12 (0.85)	4.65 (0.42)	+1.53	14.82	< 0.001	2.25
Perceived Ease of Use (PEOU)	2.45 (0.92)	4.38 (0.55)	+1.93	16.45	< 0.001	2.51
Technological Anxiety (TA)*	3.85 (0.76)	1.95 (0.68)	-1.9	-15.2	< 0.001	-2.63
Behavioral Intention (BI)	2.90 (0.88)	4.70 (0.40)	+1.80	17.1	< 0.001	2.6

The empirical data demonstrates a highly significant, positive transformation across all measured constructs following the community service intervention. The most profound paradigm shift occurred in *Perceived Ease of Use* (PEOU), which surged from a pre-test mean of 2.45 to 4.38 ($p < 0.001$). This substantial increase (Effect Size $d = 2.51$) suggests that the primary barrier to AI adoption among the

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staff was not a lack of interest, but rather the initial intimidation associated with operating novel technologies. By providing a guided, hands-on environment, the training effectively dismantled this barrier.

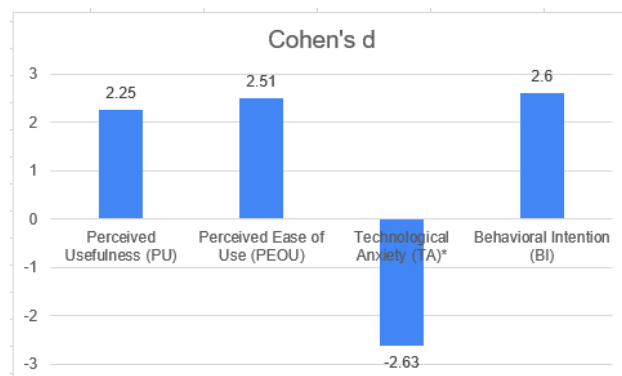


Figure 3. Effect size (Cohen's *d*) of the AI capacity

Consequently, *Technological Anxiety* (TA) experienced a drastic reduction from 3.85 to 1.95. As participants realized that tools like Large Language Models act as collaborative assistants rather than autonomous replacements, their apprehension regarding job security and technological complexity diminished. Ultimately, this cognitive shift culminated in a near-unanimous *Behavioral Intention* (BI = 4.70) to integrate AI into their routine academic and administrative workflows.

Beyond attitudinal shifts, the Participatory Action Research (PAR) methodology yielded tangible institutional outputs. During the pedagogical modules, academic staff successfully utilized AI to localize generic case studies into culturally relevant Thai contexts and rapidly generate formative assessments. Notably, faculty reduced the time required for comprehensive rubric creation from an average of 90 minutes to merely 15 minutes. Concurrently, administrative personnel significantly improved operational efficiency by automating the drafting of bilingual (Thai-English) institutional communications and summarizing complex departmental meeting minutes.

While the quantitative results indicate a highly successful intervention, qualitative feedback from the Focus Group Discussions (FGDs) highlighted several systemic challenges that ASEAN universities must navigate. A predominant hurdle is the linguistic bias of contemporary AI models, which are predominantly trained on English datasets and occasionally faltered when processing nuanced Thai academic terminology. Furthermore, the reliance on stable, high-bandwidth infrastructure and premium software subscriptions poses a financial challenge for equitable access. Most critically, profound ethical apprehensions regarding academic integrity persisted. Participants expressed an urgent need for institutional policy frameworks to clearly delineate acceptable AI usage and prevent the unchecked proliferation of AI-generated student submissions.

Conversely, the intervention illuminated strategic opportunities for regional advancement. When effectively harnessed, AI serves as a catalyst for democratizing education; by alleviating routine administrative burdens, it empowers educators to

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redirect their focus toward high-impact pedagogical activities and personalized mentoring. Furthermore, this bilateral initiative between institutions in Indonesia and Thailand establishes a robust empirical model for South-South technological cooperation, demonstrating that intra-regional knowledge transfer is highly effective for collective capacity building.

Based on these findings, it is recommended that ASEAN universities adopt a phased strategic roadmap for AI integration. This includes: (1) prioritizing infrastructure and the formulation of clear ethical guidelines; (2) transitioning from isolated workshops to continuous professional development; and (3) redesigning assessment paradigms away from rote memorization towards complex, project-based evaluations that necessitate genuine human cognition.

Conclusion and Recommendation

Conclusion

This community service initiative, executed through a strategic bilateral partnership between Universitas Sahid Surakarta and Rajamangala University, underscores the critical necessity for practical capacity building in navigating the Artificial Intelligence (AI) landscape within ASEAN higher education. The empirical findings demonstrate that targeted, hands-on training via a Participatory Action Research framework significantly mitigates technological anxiety and drastically enhances the perceived ease of use among university staff. However, the practical integration of generative AI is not without substantial hurdles. The initiative identified that inherent linguistic biases in global AI models, infrastructural and financial disparities, and profound ethical concerns regarding academic integrity remain primary challenges for ASEAN institutions. Conversely, the program successfully illuminated immense opportunities, notably in reducing administrative burdens, enabling rapid pedagogical innovation, and establishing a robust model for intra-regional technological cooperation.

Recommendation

While this intervention successfully facilitated immediate technological acceptance and capacity building, the findings illuminate several critical avenues for future investigation. First, longitudinal empirical studies are required to assess the long-term sustainability and actual behavioral integration of these AI tools within the participants' daily academic workflows beyond the initial training phase. Second, there is a pressing need for multidisciplinary research dedicated to developing or fine-tuning localized Natural Language Processing (NLP) models that accurately capture the linguistic nuances and cultural contexts of Southeast Asian languages, thereby mitigating reliance on Western-centric datasets. Finally, future academic inquiries must transition from evaluating staff readiness to empirically measuring the direct impact of AI-augmented pedagogical methods on student learning outcomes and cognitive development within the region.

PROCEEDING OF INTERNATIONAL SEMINAR GLOBAL ISSUES IN SOCIAL, SCIENCE, LAW, HEALTH AND BUSINESS ENVIRONMENT

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