

REVIEW

Open Access



Barriers to AI adoption for women in higher education: a systematic review of the Asian context

Usama Kalim^{1*} , Asha Kanwar¹, Jiena Sha² and Ronghuai Huang¹

*Correspondence:
ukalim94@gmail.com

¹ Smart Learning Institute
of Beijing Normal University,
Beijing, People's Republic
of China

² Department of Education,
University of Oxford, Oxford, UK

Abstract

Artificial Intelligence (AI) is transforming higher education rapidly by enabling personalized learning, enhancing administrative processes, and improving access to educational resources. However, disparities in AI adoption, particularly among women in the Asian context, raise concerns about equity, inclusivity, and access. This disparity could lead to a deficit in AI skills among women, affecting their ability to contribute as effectively as men in the future. Therefore, it is necessary to understand the current state of women's adoption of AI and the barriers they face in Asian higher education. The systematic review has been conducted using PRISMA guidelines. This review paper synthesizes the findings from the studies conducted in various contexts of Asia to present an overall picture of the state of AI adoption among women in Asia. A total of 17 studies were selected for this review, highlighting socio-cultural barriers, lack of trust, technological unawareness, biases in AI algorithms, and inadequate representation of women in AI policy formulation. Besides highlighting these barriers, the results also shed light on recommendations given by earlier studies that facilitate and encourage women to adopt AI in higher education. Based on the Asian perspective, the conclusion proposes specific recommendations for policymakers and practitioners to promote inclusive AI that empowers women in Asia to contribute more effectively to higher education.

Keywords: Artificial intelligence(AI), Higher education, Asian women, Educational technology

Introduction

The introduction of Artificial Intelligence (AI) technologies in higher education has dramatically benefited Higher Educational Institutions (HEIs) worldwide (Austin et al., 2023). These AI tools have enhanced higher education learning and teaching processes, improving efficiency and personalized learning standards (Stöhr et al., 2024). AI-driven educational technologies show potential for better student engagement and learning results (Adewale, 2024). However, this AI revolution in education has raised significant digital equality concerns centered on gender-based differences in technology accessibility and usage (Ahmad et al., 2024). The educational transformation through AI will likely

expand in the future yet fails to address gender inequalities (Helmiatin et al., 2024; Rana et al., 2024).

Bansal et al. (2024) stated that women in higher education encounter multiple challenges. AI algorithms display bias, and women and girls have unequal access to technological tools and experience socio-cultural restrictions in adopting technology (Dorta-González et al., 2024; Nazer et al., 2023). Recent research has revealed gender bias in AI in higher education, thus requiring equitable policies and interventions to prevent amplifying technological disadvantages for women (Ahmad et al., 2024; Fraile-Rojas et al., 2025). AI's impact on future higher education requires gender-based, in-depth research to help build an academic environment promoting equal opportunities for all (Roshanaei, 2024).

Studying AI from women's perspective and highlighting specific challenges women face in adopting AI in higher education are crucial (Møgelvang et al., 2024). Recent studies have shown that women use generative AI (genAI) chatbots less frequently than men, with women engaging with AI in fewer domains and adopting a more critical approach (Ahmad et al., 2024; Gesser-Edelsburg et al., 2024; Helmiatin et al., 2024). Women also express more concerns about the potential loss of independent thinking (Stöhr et al., 2024). This difference in AI usage could impact women's employment opportunities, as AI-related expertise is expected to become a crucial part of future job markets (Dorta-González et al., 2024). Møgelvang et al. (2024) also stated that women may be disadvantaged in the workforce due to a lack of experience with AI tools. Therefore, it is essential to understand women's adoption of AI technologies to ensure equal participation in various fields.

Studies about AI adoption among women predominantly analyze Western contexts yet overlook the Asian higher educational context (Kumar & Choudhury, 2022). AI integration in higher education creates dual benefits and hurdles, mainly affecting women in Asia (Dai et al., 2024). The socioeconomic structures and Asian cultural traditions already restrict women from participating in different fields (Martin & Dragojlovic, 2019). Asian women also fall behind men in terms of their access to technology and digital resources, according to UN Women (2022). The combination of a digital divide and persistent gender-based social beliefs about technology roles creates barriers for women in their adoption of AI in higher education (Ahn et al., 2022). However, the Asian context features insufficient research about women's barriers to adopting AI technology (Rana et al., 2024). Most research on this topic has been conducted in Western countries, revealing significant gaps in understanding the particular barriers that Asian women encounter (Kumar & Choudhury, 2022). The research gap regarding women's AI adoption in Asian higher education requires investigation because it reveals the factors hindering women's participation in AI-enhanced education. Identifying these factors will support the creation of inclusive systems that enable women in Asia to use AI-related tools with equivalent opportunities (Helmiatin et al., 2024).

Problem statement and the study's purpose

The barriers that prevent women from adopting AI within higher education remain underexplored in Asian cultural contexts (Rana et al., 2024). Currently, most of the literature on women's adoption of AI stems from Western higher educational settings

(Qadri et al., 2023). The literature available in the Western context identifies gender bias in AI algorithms, as well as unequal digital capabilities and low numbers of women in STEM fields, as significant barriers to women's AI adoption (Adewale, 2024; Gesser-Edelsburg et al., 2024; Gupta et al., 2022). However, the current literature lacks thorough and organized assessments revealing specific barriers in Asian higher education for women's AI adoption (Kumar & Choudhury, 2022). Many Asian women encounter multiple structural barriers because of gender-based inequalities which produce technological access disparities and limited digital competency among women in higher education (Ahmad et al., 2024; Siyab & Saira, 2024). Existing barriers prevent women from becoming active participants in AI-enhanced education while simultaneously hindering their ability to master AI technologies, which amplify gender inequalities in educational and professional opportunities (Rana et al., 2024). Urgent research is needed to examine these issues as global initiatives led by UNESCO, such as SDG 4, SDG 5, and SDG 8, emphasize the need for quality education access for all genders and workforce equality. The research fills this essential knowledge gap by performing an Asian-focused systematic review to reveal elements that act as barriers to AI adoption for women in higher education. The research also summarizes the recommendations given by earlier studies to facilitate women's AI adoption in higher education. The findings of this research provide a comprehensive view of the state of women's AI adoption in Asia in general and suggest comprehensive strategies for encouraging women's AI adoption in Asian higher educational contexts in this digital transformation era.

Research questions

Two main research questions have been formulated to achieve the study purpose and structure the review. This study's key focus is on finding the various types of factors that are acting as barriers to limiting women's AI adoption in Asian higher education. So the first question is formulated to conduct a thorough and organized assessment revealing specific barriers in Asian higher education for women's AI adoption. Secondly, the study seeks to offer strategies for facilitating women's AI adoption in higher education. In line, the recommendations given by earlier studies need to be compiled to build on them and recommend some comprehensive strategies that facilitate women's AI adoption in the Asian higher educational context. So the second research question seeks to compile the recommendations given by earlier studies. The two research questions of this review are as follows.

RQ 1. What are the key barriers to AI adoption for women in Asian higher education?

