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UTILIZATION AND CHALLENGES OF ARTIFICIAL INTELLIGENCE (AI) IN SELECTED HIGHER EDUCATIONAL INSTITUTIONS (HEIs) IN THAILAND: BASIS FOR THE DEVELOPMENT OF PROPOSED AI POLICY FRAMEWORK

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ABSTRACT

This quantitative study investigates the utilization and challenges of Artificial Intelligence (AI) in selected Higher Educational Institutions (HEIs) in Northeastern Thailand, aiming to inform the development of an institutional AI policy framework. The demographic profile revealed a workforce predominantly composed of young to middle-aged professionals, with a majority holding postgraduate degrees. AI utilization remained moderate across four core academic domains: research (M=2.45), extension (M=2.41), instruction (M=2.38), and production (M=2.24). Key challenges received an overall "very serious" rating (M=2.53). Gender and marital status showed significant positive correlations with AI utilization, while permanent employment and higher education levels correlated negatively in certain domains. Seminar frequency was a strong predictor of higher AI use. Findings underscore the need for targeted faculty development, resource support, and robust institutional policies.

Keywords: Artificial Intelligence (AI), Higher Education Institutions (HEIs), AI utilization, AI challenges, AI policy development

INTRODUCTION

Artificial Intelligence (AI) is profoundly transforming industries worldwide, and educational institutions are no exception. Higher Education Institutions (HEIs) in Northeastern Thailand (Isan region) have begun exploring AI to enhance teaching methodologies, learning systems, and administrative procedures. However, obstacles in AI implementation are notably distinct due to regional economic disparities and a significant absence of advanced AI infrastructure and human resources.

Globally, AI serves multiple educational purposes: enhanced learning services, predictive data analysis, and automated administrative operations. International bodies such as UNESCO and technology corporations including Google and Microsoft have significantly advanced AI in education. Despite substantial global investment, challenges persist, including concerns over academic integrity, privacy violations, and excessive intervention in teaching and learning processes.

Thailand has responded through the National AI Strategy and Thailand 4.0 policy framework. Institutions such as Khon Kaen University have initiated AI implementation; however, barriers including

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funding limitations, lack of expertise, and inadequate regional capacity development remain substantial. Limited empirical research has examined the specific benefits and barriers confronting HEIs in Northeastern Thailand regarding AI integration.

This study addresses this gap by (1) profiling HEI personnel and institutional characteristics, (2) assessing the level of AI utilization across instruction, research, extension, and production domains, (3) identifying the seriousness of challenges encountered, (4) examining correlations between respondent/institutional profiles and AI utilization, and (5) providing a data-driven foundation for crafting a strategic AI policy framework.

METHODS

Research Design

The study employed a cross-sectional, descriptive-correlational design under the quantitative method. This approach enabled measurement of the current status, possibilities, and obstacles of AI adoption at a specific point in time across selected HEIs in Northeastern Thailand.

Participants and Sampling

Data were collected from 150 participants comprising administrators (presidents, deans, directors) and faculty members (professors, lecturers, researchers) from four purposively selected HEIs. Institutions were chosen based on geographic location, institutional size, and AI engagement level, ensuring representation of both public and private universities.

Instrument and Data Collection

A validated structured questionnaire was administered via Google Forms. The instrument used a 3-point Likert scale with the following descriptive cut-offs for AI utilization: 2.51–3.00 (Very Highly Utilized), 1.51–2.50 (Moderately Utilized), and 1.00–1.50 (Not Utilized). For challenge seriousness: 2.51–3.00 (Very Serious), 1.51–2.50 (Moderately Serious), and 1.00–1.50 (Slightly Serious).

Statistical Analysis

Frequency counts and percentages described demographic and institutional profiles. Weighted means assessed AI utilization and challenge seriousness levels. Spearman Rank Correlation and Point Biserial Correlation determined relationships between profile variables and AI utilization/challenges, given the combination of ordinal and binary variables. All analyses were performed with the assistance of a professional statistician.

RESULTS

Demographic Profile of HEI Personnel

The majority of participants (51.3%) were aged 31–40, followed by those aged 41–50 (44.7%), reflecting a relatively young and professionally active workforce. Female respondents predominated (56.7%), and most were married (57.3%). Full-time employment accounted for 54.7% of participants. Educationally, 51.3% held master's degrees and 43.3% held doctoral degrees, indicating strong academic

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qualifications. Approximately 46.7% had attended 5 or fewer AI-related seminars, and 93.3% used cellphones as primary devices, while 77.3% used laptops.

Institutional Profile

The four participating HEIs comprised two private and two public universities, with balanced representation across size indicators including faculty, student enrollment, and number of degree programs. Notably, 50% of institutions reported no AI-integrated learning facilities and no AI research projects, highlighting infrastructure gaps despite overall institutional diversity.

Table 1. Summary of AI Utilization Levels Across Academic Domains

Domain	Mean	Description
Instruction	2.38	Moderately Utilized
Research	2.45	Moderately Utilized
Extension	2.41	Moderately Utilized
Production	2.25	Moderately Utilized
Overall Mean	2.37	Moderately Utilized

Scale: 1.00–1.50 = Not Utilized; 1.51–2.50 = Moderately Utilized; 2.51–3.00 = Very Highly Utilized

Level of AI Utilization

Table 1 presents overall moderate AI adoption across all functional domains. Research recorded the highest mean (M=2.45), indicating better integration through tools such as ChatGPT and Grammarly for data analysis and academic writing. Extension followed (M=2.41), then instruction (M=2.38), reflecting moderate use of tutoring systems and automated grading. Production recorded the lowest mean (M=2.25). The grand mean of 2.37 confirms that AI utilization has commenced but has not reached deep, consistent implementation across all domains.

