



# Assessing the Ethical Considerations Associated With the Utilization of Artificial Intelligence among Students in Higher Education Institutions

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## Abstract

This study aimed to develop an AI education policy for higher education by examining the perceptions and implications of text generative AI technologies. Data was collected from 457 students and 180 teachers and staff across various disciplines in Hong Kong universities, using both quantitative and qualitative research methods. Based on the findings, the study proposed an AI Ecological Education Policy Framework to address the multifaceted implications of AI integration in university teaching and learning. This framework was organized into three dimensions: Pedagogical, Governance, and Operational. The Pedagogical dimension concentrated on using AI to improve teaching and learning outcomes, while the Governance dimension tackled issues related to privacy, security, and accountability. The Operational dimension addressed matters concerning infrastructure and training. The framework fostered a nuanced understanding of the implications of AI integration in academic settings, ensuring that stakeholders were aware of their responsibilities and could take appropriate actions accordingly.

**Keywords:** AI policy framework, Artificial intelligence, ChatGPT, Ethics, Assessment

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## I. Introduction

In recent months, there has been a growing concern in academic settings about the use of text generative artificial intelligence (AI), such as ChatGPT, Bing, and the latest, Co-Pilot integrated within the Microsoft Office suite. One of the main concerns is that students may use generative AI tools to cheat or plagiarize their written assignments and exams. In fact, a recent survey of university students found that nearly one in three students had used a form of AI, such as essay-generating software, to complete their coursework (Intelligent.com, 2023). About one-third of college students surveyed (sample size 1000) in the US have utilized the AI chatbot such as ChatGPT to complete written homework assignments, with 60% using the program on more than half of their assignments. ChatGPT types of generative AI tools are capable of imitating human writing, with some students using it to cheat. The study found that 75% of students believe that using the program for cheating is wrong but still do it, and nearly 30% believe their professors are unaware of their use of the tool. The study also noted that some professors are considering whether to include ChatGPT in their lessons or join calls to ban it, with 46% of students saying their professors or institutions have banned the tool for homework. This has led to calls for stricter regulations and penalties for academic misconduct involving AI.

Another concern is that the use of generative AI may lead to a decline in students' writing and critical thinking skills (Civil, 2023; Warschauer et al., 2023), as they become more reliant on automated tools to complete their work. Some academics argue that this could have a negative impact on the quality of education and ultimately harm the students' learning outcomes (Chan & Lee, 2023; Korn & Kelly, 2023; Oliver, 2023; Zhai, 2022).

These concerns have led some universities to ban the use of generative AI in their academic programs. Eight out of 24 universities in the prestigious UK Russell Group have declared the use of the AI bot for assignments as academic misconduct, including Oxford and Cambridge. Meanwhile, many other universities around the world are rushing to review their plagiarism policies citing concerns about academic integrity

(Wood, 2023; Yau & Chan, 2023). Some Australian universities have had to alter their exam and assessment procedures back to pen- and paper-based (Cassidy, 2023; Cavendish, 2023).

However, there are also those who argue that generative AI has the potential to revolutionize education and enhance the learning experience for students. For example, some experts suggest that generative AI could be used to provide personalized feedback and support to students, helping them to identify areas of weakness and improve their skills in an adaptive manner (Kasneji et al., 2023; Sinhaliz et al., 2023).

### **1.1 Generative AI and Generative Pre-trained Transformers**

Generative AI is a subset of artificial intelligence (AI) that focuses on creating new data or content rather than analyzing and interpreting existing data (McKinsey Consultant, 2023). Generative Pre-trained Transformers (GPT) are a type of generative AI model that use deep learning techniques to generate natural language text. The latest versions of GPT, GPT-3.5 and GPT-4, are large language models trained on a large corpus of text data, capable of producing human-like text with high levels of coherence, complexity, and diversity. GPT-3.5 and GPT-4 are both examples of artificial general intelligence (AGI), which is the ability of AI systems to perform any intellectual task that a human can do. Unlike artificial narrow intelligence (ANI), which is designed to perform a specific task, AGI is designed to perform multiple tasks and generalize knowledge across different domains. While GPT-3.5 and GPT-4 are not true AGI systems, they represent significant progress towards achieving AGI by demonstrating the ability to perform a wide range of tasks with human-like proficiency. Generative AI is a subset of artificial intelligence (AI) that focuses on creating new data or content rather than analyzing and interpreting existing data (McKinsey Consultant, 2023). Generative Pre-trained Transformers (GPT), such as GPT-3.5 and GPT-4, are advanced generative AI models that leverage deep learning techniques to produce natural language text. These models can perform a wide range of language tasks and generate human-like text. The development of GPT-3.5 and GPT-4 has the potential to revolutionize many fields, including natural language processing, creative writing, and content generation.

### **1.2 Rationale for an Artificial Intelligence Education Policy**

With generative AI tools becoming easily accessible to the public in recent months, they are rapidly being integrated into various fields and industries. This has created an urgent need for universities to develop an AI education policy that prepares students to work with and understand the principles of this technology. There are several rationales supporting this need.