RQ 2. What recommendations did earlier studies make to facilitate Women's AI adoption in Asian higher education?

Methodology

Research design

The purpose of this study is to systematically review studies that highlighted women's issues with AI adoption in higher education in Asia. Therefore, the methodological

guidelines, as stated in the “Preferred Reporting Items for Systematic Reviews and Meta-Analyses” (PRISMA), have been followed to carry out this systematic review. PRISMA guidelines have been considered a standardized process for the review study (Page et al., 2021). The inclusion and exclusion criteria were based on the research questions and developed after thoroughly discussing with the co-authors and other experts in the field of AI. A well-structured approach to selecting data sources was used to start the review process. The process involves four phases: Identification, Screening, Eligibility, and Inclusion. The research questions guided every stage of the process. To ensure the quality of studies included in the systematic review, each study was evaluated using the Joanna Briggs Institute (JBI) critical appraisal checklists. After selecting the studies, a systematic and rigorous approach was used to extract data.

Data sources and search strategy

For this systematic review, an extensive literature search through 5 key electronic databases was conducted for research on this area: Web of Science, Embase, PubMed, Google Scholar, and SCOPUS. Published work from 2019 to 2024 was explored through the literature search. Google’s advanced tool for research was used to look for studies published during this period. Endnote X9 software was used to check for duplicate studies, which were later removed. Here are how the keywords has been structured in the search strategy.

("Artificial Intelligence"OR"AI") AND ("Higher Education"OR"Universities"OR"Asian Higher Education") AND ("Women"OR"Female"OR"Women Perceptions"OR"Female Perceptions"OR"AI and Gender") AND ("AI Adoption"OR "AI Usage").

Similar concepts have been grouped together using OR (e.g., "Women"OR"Female") so if any of those appear in related searches, the paper is selected. In addition, different conceptual groups have been connected using AND so that all major concepts must appear in those studies to be eligible for selection (AI + Higher Education + Gender aspect + Adoption).

Identification, screening, eligibility, and inclusion

Identification

In the identification phase, relevant studies were identified through comprehensive searches in five databases. The search focused on studies published between 2019 and 2024, during which AI technologies in education have grown significantly (Fraile-Rojas et al., 2025). The search aimed to capture research on women’s adoption of AI in higher education, specifically within the Asian context, and was limited to peer-reviewed English journals. The literature search through searching various databases online led to 363 record identifications. Duplicate records (44) were removed first. A separate automation tool was also used to separate nonrelevant studies in the search, and a total of 88 studies were eliminated through this tool at the initial identification stage.

Screening

In the screening phase, titles and abstracts were assessed for relevance. Studies that focused on AI or higher education but did not address women’s adoption of AI or were outside the Asian context were excluded at this stage. The screening process ensured

that only studies on women's perceptions of AI in higher education in Asia were considered for further evaluation.

Eligibility

A total of 143 studies were assessed for eligibility. Eligibility criteria were set to align with the research questions of this systematic review. In the eligibility phase, full-text articles were reviewed to assess whether they met the predefined inclusion criteria.

Exclusion criteria

Studies which do not fall under the direct scope of research questions of this study have been excluded. As this study primarily focuses on the women's adoption of AI in Asian higher education so studies which do not consider the women's perceptions or usage of AI, or does not relate to higher education or Asian context were excluded. Additionally, reports from government and non-governmental organizations were excluded at this stage as the study focuses on finding the academic empirical evidence of AI and female adoption in higher education. Furthermore, dissertations were also excluded to focus on peer reviewed published research that has undergone formal academic review processes to maintain higher standards. Finally, non-English studies have been excluded to maintain consistency in the analysis as most of the literature available on this topic is in English.

Inclusion

In the inclusion phase, studies that met all the eligibility criteria were included in the review. This final selection consisted only of peer-reviewed journal articles published between 2019 and 2024 that examined women's adoption of AI technologies in higher education in Asia. After excluding 126 studies based on the eligibility criteria, 17 studies were chosen to be included in the systematic review.

PRISMA flow diagram of the literature search

As shown in Fig. 1 of PRISMA diagram, seventeen articles were included in the final stage of the process. A separate table has been created to show the characteristics of the studies included in this systematic review (Appendix-Table 2). The scope of this study was mainly to understand the challenges and barriers women face in adopting AI technologies in education. One challenge was that the literature was minimal which has focused on women's issues alone. Most of the literature has focused on both genders. Studies highlighting male and female participants' perspectives about AI were included in the systematic review to overcome this challenge. However, only women's perspectives and their problems and challenges were considered for the review analysis. Studies conducted in various parts of Asia, i.e., East, South, and West Asia, were selected so to cover the range of problems Asian women are facing concerning AI adoption. The context of countries included in this review are India, Pakistan, Bangladesh, China, Hong Kong, Sri Lanka, Indonesia, Vietnam, Saudi Arabia, and Bahrain. This includes diverse countries from West Asia to East Asia and low- and middle-income countries with various religions, ethnic groups, and cultural contexts. The religious and cultural context has largely influenced women's participation in various sectors. So, understanding women's