Table 2. Summary of Challenge Seriousness Levels Across Academic Domains

Domain	Mean	Description
Instruction	2.52	Very Serious
Research	2.57	Very Serious
Extension	2.53	Very Serious
Production	2.48	Moderately Serious

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Overall Mean	2.53	Very Serious

Scale: 1.00–1.50 = Slightly Serious; 1.51–2.50 = Moderately Serious; 2.51–3.00 = Very Serious

Challenges in AI Utilization

Table 2 shows that challenges in AI utilization were rated "Very Serious" overall (M=2.53). Research domain registered the highest concern (M=2.57). The most frequently cited barriers included: the rapid pace of AI technological change (72.0% rated very serious), concerns that AI over-reliance may stifle teacher creativity (67.3%), lack of clear institutional policy on AI use (67.3%), AI impact on interpersonal connectivity in teaching (66.0%), and inadequate access to training (60.7%). Ethical concerns such as AI bias and data privacy were also prominently identified.

Correlational Analysis

Gender showed a statistically significant positive relationship with AI utilization across all domains (rpb = .325 to .415, $p < 0.01$), with female respondents demonstrating higher AI engagement. Marital status was positively correlated with research, extension, and overall utilization ($p < 0.05$). Type of employment and highest educational attainment were negatively correlated with extension and production domains ($p < 0.05$), suggesting permanent and highly educated faculty may face unique adoption patterns. Number of AI-related seminars attended was positively associated with all domains ($p < 0.01$), confirming training participation as a critical predictor. Laptop and iPad use correlated positively with research and extension activities ($p < 0.01$).

Regarding challenge seriousness, type of employment emerged as the strongest factor, with strong negative correlations across all domains (rpb = -0.275 to -0.666, $p < 0.01$), indicating that regular employees perceive greater AI-related challenges. Gender was significantly correlated with research and production challenges ($p < 0.01$), with male respondents reporting higher difficulty. Family income showed no significant relationship with AI utilization or challenge perceptions.

DISCUSSION

The moderate AI utilization scores observed across all domains align with broader literature documenting nascent but uneven AI adoption in Southeast Asian HEIs (Alotaibi & Alshehri, 2023; Fan et al., 2022). The dominance of general-purpose tools like ChatGPT and Grammarly over specialized platforms such as Elicit and Tableau reflects accessibility and familiarity barriers consistent with global trends (Dempere et al., 2023; Shahzad et al., 2024).

The "very serious" challenge ratings—particularly regarding rapid AI evolution, ethical concerns, and insufficient training—mirror findings from comparable regional and international studies (Gyawali & Mehndroo, 2024; Noniashvili & Matchavariani, 2024). The absence of clear institutional AI policies, identified as a major barrier by 67.3% of respondents, underscores the urgency for structured governance frameworks, as recommended by Ullah et al. (2024) in their survey of global universities.

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The positive correlation between seminar attendance and AI utilization strongly supports investment in structured capacity-building initiatives. This finding corroborates Vázquez-Parra et al. (2024), who demonstrated that training participation significantly predicts AI tool adoption among university staff. Conversely, the negative correlations between permanent employment and certain AI domains suggest institutional inertia, where established faculty may face greater resistance to workflow disruption.

The gender difference in AI utilization—with female respondents demonstrating higher engagement—presents an interesting contrast to some global findings and warrants further investigation into sociocultural and institutional factors unique to the Thai HEI context. The finding that higher educational attainment does not guarantee AI readiness emphasizes the distinction between academic credentials and digital literacy, highlighting the need for purposeful AI-specific upskilling regardless of prior education level.

CONCLUSIONS AND RECOMMENDATIONS

This study demonstrates that AI utilization in Northeastern Thai HEIs is in a moderate and emergent phase, with research activities showing the highest engagement and production functions the lowest. Challenges are perceived as very serious across most domains, with rapid technological change, ethical uncertainty, and training deficits as predominant barriers. Key correlates of AI adoption include gender, seminar participation, and device accessibility, while permanent employment status is associated with heightened perceived challenges.

Based on these findings, the following recommendations are proposed:

- Develop Inclusive AI Policies: HEIs should establish comprehensive AI policies ensuring equitable access to AI tools and training across all employee demographics, with explicit provisions for ethical use, data security, and academic integrity.
- Strengthen Capacity Building and Infrastructure: Prioritize in-service AI training programs and investment in AI-compatible infrastructure, particularly targeting underserved domains (production) and underutilized tools (Elicit, Tableau).
- Address Core Challenges Systematically: Establish mechanisms for ongoing ethical review, regular professional development cycles aligned with AI evolution, and clear institutional guidelines on AI-assisted pedagogy and research.
- Expand AI Seminar Programs: Intensify and diversify AI seminar offerings, with targeted outreach to male faculty, part-time staff, and those with lower technology exposure. Subsidize access to productivity devices such as laptops and iPads.
- Individualize Support by Profile: Design tiered support systems recognizing differential challenge perceptions, offering practical, solution-based interventions for permanent faculty who report the highest barriers to AI adoption.

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These recommendations collectively aim to facilitate sustainable, ethical, and inclusive AI integration across Thai HEIs, responsive to regional infrastructure realities and Thailand's national AI strategic objectives.

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