Firstly, AI technology is becoming more prevalent in many sectors of the economy, such as finance (Bholat & Susskind, 2021; Buckley et al., 2021), healthcare (Eggmann et al., 2023; Yu et al., 2018), and transportation (Abduljabbar et al., 2019; Wu et al., 2022). As a result, graduates will need to have a strong understanding of AI principles in order to succeed in these fields. An AI education policy can provide students with the necessary knowledge and skills to work with AI in a professional capacity. Secondly, AI has the potential to revolutionize many aspects of society, including education itself (Adiguzel et al., 2023). AI can be used to enhance student learning by providing personalized, real-time feedback and adapting to individual learning styles (Atlas, 2023; Chan & Hu, 2023; Luckin, 2017). By educating students on AI, universities can help prepare them to be active participants in the development and implementation of AI technology, ensuring that it benefits society as a whole.

Thirdly, as the use of AI in education and assessment becomes more prevalent, it is essential that students understand the principles behind the technology in order to maintain academic integrity and prevent cheating, as mentioned previously (Chan, 2023; Cotton et al., 2023). An AI education policy can teach students about the ethical considerations surrounding AI, such as bias and fairness, as well as the potential consequences of using AI in academic contexts. Fourthly, developing an AI education policy for universities is important to prepare students for the future (Aoun, 2017). AI technology is rapidly advancing, and it is likely to play an increasingly important role in society in the coming years. By providing students and teachers with training in AI, universities can help ensure that graduates are equipped to contribute to the development of AI and to navigate the ethical, social, and economic issues that are likely to arise as AI becomes more widespread. Such training should also help students become competent and responsible users of AI in their daily lives.

Finally, it is worth mentioning that previous AI policies in education did not anticipate the level of advancements that text-based GPT-3.5 and GPT-4 have now achieved. Given the potential benefits and risks associated with the use of generative AI in education, it is important to develop a proper AI education policy that addresses these concerns and provides guidance on the responsible use of AI. Conducting research on AI policy in education within Hong Kong is specifically justified due to the city's unique position as a global hub of technology, commerce, and education, coupled with its evolving education landscape. Hong Kong's blend of Eastern and Western educational philosophies and practices offers a fertile ground for examining the impacts and opportunities of AI integration in varied educational contexts. Furthermore, as Hong Kong is actively striving to enhance its digital learning capabilities and infrastructure, studying AI policy could provide valuable

insights into the challenges and best practices of implementing AI in education, thereby potentially informing AI education strategies not only in Hong Kong but also in other global contexts.

The study employed a comprehensive approach to data collection, gathering rich quantitative and open-ended survey data from a diverse range of stakeholders in the education community to ensure that it reflects the needs and values of all those involved. The combination of these data sources allowed for a holistic understanding of the topic under investigation, providing a nuanced and multifaceted view of the issues at hand. By doing so, we can help to ensure that the use of generative AI in education is both beneficial and ethical.

## **II. Existing Policy on Artificial Intelligence**

The aim of this study is to investigate the education policy related to AI. However, it is essential to also scrutinize the existing policies governing AI as a whole. As AI expands its sphere of influence to various sectors in our society, there are increasing concerns over the risks of its usage and how it might impact human activities (AI regulation, 2023; World Economic Forum [WEF], 2023). Some of the major issues of concern that have drawn the attention of governments around the world include discrimination and bias of AI, loss of privacy, violation of human rights, and malicious use of AI (Greiman, 2021; Hogenhout, 2021). Federspiel et al. (2023) caution that misuse of AI could encourage manipulation of people, create social division, and exacerbate inequalities, posing existential threats to the human race. In view of this, countries have been working on national policies and strategies to provide clearer guidance on AI usage in order to maximize its benefits while mitigating the threats brought by it.

To advocate the responsible and proper management of AI technologies, the center of focus for most national policies on AI has fallen on the discussion of ethics, which deals with “the standards of right and wrong, acceptable and not acceptable” (Hogenhout, 2021, p. 11). Floridi (2021)’s framework for the ethical use of AI, which proposed the five core principles of “beneficence, non-maleficence, autonomy, justice, and explicability,” is referred to by most national policies on AI as a foundation to further develop on. In addition, Dexe and Franke (2020) summarized the AI strategy documents from the Nordic countries and identified various ethical principles as the implicit foundation for further developing policies. The official AI governance framework from Singapore also recognized the “explainable, transparent, and fair usage of AI in decision-making processes” and “human-centric AI solutions” as the guiding principles of ethical use of AI (IMDA & PDPC, 2020). Apart from individual countries, ethics has been the emphasis of the AI policies published by regional and international bodies. UNESCO developed its guidelines on the ethical use of AI technologies by emphasizing the key idea of human-centeredness, and hence, human rights and values laid out in the Universal Declaration of Human Rights (UDHR) are advised to be adopted as the necessary foundation to further promote beneficial and appropriate use of AI technologies (UNESCO, 2021b, 2023).

AI strategy in the European Union, as Renda’s (2020) analysis pointed out, also focused on ethics and highlighted a human-centric approach to AI. In order to protect EU citizens from the danger of abusive use of advanced technologies, the EU proposed its own pillars (legal compliance, ethical alignment, and sociotechnical robustness) to ensure the trustworthiness of AI and established a specific AI expert group to work on specific policy recommendations and guidelines.