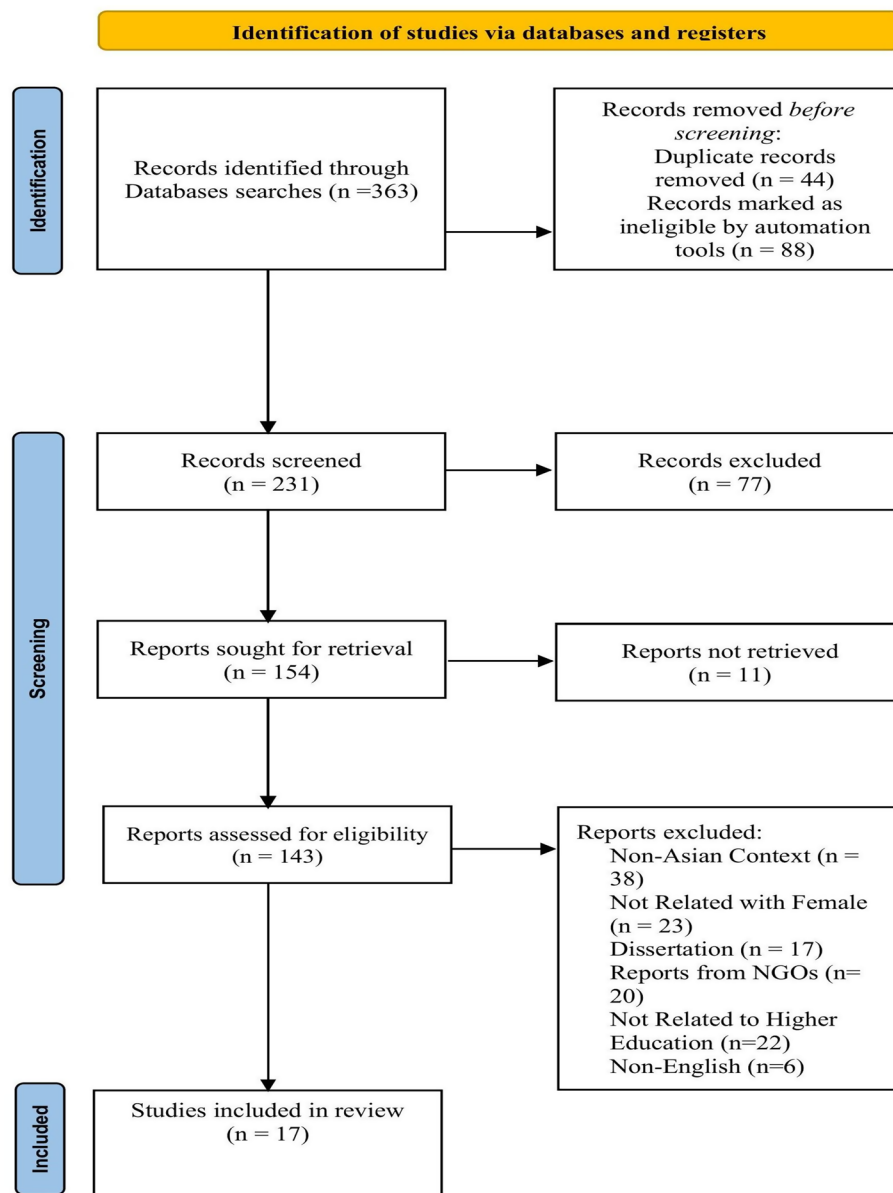


Fig. 1 Reporting Items for Systematic Reviews (PRISMA 2020) Source: Page et al. (2021)

adoption of AI from religious and socioeconomic backgrounds is critical to fully grasp the challenges they face in different environments. The range of studies covered various parts of Asia, making it a comprehensive review highlighting women's challenges in Asia (Appendix-Table 2).

Methodological quality assessment

To ensure the quality of studies included in the systematic review, each study has been evaluated using the Joanna Briggs Institute (JBI) critical appraisal checklists. Based on the online checklist, each study chosen for this review was separately evaluated to judge its quality. JBI criteria judge the studies separately based on the methodology of the study. Based on whether the chosen study is purely qualitative, quantitative, or

mixed-method, JBI has a separate checklist to evaluate its quality. It offers separate checklist points to check the quality of studies. The quality of the studies was confirmed after reviewing them through the lens of JBI criteria. As per the analysis, all the studies chosen in this systematic review had enough quality standards to be included in the systematic review. However, studies also have some limitations. The complete details and the concluding remarks based on methodological evaluation are provided in Table 1 below:

Data extraction

The research adopted a standardized data extraction framework to collect relevant information from the selected studies. The research extraction process follows the study's core questions by collecting information about barriers and recommendations regarding AI adoption by Asian women in higher educational contexts. The research primarily focused on extracting the two major categories: Barriers in AI adoption and recommendations given by researchers in the selected studies to answer the study questions. However, basic information like study characteristics that present authors' information, publication dates, geographical locations, and research designs has also been collected to understand findings according to academic settings and cultural environments. The data about the AI tools and applications that researchers studied to define their functions in academic environments has also been extracted to emphasize the usage and adoption of various AI tools. The key barriers extracted from the studies that affect women's adoption of AI technology in higher education answered the first research question. The research utilizes findings and recommendations from previous studies to determine strategies for better AI adoption for women in higher education, which matches the second research question.

Coding scheme and process

A thematic coding approach is applied to systematically categorize the extracted data. The development of an initial coding framework starts from the study's research questions. The coding group categories into two main sections:

1. The barriers to AI Adoption include factors that prevent women in higher education from adopting AI technology. These barriers include systemic barriers alongside technological barriers and socio-cultural challenges.
2. Previous research provides recommendations to adopt strategies for developing inclusive AI for women students in higher education.

Different researchers independently code the data at first to confirm consistency before moving forward with the process. Researchers resolve coding differences by discussing the definitions of categories together. Multiple researchers conduct a reliability check through Cohen's Kappa coefficient analysis to verify the consistency and validity of extracted data between coders. The outcome value was 81 percent among the coders, signaling an excellent agreement among the researchers regarding the extracted data. A value above 75 is considered excellent agreement among the raters (Warrens, 2014). The defined data extraction and coding system enables the study to systematically review selected studies, revealing important findings about women's AI adoption barriers and facilitators in Asian higher education.

Table 1 Studies Methodological Quality Assessment using JBI criteria

Study reference	Checklist used	Strengths	Weaknesses	Conclusion
Gesser-Edelsburg et al. (2024)	JBI Mixed Methods Appraisal	Large sample size; inclusion of diverse professionals	Regional limitation (Israel): minimal focus on intervention details	High relevance for targeted AI literacy programs
Chan (2024)	JBI Cross-Sectional Study Appraisal	Balanced gender representation; clear focus on AI-related plagiarism	Self-reported data lacks a longitudinal design for trends	Suitable for understanding AI-related plagiarism ambiguities
Kumar and Choudhury (2022)	JBI Case Study Appraisal	It focuses on gender bias in AI; multiple data sources were used	Limited regional generalizability; smaller scale	Valuable for addressing algorithmic biases in AI design
Dai et al (2024)	JBI Scoping Review Appraisal	Covers multiple universities; policy gaps identified	Does not incorporate direct feedback from stakeholders	Useful for policy frameworks but lacks actionable solutions
Maheshwari (2024)	JBI Survey-Based Study Appraisal	Addresses adoption drivers; considers user-friendliness	Small sample size; lacks regional diversity	Highlights key factors influencing ChatGPT adoption
Qadri et al. (2023)	JBI Community-Centered Appraisal	Highlights cultural biases in T2I models	Limited participant size; lack of scalability	Reveals critical challenges in AI cultural representation
Rana et al. (2024)	JBI Cross-Sectional Study Appraisal	Trust and privacy factors were explored; including diverse academic roles	Region-specific (Bangladesh); lacks long-term evaluation	Strong insights into privacy concerns impacting women
Siyab and Saira (2024)	JBI Quantitative Study Appraisal	Focus on female-specific challenges in AI adoption	Small, localized sample; limited generalizability	Highlights gender-specific policy gaps in AI education
Ahmad et al. (2024)	JBI Quantitative Study Appraisal	Large sample size; diverse geographic regions included	Ethical challenges addressed broadly; lacks regional focus	Provides a global perspective on Gender and AI adoption
Chan and Hu (2023)	JBI Cross-Sectional Study Appraisal	Explores generative AI's impact on education	Ethical ambiguities are not deeply examined	Highlights educational benefits with ethical caveats
Rahiman and Kodikal (2023)	JBI Survey-Based Study Appraisal	Includes faculty from QS-ranked institutions	Focuses mainly on perceived risks; lacks actionable solutions	Explores engagement and risks in AI adoption
Henadirage and Gunarathne (2024)	JBI Quantitative Study Appraisal	Explores barriers and opportunities in management education	Limited to one faculty; lacks broader perspective	Useful for identifying challenges in GenAI adoption
Ma et al. (2024)	JBI Cross-Cultural Survey Appraisal	Compares cultural influences on AI attitudes	No longitudinal data; small international student sample	Cultural differences significantly influence AI adoption
He et al. (2024)	JBI Cross-Sectional Study Appraisal	High adoption trends were analyzed; demographic variations were noted	Focuses only on students; lacks faculty input	Strong for understanding ChatGPT adoption impacts
Huang et al. (2024)	JBI Quantitative Study Appraisal	Analyzes AI adoption factors in management education	Does not explore ethical challenges deeply	Relevant for driving adoption through advantages like trialability
Helmiatin et al., (2024)	JBI Survey and SEM-PLS Analysis Appraisal	Analyzes performance expectancy and risks in adoption	Focused only on public universities; lacks private institution input	Provides actionable insights on adoption challenges
Al-Zahrani and Alas-mari (2024)	JBI Quantitative Study Appraisal	Large sample size; includes diverse stakeholders	Ethical and social concerns are not thoroughly analyzed	Highlights broad AI adoption trends in Saudi higher education