The heavy focus that these national and regional policies have placed on ethics demonstrates how limited they can be for the implementation of AI technologies. On the one hand, the difficulty in laying down a universal definition of ethical principles becomes a hindrance for certain countries in formulating policies on the use of AI (Dexe & Franke, 2020). On the other hand, as AI can weave into the fabrics of everyday human activities, the resulting wide coverage of policy areas ranging from governance to education and even to the environment makes it a challenging task for governments to establish specific policies on AI usage (UNESCO, 2021b). Thus, as the Singaporean AI governance framework highlighted, model frameworks or ethical guidelines were in themselves directional and for reference only, and AI practitioners need to consider them with flexibility and according to the relevance of particular situations (IMDA & PDPC, 2020).

Moving forward, the ongoing efforts of national and international organizations to ensure the positive implementation of AI technologies will continue to prioritize discussions and the formulation of legal and ethical principles (AI regulation, 2023; UNESCO, 2023). However, until these principles are validated by real-time implementation of AI technologies, they will remain primarily predictive and prescriptive in nature (Chatterjee, 2020). Over time, it may become necessary for countries to establish institutional support systems to effectively manage AI practices in accordance with validated legal and ethical guidelines (Renda, 2020).

**Table 1: Compilation of Fundamental Ethical Principles (IMDA & PDPC, 2020)**

Fundamental Ethical Principles for AI	Description
<b>Accountability</b>	Ensure AI actors are held responsible for the AI systems' functioning and adherence to ethical principles
<b>Accuracy</b>	Recognize and communicate sources of error and uncertainty in algorithms and data to inform mitigation procedures
<b>Auditability</b>	Allow third parties to examine and review algorithm behavior through transparent information disclosure
<b>Explainability</b>	Ensure that algorithmic decisions and underlying data can be explained in layman's terms
<b>Fairness</b>	Prevent discriminatory impacts, include monitoring mechanisms, and consult diverse perspectives during system development
<b>Human Centricity and Well-being</b>	Prioritize the well-being and needs of humans in AI development and implementation
<b>Human Rights Alignment</b>	Ensure technologies do not violate internationally recognized human rights
<b>Inclusivity</b>	Make AI accessible to everyone
<b>Progressiveness</b>	Favor projects with significantly greater value than their alternatives
<b>Responsibility, Accountability, and Transparency</b>	Build trust through responsibility, accountability, and fairness, provide avenues for redress, and maintain records of design processes
<b>Robustness and Security</b>	Ensure AI systems are safe, secure, and resistant to tampering or data compromise
<b>Sustainability</b>	Favor implementations that provide long-lasting, beneficial insights and can predict future behavior

### III. Methodology

In this study, a survey design was utilized to gather data from students, teachers, and staff in Hong Kong to develop an AI education policy framework for university teaching and learning. The survey was administered through an online questionnaire, featuring a mix of closed-ended and open-ended questions. The questionnaire was designed based on a review of current literature on AI use in higher education. Topics covered in the survey were major issues concerning the use of AI in higher education, which included the use of generative AI technologies like ChatGPT, the integration of AI technologies in higher education, potential risks associated with AI technologies, and AI's impact on teaching and learning.

Data were collected via an online survey from a diverse group of stakeholders in the education community, ensuring that the results reflect the needs and values of all participants. A convenience sampling method was employed for selecting the respondents, based on their availability and willingness to participate in the study. Participants were recruited through an online platform and provided with an informed consent form prior to completing the survey. The survey was completed by 457 undergraduate and postgraduate students, as well as 180 teachers and staff members across various disciplines in Hong Kong. Descriptive analysis was used to analyze the survey data, while a thematic analysis approach was applied to examine the responses from the open-ended questions in the survey.

#### 3.1 Quantitative Data (Survey Data) and Descriptive Analysis

A range of survey items was included to capture different aspects of participants' usage and perception of generative AI technologies like ChatGPT. For example, participants were asked whether they have used ChatGPT or similar generative AI technologies before and how they envision using these technologies in their teaching and learning practices.

##### 3.1.1 Descriptive Analysis and Thematic Analysis of Survey Data

###### I. Descriptive Analysis of Quantitative Data

Descriptive analysis was employed to analyze the survey data collected from students and teachers in Hong Kong to gain a better understanding of the usage and perception of generative AI technologies like ChatGPT in higher education. Descriptive analysis is an appropriate statistical method for summarizing and describing the main characteristics of the sample and the data collected. It is particularly useful for analyzing survey data and can provide an overview of the distribution, central tendency, and variability of the responses.

The survey was conducted among 457 students and 180 teachers and staff from different disciplines in Hong Kong universities. The goal was to explore the kinds of requirements, guidelines, and strategies necessary for developing AI policies geared towards university teaching and learning. The findings reveal valuable insights into the perception of generative AI technologies like ChatGPT among students and teachers (refer to Table 2).

Regarding the usage of generative AI technologies, both students (mean = 2.28, SD = 1.18) and teachers (mean = 2.02, SD = 1.1) reported relatively low experience, suggesting that there is significant room for growth in adoption. Both groups demonstrated a belief in the positive impact of integrating AI technologies into higher education (students: mean = 4, SD = 0.891; teachers: mean = 3.87, SD = 1.32). This optimism was also reflected in the strong agreement that institutions should have plans in place associated with AI technologies (students: mean = 4.5, SD = 0.854; teachers: mean = 4.54, SD = 0.874).

Both students and teachers were open to integrating AI technologies into their future teaching and learning practices (students: mean = 3.93, SD = 1.09; teachers: mean = 3.92, SD = 1.31). However, there were concerns among both groups about other students using AI technologies to get ahead in their assignments (students: mean = 3.67, SD = 1.22; teachers: mean = 3.93, SD = 1.12). Interestingly, both students and teachers did not strongly agree that AI technologies would replace teachers in the future (students: mean = 2.14, SD = 1.12; teachers: mean = 2.26, SD = 1.34).

**Table 2: Descriptive Analysis for Quantitative Results**

Item	Students	Teachers
I have used generative AI technologies like ChatGPT	N=457, Mean=2.28, Median=2, SD=1.18	N=180, Mean=2.02, Median=2, SD=1.1
The integration of generative AI technologies like ChatGPT in higher education will have a positive impact on teaching and learning in the long run	N=457, Mean=4, Median=4, SD=0.891	N=180, Mean=3.87, Median=4, SD=1.32
Higher education institutions should have a plan in place for managing the potential risks associated with using generative AI technologies like ChatGPT in teaching and learning	N=457, Mean=4.5, Median=5, SD=0.854	N=180, Mean=4.54, Median=5, SD=0.874
I envision integrating generative AI technologies like ChatGPT into my teaching and learning practices in the future	N=455, Mean=3.93, Median=4, SD=1.09	N=180, Mean=3.92, Median=4, SD=1.31
I am concerned that other students may use generative AI technologies like ChatGPT to get ahead in their assignments	N=456, Mean=3.67, Median=4, SD=1.22	N=180, Mean=3.93, Median=4, SD=1.12
AI technologies like ChatGPT will replace teachers in the future	N=457, Mean=2.14, Median=2, SD=1.12	N=180, Mean=2.26, Median=2, SD=1.34
Students must learn how to use generative AI technologies well for their career	N=457, Mean=4.07, Median=4, SD=0.998	N=180, Mean=4.1, Median=4, SD=1.08
Teachers can already accurately identify a student's usage of generative AI technologies to partially complete an assignment	N=457, Mean=3.02, Median=3, SD=1.56	N=180, Mean=2.72, Median=2, SD=1.62
Generative AI technologies such as ChatGPT can provide guidance for coursework as effectively as human teachers	N=455, Mean=3.19, Median=3, SD=1.25	N=180, Mean=2.93, Median=3, SD=1.4
Using generative AI technologies such as ChatGPT to complete assignments undermines the value of a university education	N=455, Mean=3.29, Median=3, SD=1.25	N=180, Mean=3.56, Median=4, SD=1.31
I can ask questions to generative AI technologies such as ChatGPT that I would otherwise not voice out to my teacher	N=454, Mean=3.51, Median=4, SD=1.2	N=180, Mean=3.97, Median=4, SD=1.06
Generative AI technologies such as ChatGPT will not judge me, so I feel comfortable with it	N=452, Mean=3.66, Median=4, SD=1.15	N=180, Mean=4, Median=4, SD=1.17
Generative AI technologies such as ChatGPT will limit my opportunities to interact with others and socialize while completing coursework	N=454, Mean=3.24, Median=3, SD=1.32	N=180, Mean=3.69, Median=4, SD=1.3
Generative AI technologies such as ChatGPT will hinder my development of generic or transferable skills such as teamwork, problem-solving, and leadership skills	N=454, Mean=3.3, Median=3, SD=1.33	N=180, Mean=3.74, Median=4, SD=1.412
If a fully online programme with the assistance of a personalized AI tutor was available, I would be willing to pursue my degree through this option	N=454, Mean=2.92, Median=3, SD=1.46	N=180, Mean=3.21, Median=3, SD=1.52
I can become over-reliant on generative AI technologies	N=454, Mean=3.11, Median=3, SD=1.35	N=180, Mean=4.24, Median=4, SD=0.955
I believe generative AI technologies such as ChatGPT can improve my digital competence	N=454, Mean=3.8, Median=4, SD=1.06	N=180, Mean=3.83, Median=4, SD=1.12
I believe generative AI technologies such as ChatGPT can improve my overall academic performance	N=455, Mean=3.67, Median=4, SD=1.18	N=180, Mean=3.63, Median=4, SD=1.36
I believe generative AI technologies such as ChatGPT can help me save time	N=453, Mean=4.23, Median=4, SD=0.848	N=180, Mean=4.06, Median=4, SD=1.01
I think generative AI technologies such as ChatGPT can help me become a better writer	N=455, Mean=3.46, Median=4, SD=1.27	N=180, Mean=3.31, Median=3, SD=1.45
I believe AI technologies such as ChatGPT can provide me with unique insights and perspectives that I may not have thought of myself	N=455, Mean=3.84, Median=4, SD=1.13	N=180, Mean=3.77, Median=4, SD=1.26
I think AI technologies such as ChatGPT can provide me with personalized and immediate feedback and suggestions for my assignments	N=455, Mean=3.75, Median=4, SD=1.14	N=180, Mean=3.86, Median=4, SD=1.34
I think AI technologies such as ChatGPT is a great tool as it is available 24/7	N=455, Mean=4.16, Median=4, SD=0.893	N=180, Mean=3.81, Median=4, SD=1.17
I think AI technologies such as ChatGPT is a great tool for student support services due to anonymity	N=455, Mean=3.91, Median=4, SD=1.12	N=180, Mean=3.77, Median=4, SD=1.29

The respondents acknowledged the importance of learning to use generative AI technologies well for their careers (students: mean = 4.07, SD = 0.998; teachers: mean = 4.1, SD = 1.08). However, both groups expressed skepticism about the ability of teachers to accurately identify AI usage in assignments (students: mean = 3.02, SD = 1.56; teachers: mean = 2.72, SD = 1.62). Concerns were also raised about generative AI technologies potentially being used for plagiarism (students: mean = 3.29, SD = 1.25; teachers: mean = 3.56, SD = 1.31).