Partial help was taken from generative AI tools in the creation of this table. Separate JBI criteria along with relevant studies were uploaded in the AI tools while analyzing the quality of studies

Assessment of publication bias

Assessing publication bias is important to ensure the credibility of review's findings (Joober et al., 2012). Statistical test like Egger's or Begg's test were not required in the study as no formal meta-analysis was conducted. Moreover, many of the studies were exploratory in nature as it relates to a new phenomenon in education. Therefore, a qualitative assessment of the all seventeen studies included in the review has been conducted carefully. The qualitative assessment revealed a balanced representation of positive and negative findings. Additionally, all the studies included in the review were from different countries context suggesting only a moderate risk of publication bias.

Data synthesis

A narrative synthesis has been employed to summarize the findings. Themes are identified through the analyses of extracted data to answer the research questions of the systematic review.

Results

Basic characteristics of selected studies

Before moving to the analysis part which is related to the research questions of this study, here is the basic description of the selected studies included in the review to show the key characteristics and background context of these studies. Table 2 (Appendix 1) shows the characteristics of the studies which were part of the review. The study included in the review used various quantitative, qualitative, and mixed-methods research designs. The sample size ranged from 50 to 1150 participants in the selected studies. Some studies were conducted only in one country context, and fewer studies have also been conducted in multicultural settings using samples from different countries. Most of the studies have used participants'gender to compare the data analysis. Studies from all parts of Asia were included in the systematic review. From South Asia, India, Pakistan, and Bangladesh received focused representation. From the Middle East, Saudi Arabia is prominently represented. Most of the studies focused on understanding students'and educators'familiarity, adoption, and ethical concerns regarding AI. Some studies also focused on understanding the AI algorithm biases, challenges in socio-cultural contexts, and the AI frameworks in higher educational institutions, which affect women's AI adoption.

Several studies highlighted underrepresentation and gender-specific challenges in AI adoption.

For example, Rana et al. (2024) found privacy concerns more impactful for women, while Kumar and Choudhury (2022) addressed gender bias embedded in AI applications. Challenges in inclusivity and ambiguity in AI-related policy frameworks were other barriers to women's AI adoption, e.g., Chan (2024) and Dai et al. (2024). Studies like Siyab and Saira (2024) and Dai et al. (2024) emphasized the need for more inclusive, evidence-based AI policies targeting academic and non-academic stakeholders. Some studies also targeted the cultural and social dimensions. Qadri et al. (2023) identified cultural biases in text-to-image (T2I) models, while Ma et al. (2024)

explored cross-cultural differences in AI perceptions. Some studies also shed light on the ethical use of AI Maheshwari (2024) and Helmiatin et al. (2024) specifically.

Substantive findings and synthesis of results

Seventeen studies were used in the analysis to examine the barriers and recommendations given regard to women's AI adoption in Asian higher education. Of these, fifteen looked at barriers through women's experiences in higher education. Two studies examined universities' AI models and policy frameworks to draw conclusions from them.

RQ 1. What are the key barriers to AI adoption for women in Asian higher education?

The results show many important themes which highlights various areas that act as barriers to women's AI adoption in higher education in Asia. These areas include Technological Illiteracy, Cultural Factors, Systematic Barriers, Exclusion from AI Policy Frameworks and Lack of Training. These problems are highlighted in the earlier researches and issues in these areas leads to women having difficulties in adopting AI in higher education in Asia.

Technological illiteracy

One key factor that is limiting AI adoption in Asian higher education is the women's inadequate familiarity with AI tools. According to Gesser-Edelsburg et al. (2024), women were found to be less familiar with AI technologies in higher education and were not able to use AI tools as frequently as men. Rana et al. (2024) concluded that a lower level of AI literacy among women results in a lower adoption rate for women AI adoption in higher education. This lack of familiarity and awareness about various AI tools for education often leads to lower usage rates and less trust in AI tools, which reinforces unfair gender roles and act as a barrier to women AI adoption in higher education (Chan, 2024; Chan & Hu, 2023).

Cultural factors

The effect of cultural and social norms was another topic that presented significant barriers to women's AI adoption in Asian higher educational context. He et al. (2024) observed that in Hong Kong despite the high adoption of tools like ChatGPT, women are more concerned about the AI misuse of their data, which disproportionately affects female students in AI adoption. Huang et al. (2024) similarly highlights that societal norms embedded in Chinese culture negatively impact women's adoption of AI tools, particularly in management education. Al-Zahrani & Alasmari, 2024 also concluded that the traditional environment of Saudi Arabia does not encourage women's participation in technological fields, which ultimately affects their AI adoption in higher education. Therefore, cultural barrier is another significant barrier to women AI adoption in Asian Higher Education.

Systematic barriers

Systematic barriers like stereotypes and AI algorithms were also found to be creating significant barriers to women's AI adoption in Asian higher education. Kumar and Choudhury (2022) found that gender stereotypes are built into algorithm design and

workplace practices, which discourages women, especially in South Asia and other developing countries. In the same way, Qadri et al. (2023) discovered that AI-generated outputs often reinforce cultural norms, making gender biases worse. These kinds of biases presented in AI application designs further strengthen already established stereotypes about women and discourage them from using these technologies as often.

Exclusion from AI policy frameworks

Problems with AI policy frameworks were also a significant barrier to women's AI adoption. Researchers like Dai et al. (2024), Huang et al. (2024), and Henadirage and Gunarathne (2024) concluded that policies for adopting AI did not include women and did not deal with the specific problems they faced. These frameworks do not just ignore what women think; they also ignore their unique needs, like having access to tools and training. According to the authors, less representation of women in AI policy formation leads to the creation of policies that are not as beneficial for women.

Personal constraints

Privacy and moral concerns came up as another important problem (Ahmad et al., 2024). These concerns made women less likely to want to use AI technologies. Studies by Rana et al. (2024) and Ahmad et al. (2024) show that women are more likely than men to worry about data protection and the moral effects of AI use, which leads to less use of AI technologies from women in higher education.