## **II. Qualitative Data and Thematic Analysis**

The qualitative data collected from students, teachers, and staff through open-ended responses were analyzed to identify common themes and provide insights into the perception and recommendations regarding AI policies. The analysis yielded ten main themes and 25 subthemes relevant to AI policy planning for teaching and learning in universities. The themes identified are as follows:

1. **Understanding, Identifying, and Preventing Academic Misconduct and Ethical Dilemmas:**
  - Key Insight: There is a need for clear guidelines and strategies to detect and prevent misuse of generative AI. Respondents emphasized the importance of creating university-wide policies to manage AI-related academic misconduct.
  - Example: A student suggested, “A clear set of rules about what happens if AI is used and resources on informing.”
2. **Professional Development and Training:**
  - Key Insight: Comprehensive training programs for both students and teachers are necessary to effectively use generative AI technologies.
  - Example: Respondents highlighted the need for training workshops and resources to integrate AI technologies into teaching practices.
3. **Ethical Use and Risk Management:**
  - Key Insight: Developing policies for the ethical use of AI technologies and managing associated risks is crucial.
  - Example: Teachers recommended establishing guidelines for the ethical use of AI and risk management.
4. **Incorporating AI without Replacing Human Interaction:**
  - Key Insight: AI should be used as a supplementary tool rather than a replacement for human interaction.
  - Example: Suggestions were made to incorporate AI technologies in ways that assist, rather than replace, human teachers and interactions.
5. **Enhancing Holistic Competencies:**
  - Key Insight: AI technologies should enhance specific skills while ensuring the development of transferable skills.
  - Example: There were calls for AI to support skill development without hindering generic skills such as teamwork and problem-solving.
6. **Fostering a Transparent AI Environment:**
  - Key Insight: Creating an environment where students and teachers can openly discuss the benefits and concerns of AI technologies is important.
  - Example: Respondents advocated for transparency and open discussions about AI in education.
7. **Data Privacy and Security:**
  - Key Insight: Ensuring the privacy and security of data while using AI technologies is critical.
  - Example: Concerns about data security and privacy were raised, highlighting the need for strict policies.
8. **Inclusivity and Accessibility:**
  - Key Insight: AI policies should ensure that technologies are accessible to all learners.
  - Example: Recommendations were made to address issues of bias and accessibility in AI tools.
9. **Continuous Evaluation and Feedback:**
  - Key Insight: Ongoing evaluation of AI’s effectiveness and gathering feedback is important for continuous improvement.
  - Example: There were suggestions for regular assessments and feedback mechanisms for AI integration.
10. **Encouraging Local AI Innovations:**
  - Key Insight: Supporting local innovations in AI to meet specific community needs is important.
  - Example: Calls for funding and support for local AI research and startups were made.

These insights, derived from both quantitative and qualitative data, provide a comprehensive understanding of the usage and perception of generative AI technologies in higher education. Addressing these findings through informed policies will be crucial for effectively and ethically integrating AI technologies in university teaching and learning.

**Table 3: Main Themes and Subthemes of Qualitative Data**

Main Themes	Subthemes
1. Understanding, identifying and preventing academic misconduct and ethical dilemmas	Develop guidelines and strategies for detecting and preventing the misuse of generative AI; Identify ethical dilemmas; Familiarize students with ethical issues
2. Addressing governance of AI: Data privacy, transparency, accountability and security	Be transparent about decisions concerning AI use; Ensure data privacy and security; Address ethical issues such as bias and stereotypes
3. Monitoring and evaluating AI implementation	Conduct longitudinal experiments to examine the effects of AI use; Collect feedback from teachers and students to make informed decisions
4. Ensuring equity in access to AI technologies	Provide resources and support to all students and staff; Ensure all students have access and training to AI tools
5. Attributing AI technologies	Promote academic integrity in AI use; Develop guidelines on how to attribute generative AI's contribution to student work
6. Providing training and support for teachers, staff and students in AI literacy	Enhance staff confidence and competence through adequate training; Teach students how to use and critique the use of AI technologies; Provide education on ethics; knowledge of the affordances, use, and limitations; and capability to evaluate AI outputs
7. Rethinking assessments and examinations	Design assessments that integrate AI technologies to enhance learning outcomes; Develop assessment strategies that focus on students' critical thinking and analysis
8. Encouraging a balanced approach to AI adoption	Recognize the potential benefits and limitations of generative AI technologies; Avoid over-reliance on AI technologies; Use AI technologies as complementary tools
9. Preparing students for the AI-driven workplace	Teach students how to use AI responsibly; Develop curricula that equip students with AI skills and knowledge; Familiarize students with AI tools they will encounter for university studies and future workplace
10. Developing student holistic competencies/generic skills	Enhance students' critical thinking to help them use AI technologies effectively; Provide opportunities for developing competencies that are impeded by AI use such as teamwork and leadership

## IV. Detailed Insights and Recommendations

### 4.1 Understanding, identifying, and preventing academic misconduct and ethical dilemmas

The development of guidelines and strategies for detecting and preventing the misuse of generative AI technologies is essential. Identifying ethical dilemmas and familiarizing students with ethical issues related to AI use is a key focus. Clear policies on academic misconduct must be established, detailing which uses of AI are permissible and which are not. Procedures for handling suspected cases of misuse and the consequences for violations should be explicitly outlined. Both teachers and students have suggested that assessments should minimize opportunities for AI misuse, such as through oral examinations or controlled settings with limited internet access. The definition of cheating in the context of AI remains a significant question that needs to be addressed. Establishing a robust framework to navigate the complexities of AI in education will help uphold academic integrity and ethical standards.