Lack of training

A common problem for women, especially teachers and professionals, was insufficient access to training options. Rahiman and Kodikal (2023) and Siyab and Saira (2024) showed that gaps in training make existing differences worse, making it harder for women to learn the skills they need to deal with AI. This lack of training of advanced AI tools also limits women ability to adopt AI for academic purposes and limit their potential of AI usage in higher education.

Overall, these themes reveal significant factors which act as barriers to AI adoption for women in Asian higher education. These factors have varied nature, from technological to personal constraints, these factors uniquely affect women's engagement with AI in higher educational context of Asia.

RQ 2. What recommendations did earlier studies make to facilitate Women's AI adoption in Asian higher education?

Besides highlighting the barriers, the selected studies have also recommended various strategies to mitigate the barriers and encourage women's equal participation in AI-driven higher education. Using narrative synthesis, some particular themes of recommendation have been identified. These specific themes are as under:

Access to targeted training and AI literacy programs

Multiple studies show that women need appropriate training to achieve better AI literacy levels. The authors Gesser-Edelsburg et al. (2024) suggested implementing specialized AI literacy programs to improve the literacy level of women's AI understanding in the higher education context of Asia. Similarly, Rana et al. (2024) recommended that

specific training programs should be implemented to address women's privacy concerns thus promoting their adoption of AI technologies in higher education. Siyab and Saira (2024) also concluded that female students show reluctance toward AI use in higher education so they need specific training programs.

Cultural sensitivity and inclusivity in AI design

Selected studies have also demonstrated why culturally inclusive AI tools should be a priority. Qadri et al. (2023) stressed the importance of developing AI systems that demonstrate community diversity. The research by Ma et al. (2024) shows there is a need for AI tools to support a wide range of needs between international and local students as well as women students. According to Huang et al. (2024), cultural roles create barriers for women to utilize AI while the author has recommended that AI applications should accept these cultural preferences to encourage equal participation from diverse groups.

Ethical guidelines and trust in AI

The adoption of AI depends heavily on ethical considerations and trust levels because women tend to be more cautious in AI adoption. He et al. (2024) recommended that women need more awareness about the ethical usage of AI tools to build trust since they display greater concern about AI misuse. The authors of Chan and Hu (2023) stated that women face ethical ambiguity barriers so they recommended structured ethical frameworks to help reduce their concerns. Similarly, Helmiatin et al. (2024) emphasized that women show higher ethical concerns about AI tools so they need specific guidelines to reduce their perceived risks for better adoption rates.

Supportive policies and gender-inclusive frameworks

AI-related gender bias problems can be solved effectively through gender-inclusive policy frameworks. Educational institutions require gender-sensitive policy frameworks for achieving equality (Kumar & Choudhury, 2022). Rana et al. (2024) concluded that women face higher levels of trust and privacy concerns which requires policy development to ensure equal women participation. Siyab and Saira (2024) discovered fundamental weaknesses in existing policies that address AI-specific gender challenges thus stressing the importance of developing complete frameworks for better assisting women in higher education.

Mentorship and support networks

Women need both mentorship and access to supportive networks to help them improve their AI adoption in higher education. Rahiman and Kodikal (2023) noted that female faculty members lack sufficient access to AI training but mentoring programs might help increase AI adoption according to their research. According to Henadirage and Gunarathne (2024), women lack representation during AI policy discussions yet mentorship and support networks would help bridge this gap.

User-friendly and personalized AI tools

AI tools that are easy to use and personalized in design encourage more users to adopt them, especially women. The adoption of AI tools increases when they become

accessible and personalized according to the needs of women according to Maheshwari (2024). Rana et al. (2024) also concluded that user-friendly gender-sensitive AI tools represent essential elements for adoption growth for women.

Improved representation of women in AI decision-making

The low rate of women's participation in AI decision frameworks leads to AI tool design missing specific requirements of women. Henadirage and Gunarathne (2024) mentioned that inadequate women's participation in AI policy discussions impedes the development of inclusive AI systems. There is a need for women's involvement in AI systems and educational policy development in order to understand their specific requirements and needs (Al-Zahrani & Alasmari, 2024).

Addressing societal gender roles and expectations

The traditional gender roles that society imposes create barriers for women to use AI tools. Kumar and Choudhury (2022) recommended that gender-sensitive frameworks should be used to address these types of barriers. Women face barriers to AI access because of traditional societal roles (Al-Zahrani & Alasmari, 2024). Huang et al. (2024) stated that AI strategies must be both gender-sensitive and culturally aware to overcome these cultural barriers.

Discussion and conclusion

This systematic review thoroughly analyzed the barriers to women's AI adoption in Asian higher education by reviewing existing literature in the Asian context. The results reveal that several social, cultural, and structural factors affect women's use of AI tools. This systematic review compiles the results of previous studies that highlighted key barriers and recommended strategies to eliminate these barriers related to AI adoption among women in Asian higher education. Given the exploratory nature of the included studies, a qualitative assessment of publication bias was performed. All of the included studies reported one or more barriers to AI adoption concerning women. This asymmetry in findings suggests the potential presence of publication bias favoring studies that identified significant barriers. However, the nature of barriers and country context were different from each other. This heterogeneity suggests that the selected studies have captured a wide range of challenges that women in higher education face with AI adoption in Asia, rather than reflecting a uniform or biased outcome. Overall, the risk of publication bias is moderate.

The review stresses that women face systematic barriers preventing them from joining the AI revolution fully. Not knowing how to use or understand AI tools is the main challenge, which highlights more significant differences between men and women in technology access. This is especially clear in South Asian countries where women have less access to technology and are less likely to know how to use it. The socioeconomic situation of families in Asian countries highlights the resource constraints they face. Families in these countries often invest in boys' education and provide technological tools as opposed to girls. Cultural stereotypes channel women into more 'feminine' subjects from an early age rather than encourage their participation in STEM subjects. This disparity also affects women in the long term, and even after joining higher education, they tend

to be less familiar with technological tools and science subjects than men (Ahmad et al., 2024; Gesser-Edelsburg et al., 2024; Kumar & Choudhury, 2022).

Another barrier is religious and cultural priorities in some countries, like Saudi Arabia, where women get limited exposure to technological and advanced tools due to their traditional role in society, affecting their overall adoption of AI in higher education. Moreover, traditional societal norms that only allow specific roles to women discourage their participation in technology, limiting their potential for AI adoption (Al-Zahrani & Alasmari, 2024; He et al., 2024; Huang et al., 2024). Similar to these findings, Li et al. (2021) also concluded in their review study that the cultural context plays a significant role in technology adoption in higher education.

Besides these cultural barriers, the inherent gender biases in the technology itself present another challenge for women. These biases affect how people see women's skills and how AI systems are designed and used. One major factor contributing to these biases in technology is that women are excluded from policy frameworks and decision-making processes. This keeps them from being represented in AI policy formation, which does not meet their specific needs (Dai et al., 2024; Huang et al., 2024; Qadri et al., 2023). Similar to these results, Shrestha and Das (2022) also stated that gender biases are common in various AI academic tools, discouraging women's participation in AI. The authors also stated that more research and policy formation are needed to ensure fairness in AI adoption for both genders. Even though women constitute 50% of the global population, only 22% of women professionals can be found in AI.