### 4.2 Addressing governance of AI: data privacy, transparency, accountability, and security

Universities must take responsibility for decisions regarding the use of generative AI, including transparency about data collection and usage. It is crucial to disclose information about the algorithms employed, their functions, and any potential biases or limitations to foster trust among students and staff. Privacy and security concerns are paramount, with a need to ensure that data used in AI technologies is de-identified and protected against unauthorized access. Transparency about AI's role in teaching and learning, including ethical concerns and potential biases, is essential. Institutions should address ethical issues such as potential discrimination and bias while ensuring that data privacy and security are maintained. Accountability for AI decisions and actions remains a complex issue that requires careful consideration.

### 4.3 Monitoring and evaluating AI implementation

To ensure the successful integration of AI in university teaching and learning, continuous monitoring and evaluation are necessary. Conducting longitudinal experiments to understand how AI affects student learning and performance is recommended. Regular assessments of AI's impact on teaching practices and student outcomes will help identify areas for improvement and ensure effective and ethical use of the technology. Collecting feedback from both teachers and students is crucial for making informed decisions about AI implementation. Evaluating the effectiveness of AI tools in enhancing learning outcomes is vital for determining their value and making necessary adjustments.

### 4.4 Ensuring equity in access to AI technologies

Equitable access to AI technologies is crucial for fostering an inclusive learning environment. Universities should ensure that all students and staff have access to AI tools and resources, regardless of their background or socio-economic status. This may involve procuring AI tools, including AI detectors, for the entire university community. Ensuring fairness in the availability of AI technologies is essential for maintaining

a level playing field and promoting inclusivity. Access and training in AI tools should be provided to all students to avoid discrimination and reinforce fairness in educational opportunities.

## **V. Attributing AI technologies**

Attribution is a key aspect of AI policy in education. Universities should require students to clearly state the contributions of AI in their academic work, similar to current practices of referencing and citation. Developing guidelines on how to fairly attribute generative AI's contribution to student work will promote academic integrity. It is important to address the ethics of AI use, including how to effectively use and evaluate AI outputs and integrate AI into workflows. Clear guidelines on attribution will help ensure that AI technologies are used ethically and transparently in the academic setting.

### **5.1 Providing training and support for teachers, staff, and students in AI literacy**

This training should include information on selecting appropriate technologies, using them effectively, and managing the risks associated with their use. Teaching students how to use the technology and how to critique it is central to successfully planning for the integration of AI in education. Students suggest that teaching students the potential of using generative AI properly and critically can benefit from students using AI hiddenly and relying on tools capable of detecting the use of a generative language model while being aware of the limits of such tools. AI literacy is crucial for both students and staff as they navigate the use of generative AI in teaching and learning. Teachers emphasize the need for education on ethics, knowledge of AI tool affordances, effective use (e.g., prompt engineering), critique and evaluation of outputs, and the role of AI in study and professional settings. A comprehensive AI literacy program will help students and staff better understand and responsibly utilize AI technologies in their academic and professional lives. By providing training and resources on AI technologies, universities can empower students and staff to make informed decisions about their use and potential applications in teaching and learning.

### **5.2 Rethinking assessments and examinations**

The integration of generative AI in education calls for a re-evaluation of assessments and examinations. Teachers suggest designing assessments that allow AI technologies to enhance learning outcomes rather than solely producing outputs. For example, one teacher recommends promoting assessments and activities where students can discover the limits of such techniques themselves and relativize the idea that they could be useful to 'cheat'. This shift may necessitate the development of new assessment methods that balance the benefits of AI with the need to maintain academic integrity. A student stated that a change in assessment methods is needed to measure the true understanding of students instead of their ability to collect information, which can easily be done with AI tools. Universities may need to develop new assessment strategies that focus on students' understanding, critical thinking, and analysis to prevent AI-generated content from compromising the assessment process. As one teacher noted, "... it is hard to assess most of them, so we fall back on regurgitation," highlighting the need for change.

### **5.3 Encouraging a balanced approach to AI adoption**

A balanced approach to AI adoption in university teaching and learning involves recognizing both the potential benefits and limitations of generative AI technologies. One teacher suggests being positive about this technological evolution and incorporating it to develop new assignments and assessments. This approach requires flexibility, striking a balance between embracing new technology for its potential to enhance efficiency and productivity while maintaining a focus on critical thinking and ethical considerations. It is also important to encourage a balanced approach to AI adoption to avoid overreliance on these technologies. "We should learn how AI can assist us, but not replace schoolwork," one teacher advised. This approach involves using AI technologies as complementary tools.