Additionally, women have more privacy, security, and moral concerns than men do. Many women are more wary of AI tools because they worry about privacy and data security, making it harder for them to use AI in higher education (Ahmad et al., 2024; Rana et al., 2024). These challenges are further exacerbated because training and tools are hard to get. This is especially true for women professionals and educators, who are often shut out of chances to improve their AI skills (Henadirage & Gunarathne, 2024).

Previous studies have highlighted several ways to address these issues. Specific actions, like courses on AI literacy for women, could help close the knowledge gap and give women the power to use AI tools. Policy changes that include diverse perspectives in policy-making are necessary to create an environment supporting women's adoption of AI. By letting women help make and carry out AI policy, decision-makers can ensure that their wants and opinions are considered. Privacy concerns could be eased with ethical guidelines and public awareness efforts. Ethical use of AI could also be encouraged to protect academic integrity in higher education. Investments in infrastructure and resources could facilitate women in their long-term adoption of AI in higher education (Dai et al., 2024; Siyab & Saira, 2024; Henadirage & Gunarathne, 2024; Maheshwari, 2024; Ahmad et al., 2024).

The research concludes that Asian women face multiple barriers to adopting AI within higher education systems. In terms of technological literacy, women are less literate than men and get less access to technological tools, affecting their AI adoption negatively. The conservative nature of Asian society also limits their ability to fully interact with AI in higher education. Religious and cultural priorities in some countries also allow them to work in specific roles, which limits their potential in AI adoption. Moreover, the exclusion of women in AI policy formation also creates barriers for women in higher

education as these policies do not consider women's specific challenges and needs. Therefore, there is a need for proper attention in this area as the barriers to women's AI adoption are discouraging their potential to be fully involved in AI-integrated education.

The systematic review included studies conducted in the diverse context of Asia. The countries from West Asia to East Asia and low- and middle-income countries with various religions, ethnic groups, and cultural contexts were part of the review. The results highlighted that religious and cultural context has largely influenced women's participation in various sectors. Hence, barriers to women's adoption of AI vary in various contexts. In the Middle Eastern context, women are facing barriers like cultural expectations, and societal roles which are discouraging their AI adoption. In South Asian countries, financial barriers like access to resources and digital illiteracy are the main challenges for women. While barriers to women's AI adoption in middle-income contexts like China, Hong Kong are more systematic like biases in technology and ethical concerns. Hence, understanding religious and socioeconomic backgrounds is critical to fully grasp the challenges they face in different environments. The study concludes that Asian higher education requires immediate cultural specific and gender-sensitive approaches to encourage women's AI adoption. The necessary changes include developing proper policy frameworks and providing equitable resource access for women in higher education. A targeted approach is needed to ensure that women and girls are not left behind in this era of AI. With policymakers and AI experts, higher education institutions must work collaboratively to create an inclusive AI environment for women. The focus should be on developing policies that incorporate the entire population while specifically handling women's distinctive challenges.

Implications for practice, research, and policies

The results of this review study have highlighted significant barriers limiting the potential of women's AI adoption in higher education. Besides finding barriers, the review also discussed recommendations and strategies discussed in those selected studies that can encourage women to be involved in AI technologies in higher education. By reducing barriers and encouraging positive strategies, countries can encourage women to participate more in AI applications in higher education, improving their skill level and learning. Therefore, the results of this review offer actionable recommendations for advancing gender equity in AI adoption in Asian higher education.

For Policy Makers: There is a need to build the capacity of policymakers to mainstream gender in policies, strategies, and implementation plans. Evidence must be provided on how gender equity improves economic and development outcomes. In addition, the frameworks of AI should be designed in such a way as to understand the needs and sensitivity of gender in the usage of AI tools in education. Moreover, policies should be formulated to eliminate gender biases from AI tools so women do not feel discouraged or marginalized. One of the ways forward is to proactively promote more women's participation in the decision-making process of AI frameworks. When women become part of these processes and frameworks, they can better present their perspectives, identify the biases, and take steps to remove such issues.

For Practitioners: Training should be provided to educators, AI program developers, designers, and students to be aware of and to adopt women-friendly approaches to

ensure inclusiveness and encourage women's participation in AI development and use. AI literacy programs and ethical training modules for women can address ethical issues, increasing their confidence in using AI tools in education.

For Research: As this systematic review has taken studies from the Asian context, minimal literature is available in the South Asia context and Middle Eastern context. This highlights the need to conduct more research on these topics in these specific geographical regions to ensure that women from all parts of Asia grow in the era of AI. Future research should also compare the performance of students who use more AI tools to those who rarely use AI tools. Evidence in this regard will further encourage the participation of women in AI tools in education. Moreover, future research should also assess the long-term adoption trends and the efficacy of focused interventions for women in higher education.

Limitations

Despite its broad reach, this assessment has some limitations. First, many studies in the systematic review did not discriminate results based on demographic factors like age and socioeconomic background. So, the information about women's usage of AI concerning their age and economic situation remains unknown. Future research needs to examine the relationship between women's AI adoption and their age and economic situation, as literature is very limited in this regard in Asia. Second, the evaluation concentrated on published studies, potentially overlooking practical insights from various reports of UNESCO, and UNICEF UN Women in this area. Future studies and reviews can also include published reports of AI adoption among women in Asia from government and non-government organizations to integrate their views and remarks to get more in-depth insights about the women's situation in the Asian context.

Appendix 1

See Table 2.

Table 2 Selected Studies Characteristics and Key Findings

Study reference	Study design	Study sample	Region	Population	AI application	Key findings & recommendations	Barriers to women AI adoption
Gesser-Edelsburg et al. (2024)	Mixed-methods cross-sectional study	704 students and lecturers, 12 industry/academic professionals	Palestine	University students and lecturers	Familiarity, usage, and attitudes towards AI and GenAI tools	Minimal familiarity with AI tools; Higher familiarity among men. Need for targeted AI literacy programs	Lower familiarity with AI tools among women
Chan, (2024)	Quantitative study with an online questionnaire	393 students (198 males, 195 females)	Hong Kong	University students across various disciplines	Perceptions and understanding of plagiarism and AI	Students generally understand traditional plagiarism but show ambiguity regarding AI-related plagiarism	Ambiguities in understanding AI-related plagiarism's impact on women
Kumar and Choudhury (2022)	Case study with interviews and surveys	225 participants (125 females, 100 males)	South Asia (India, Pakistan, Bangladesh)	Women and men in developing countries	Gender bias and AI applications	AI could exacerbate gender bias but also offer opportunities for improvement	Biases in algorithm design; workplace underrepresentation
Dai et al. (2024)	A scoping review of university policies	30 Asian universities	Asia	University stakeholders	Generative AI policy frameworks	Gaps in inclusivity; ethical and evidence-based policy-making emphasized	Lack of inclusivity for non-academic staff in policy frameworks
Maheshwari (2024)	Survey-based SEM analysis	108 students (undergraduate and postgraduate)	Vietnam	Higher education students	ChatGPT adoption in education	User-friendliness and personalization drive adoption; trust is less significant	Ethical use guidance for preserving creativity and critical thinking
Qadri et al. (2023)	Community-centered study of T2I models	36 participants from Pakistan, India, and Bangladesh	South Asia	Community perspectives on AI models	Cultural representation in T2I models	T2I models amplify cultural stereotypes and marginalization	Gendered biases in T2I outputs reinforce societal norms
Study reference	Study design	Study sample	Region	Population	AI application	Key findings & recommendations	Women's challenges and facilitating factors
Rana et al. (2024)	Trust and privacy-augmented UTAUT framework	310 AI users (teachers, researchers, students)	Bangladesh	AI users in academia	Behavioral intention and AI adoption in education	Trust and privacy concerns significantly influence AI adoption	Privacy concerns disproportionately affect female participants

Table 2 (continued)

Study reference	Study design	Study sample	Region	Population	AI application	Key findings & recommendations	Women's challenges and facilitating factors
Siyab and Saira (2024)	Quantitative study	One College, 60 female students	Pakistan	Undergrad female students	ChatGPT adoption in education	Policy gaps identified; need for comprehensive frameworks	Limited policy focuses on gender-specific AI challenges
Ahmad et al., (2024)	Quantitative Design	815 highly educated Asian and African participants from 11 countries	Asia & Africa	Global AI researchers and educators in Developing World	Generative AI applications	Ethical challenges persist despite increasing AI adoption	Access gaps and ethical concerns vary by gender globally
Chan and Hu (2023)	Survey on generative AI perceptions	399 students from Hong Kong	Hong Kong	Undergraduate and postgraduate students	Generative AI for teaching and learning	Generative AI provides learning benefits but raises ethical concerns	Ethical ambiguities in AI use for women's education needs
Rahiman and Kodikal (2023)	Quantitative study using SEM and survey methods	250 faculty members from QS-ranked institutions	Asia (including India and Bahrain)	Higher education faculty	AI for personalized learning and faculty engagement	AI enhances engagement and assessment. Perceived risks significantly influence adoption	Limited access to training on AI tools for female faculty members
Henadrage and Gunaratne (2024)	Quantitative study using SEM and survey methods	Largest management faculty in Sri Lanka	Sri Lanka	Higher education students and faculty	Barriers and opportunities for GenAI in management education	Barriers include lack of policies, infrastructure, and expertise; opportunities to improve accessibility and resources	Underrepresentation of female faculty in GenAI policy discussions
Ma et al. (2024)	Cross-cultural survey using TAM framework	Chinese and international students (The participants consisted of 372 Chinese and 317 international students)	China	Higher education students	Examined behavioral intentions and attitudes toward AI in education	Cultural differences influence attitudes; ease of use is critical for international students	Limited cultural inclusivity in AI design, impacting its accessibility for diverse user groups

Table 2 (continued)

Study reference	Study design	Study sample	Region	Population	AI application	Key findings & recommendations	Women's challenges and facilitating factors
He et al. (2024)	Survey study using the Technology Acceptance Model	680 students from HKUST (Hong Kong and Guangzhou campuses)	Hong Kong, Mainland China	University students	Usage and perception of ChatGPT in learning and career contexts	High ChatGPT adoption; variations by demographics; positive learning/career impacts	Concerns about ethical use and potential misuse, disproportionately affecting women
Huang et al. (2024)	Quantitative study using CTA and PLS-SEM	420 management undergraduates in Hangzhou, China	Hangzhou, China	Management undergraduates	AI adoption factors in management education	Relative advantage and trialability drive AI adoption; cultural/social factors dominate	Traditional societal roles influencing women's access to AI tools in education Limited representation in decision-making regarding AI integration in universities
Helmiatin et al. (2024)	Survey and SEM-PLS analysis	351 respondents from public universities in Indonesia	Indonesia	Educators and policy-makers	Adoption factors of AI in public universities	Performance expectancy boosts adoption; perceived risks hinder adoption	High perceived risk of adopting AI tools due to privacy and security concerns
Al-Zahrani and Alasmari (2024)	Quantitative study with online survey	1113 stakeholders in Saudi higher education	Saudi Arabia	Students, faculty, administrators	Impact on teaching, learning, ethics, and administration	Positive attitudes towards AI; ethical and social concerns emphasized	Algorithmic biases within AI systems reinforce gender stereotypes

Acknowledgements

We extend our sincere gratitude to Professor Asha Kanwar for her invaluable guidance and support throughout the completion of this research. Her insightful feedback and mentorship played a crucial role in shaping this study. Additionally, we appreciate the contributions of our research collaborators who provided constructive input during various stages of this work.

Author contributions

UK drafted the manuscript and completed the writing process. AK conceptualized the study and provided guidance throughout the research process. JS contributed to the study design, performed the analysis, and interpreted the data collected from the selected studies. RH supervised the research project and provided oversight for its execution.

Declaration

Competing interests

No competing Interest.