### **5.4 Preparing students for the AI-driven workplace**

Preparing students for an AI-driven workplace involves equipping them with the skills and knowledge necessary to use AI technologies responsibly. Curricula should be developed to include AI skills and knowledge that will be relevant in both academic and professional settings. Teaching students how to use AI tools effectively and ethically, and familiarizing them with the AI technologies they will encounter in their future careers, is essential. By integrating AI education into the curriculum, universities can ensure that students are well-prepared for the evolving job market and can navigate the challenges and opportunities presented by AI technologies in their professional lives.



### **5.5 Developing student holistic competencies/generic skills**

The integration of AI technologies in education should be balanced with the development of students' holistic competencies and generic skills. Enhancing students' critical thinking is crucial for effective use of AI technologies, ensuring that they can analyze and evaluate AI outputs critically. Providing opportunities for students to develop competencies such as teamwork and leadership, which may be impeded by over-reliance on AI, is also important. By focusing on the development of these skills alongside the use of AI, universities can help students build a well-rounded skill set that supports both their academic and professional growth.

## **VI. Discussion**

Triangulating the quantitative and qualitative data reveals that the concerns and recommendations identified in the qualitative findings are strongly supported by the quantitative results. The quantitative data highlights a shared apprehension among both students and teachers regarding the potential misuse of AI technologies, such as ChatGPT, for assignments, with students reporting a mean score of 3.67 and teachers a mean of 3.93. This concern underscores the need for clear guidelines and strategies to prevent academic misconduct. Additionally, there is significant agreement on the necessity for higher education institutions to develop robust plans for managing risks associated with generative AI technologies, reflected in mean scores of 4.5 for students and 4.54 for teachers. This consensus emphasizes the importance of addressing data privacy, transparency, accountability, and security in AI integration.

The positive overall perception of AI technologies within education suggests that with appropriate policies, responsible AI incorporation can be achieved. The concern about potential misuse of AI for academic advantage (students: mean 3.67, teachers: mean 3.93) further highlights the importance of ensuring equitable access to AI technologies. There is also strong agreement on the need for AI literacy and training, with students (mean 4.07) and teachers (mean 4.1) acknowledging the importance of preparing students for an AI-driven workplace.

However, there is uncertainty among both students and teachers regarding the ability to accurately identify AI-assisted work, with students scoring a mean of 3.02 and teachers a mean of 2.72. This indicates a potential need to rethink assessment methods. Data also shows a consensus that AI technologies will not replace teachers (students: mean 2.14, teachers: mean 2.26), suggesting that AI should be viewed as a complementary tool rather than a replacement for traditional teaching methods. Finally, concerns about AI hindering the development of generic skills such as teamwork and leadership (students: mean 3.3, teachers: mean 3.74) underscore the importance of focusing on students' holistic competencies in preparation for the AI-driven workplace. The study initially aimed to develop an AI education policy framework based on UNESCO's recommendations, incorporating inputs from various stakeholders to identify and address any gaps in the framework.