Received: 4 March 2025 Accepted: 12 May 2025

Published online: 05 June 2025

References

- Adewale, S. (2024). Exploring ChatGPT usage amongst female academics and researchers in the academia. *International Journal of Information and Learning Technology*. <https://doi.org/10.1108/IJILT-01-2024-0012>
- Ahmad, M., Subih, M., Fawaz, M., Alnuqaidan, H., Abuejheisheh, A., Naqshbandi, V., & Alhalaia, F. (2024). Awareness, benefits, threats, attitudes, and satisfaction with AI tools among Asian and African higher education staff and students. *Journal of Applied Learning & Teaching*. <https://doi.org/10.37074/jalt.2024.7.1.10>
- Ahn, J., Kim, J., & Sung, Y. (2022). The effect of gender stereotypes on artificial intelligence recommendations. *Journal of Business Research*, 141, 50–59.
- Al-Zahrani, A. M., & Alasmari, T. M. (2024). Exploring the impact of artificial intelligence on higher education: The dynamics of ethical, social, and educational implications. *Humanities and Social Sciences Communications*. <https://doi.org/10.1057/s41599-024-03432-4>
- Austin, T., Rawal, B. S., Diehl, A., & Cosme, J. (2023). AI for equity: Unpacking potential human bias in decision making in higher education. *AI, Computer Science and Robotics Technology*, 1(2), 43–58.
- Bansal, V., Rezwan, M., Iyer, M., Leasure, E., Roth, C., Pal, P., & Hinson, L. (2024). A scoping review of technology-facilitated gender-based violence in low-and middle-income countries across Asia. *Trauma, Violence, & Abuse*, 25(1), 463–475.
- Chan, C. K. Y. (2024). Students' perceptions of 'AI-giarism': Investigating changes in understandings of academic misconduct. *Education and Information Technologies*. <https://doi.org/10.1007/s10639-024-13151-7>
- Chan, C. K. Y., & Hu, W. (2023). Students' voices on generative AI: Perceptions, benefits, and challenges in higher education. *International Journal of Educational Technology in Higher Education*. <https://doi.org/10.1186/s41239-023-00411-8>
- Dai, Y., Lai, S., Lim, C. P., & Liu, A. (2024). University policies on generative AI in Asia: Promising practices, gaps, and future directions. *Journal of Asian Public Policy*. <https://doi.org/10.1080/17516234.2024.2379070>
- Dorta-González, P., López-Puig, A. J., Dorta-González, M. I., & González-Betancor, S. M. (2024). Generative artificial intelligence usage by researchers at work: Effects of gender, career stage, type of workplace, and perceived barriers. *Telematics and Informatics*, 94, 102187. <https://doi.org/10.1016/j.tele.2024.102187>
- Fraila-Rojas, B., De-Pablos-Heredero, C., & Mendez-Suarez, M. (2025). Female perspectives on algorithmic bias: Implications for AI researchers and practitioners. *Management Decision*, 2(4), 13–28.
- Gesser-Edelsburg, A., Hijazi, R., Eliyahu, E., & Tal, A. (2024). Bridging the divide: An empirical investigation of artificial intelligence and generative artificial intelligence integration across genders, disciplines, and academic roles. *European Journal of Open, Distance and E-Learning*, 26(S1), 51–69. <https://doi.org/10.2478/eurodl-2024-0008>
- Gupta, M., Parra, C. M., & Dennehy, D. (2022). Questioning racial and gender bias in AI-based recommendations: Do espoused national cultural values matter? *Information Systems Frontiers*, 24(5), 1465–1481.
- He, A. J., Zhang, Z., Anand, P., & McMinn, S. (2024). Embracing generative artificial intelligence tools in higher education: A survey study at the Hong Kong university of science and technology. *Journal of Asian Public Policy*. <https://doi.org/10.1080/17516234.2024.2447195>
- Helmiati, H., Hidayat, A., & Kahar, M. R. (2024). Investigating the adoption of AI in higher education: A study of public universities in Indonesia. *Cogent Education*, 11(1), 2380175. <https://doi.org/10.1080/2331186X.2024.2380175>
- Henadirage, A., & Gunarathne, N. (2024). Barriers to and opportunities for the adoption of generative artificial intelligence in higher education in the global south: Insights from Sri Lanka. *International Journal of Artificial Intelligence in Education*, 35, 245–281. <https://doi.org/10.1007/s40593-024-00439-5>
- Huang, Q., Kumarasinghe, P. J., & Jayarathna, G. S. (2024). Navigating the future: Exploring AI adoption in Chinese higher education through the lens of diffusion theory. *Interdisciplinary Journal of Information, Knowledge, and Management*. <https://doi.org/10.28945/5277>
- Joober, R., Schmitz, N., Annable, L., & Boksa, P. (2012). Publication bias: What are the challenges and can they be overcome? *Journal of Psychiatry and Neuroscience*, 37(3), 149–152. <https://doi.org/10.1503/jpn.120065>
- Kumar, S., & Choudhury, S. (2022). Gender and feminist considerations in artificial intelligence from a developing-world perspective, with India as a case study. *Humanities and Social Sciences Communications*. <https://doi.org/10.1057/s41599-022-01043-5>

- Li, N., Zhang, X., & Limniou, M. (2021). A country's national culture affects virtual learning environment adoption in higher education: A systematic review (2001–2020). *Interactive Learning Environments*, 31(7), 4407–4425. <https://doi.org/10.1080/10494820.2021.1967408>
- Ma, D., Akram, H., & Chen, I. H. (2024). Artificial intelligence in higher education: A cross-cultural examination of students' behavioral intentions and attitudes. *The International Review of Research in Open and Distributed Learning*, 25(3), 134. <https://doi.org/10.19173/irrodl.v25i3.7703>
- Maheshwari, G. (2024). Factors influencing students' intention to adopt and use ChatGPT in higher education: A study in the Vietnamese context. *Education and Information Technologies*, 29, 12167–12195. <https://doi.org/10.1007/s10639-023-12333-z>
- Martin, F., & Dragojlovic, A. (2019). Gender, mobility regimes, and social transformation in Asia. *Journal of Intercultural Studies*, 40(3), 275–286.
- Møgelvang, A., Bjelland, C., Grassini, S., & Ludvigsen, K. (2024). Gender differences in the use of generative artificial intelligence chatbots in higher education: Characteristics and consequences. *Education Sciences*, 14(12), 1363. <https://doi.org/10.3390/educsci14121363>
- Nazer, L. H., Zatarah, R., Waldrip, S., Ke, J. X. C., Moukheiber, M., Khanna, A. K., & Mathur, P. (2023). Bias in artificial intelligence algorithms and recommendations for mitigation. *PLOS Digital Health*, 2(6), 27–38.
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Aki, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., & Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *PLOS Medicine*, 18(3), e1003583. <https://doi.org/10.1371/journal.pmed.1003583>
- Qadri, R., Shelby, R., Bennett, C. L., & Denton, E. (2023). AI's regimes of representation: A community-centered study of text-to-image models in South Asia. In: Proceedings of the 2023 ACM conference on fairness, accountability, and transparency (FAccT '23), Chicago, IL, USA. <https://doi.org/10.1145/3593013.3594016>
- Rahiman, H. U., & Kodikal, R. (2023). Revolutionizing education: Artificial intelligence empowered learning in higher education. *Cogent Education*, 11(1). <https://doi.org/10.1080/2331186X.2023.2293431>
- Rana, M. M., Siddiquee, M. S., Sakib, M. N., & Ahamed, M. R. (2024). Assessing AI adoption in developing country academia: A trust and privacy-augmented UTAUT framework. *Heliyon*, 10, e37569. <https://doi.org/10.1016/j.heliyon.2024.e37569>
- Roshanaei, M. (2024). Towards best practices for mitigating artificial intelligence implicit bias in shaping diversity, inclusion and equity in higher education. *Education and Information Technologies*, 2(4), 1–26.
- Shrestha, S., & Das, S. (2022). Exploring gender biases in ML and AI academic research through systematic literature review. *Frontiers in Artificial Intelligence*, 5, 976838. <https://doi.org/10.3389/frai.2022.976838>
- Siyab, M., & Saira. (2024). AI practices among undergraduate students: A case study of ace college for girls Kalaske. *Journal of Asian Development Studies*, 13(4), 722–737. <https://doi.org/10.62345/jads.2024.13.4.59>
- Stöhr, C., Ou, A. W., & Malmström, H. (2024). Perceptions and usage of AI chatbots among students in higher education across genders, academic levels and fields of study. *Computers and Education: Artificial Intelligence*, 5, 100259. <https://doi.org/10.1016/j.caeai.2024.100259>
- UN Women (2022). Innovation and technological change, and education in the digital age for achieving gender equality and the empowerment of all women and girls. https://www.unwomen.org/sites/default/files/2022-12/EP2_Helani%20Galpaya.pdf
- Warrens, M. J. (2014). New interpretations of Cohen's kappa. *Journal of Mathematics*, 2014(1), 203907. <https://doi.org/10.1155/2014/203907>

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.