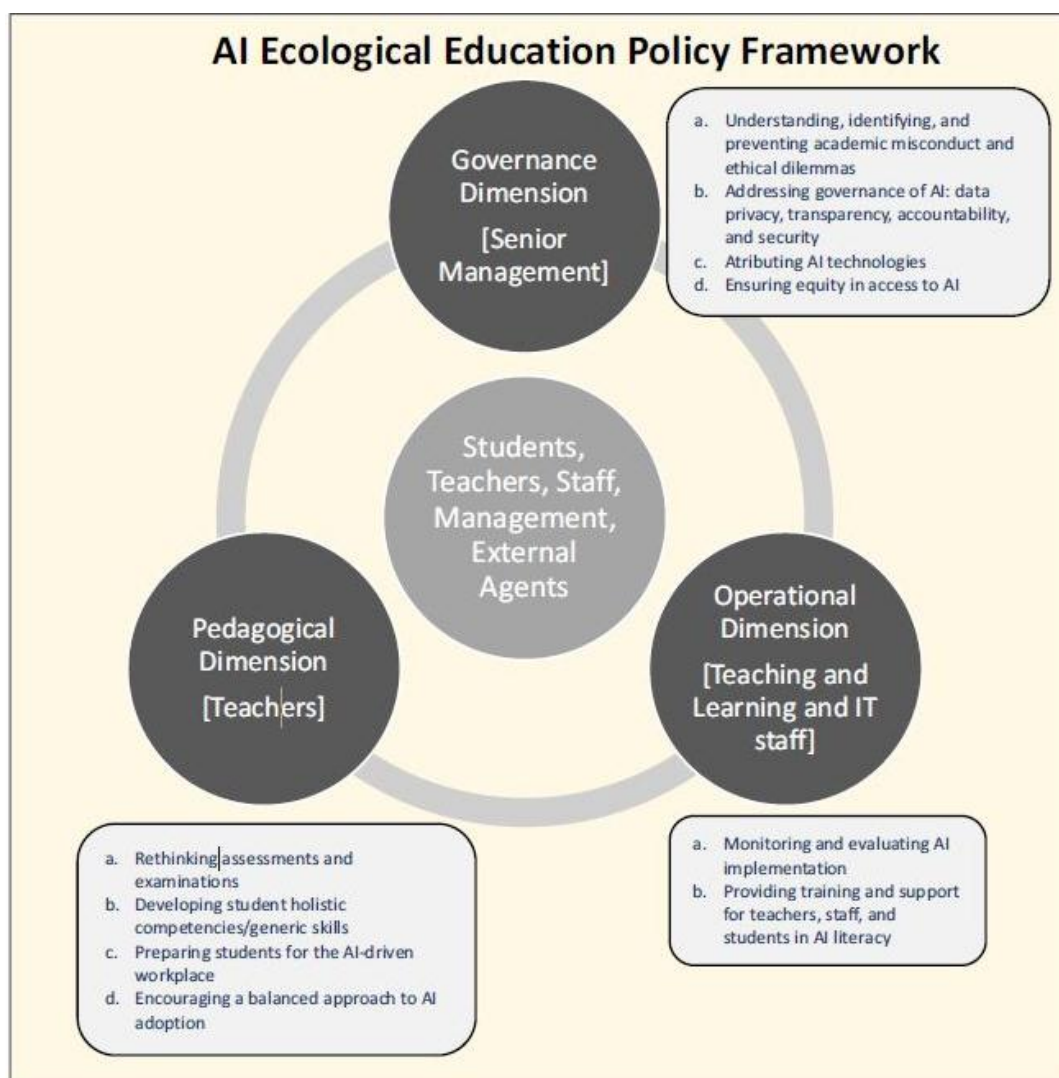


Figure 1: AI Ecological Education Policy Framework

### 6.1 AI Ecological Education Policy Framework

To effectively translate policy recommendations into actionable plans, the ten key areas have been organized into three dimensions within the AI Ecological Education Policy Framework: Pedagogical, Ethical, and Operational. Each dimension is led by a responsible party, as illustrated in Figure 1. This framework provides a comprehensive approach to understanding the diverse implications of AI integration in university settings, ensuring that all stakeholders consider the broader context of AI adoption and its impact on teaching and learning.

### 6.2 Pedagogical Dimension (Teachers)

The Pedagogical dimension concentrates on the teaching and learning aspects of AI integration. It encompasses the following key areas:

- Rethinking Assessments and Examinations:** This area addresses the need to redesign assessments to better incorporate AI technologies, aiming to enhance learning outcomes while upholding academic integrity. It involves developing new assessment methods that focus on students' understanding, critical thinking, and analysis, rather than merely their ability to gather information using AI tools.
- Developing Student Holistic Competencies/Generic Skills:** This area emphasizes the importance of fostering generic skills such as teamwork, problem-solving, and leadership in students. It recognizes that while AI technologies can support learning, they should not undermine the development of these essential competencies necessary for success in the AI-driven workplace.
- Preparing Students for the AI-Driven Workplace:** This involves equipping students with the skills and knowledge needed to thrive in a professional environment increasingly influenced by AI technologies. It

highlights the necessity of integrating AI literacy into the curriculum to ensure that students are well-prepared for future careers.

4. **Encouraging a Balanced Approach to AI Adoption:** This area focuses on promoting a balanced perspective on AI integration. It encourages the use of AI as a complementary tool to traditional teaching methods, rather than as a replacement. This approach aims to leverage AI's potential to enhance educational efficiency while maintaining critical thinking and ethical considerations.

By organizing these areas within the Pedagogical dimension, the framework aims to provide a structured approach to addressing the teaching and learning challenges associated with AI integration, ensuring that educational practices evolve in alignment with technological advancements.

### **6.3 AI Ecological Education Policy Framework**

To effectively translate policy recommendations into actionable plans, the ten key areas have been organized into three dimensions within the AI Ecological Education Policy Framework: Pedagogical, Governance, and Operational. Each dimension is overseen by a responsible party, ensuring a comprehensive approach to the integration of AI in university settings and accounting for its multifaceted implications.

#### **6.4 Pedagogical Dimension (Teachers)**

The Pedagogical dimension focuses on the teaching and learning aspects of AI integration. It includes several critical areas: rethinking assessments and examinations, developing students' holistic competencies and generic skills, preparing students for an AI-driven workplace, and encouraging a balanced approach to AI adoption. This dimension emphasizes the need to adapt teaching methods and assessment strategies to leverage AI's growing capabilities, preparing students for an increasingly AI-driven professional landscape. Teachers are central to this dimension, responsible for designing and implementing lesson plans and assessments that effectively incorporate AI technologies. They must also educate students about the potential risks associated with AI, such as plagiarism and contract cheating, and foster ethical use through proper attribution. By assigning this responsibility to teachers, the framework ensures that AI tools are used pedagogically sound and enhance learning outcomes.

#### **6.5 Governance Dimension (Senior Management)**

The Governance dimension highlights the governance considerations surrounding AI usage in education. It encompasses understanding, identifying, and preventing academic misconduct and ethical dilemmas, addressing the governance of AI through data privacy, transparency, accountability, and security, attributing AI technologies, and ensuring equity in access to AI technologies. Senior management is tasked with developing and enforcing policies, guidelines, and procedures that address these ethical concerns. Their role is crucial in ensuring responsible and ethical AI use, fostering a fair, equitable, and inclusive learning environment. By overseeing this dimension, senior management helps maintain trust within the university community and ensures that AI technologies are used in a manner that upholds academic integrity and ethical standards.

#### **6.6 Operational Dimension (Teaching and Learning and IT Staff)**

The Operational dimension concentrates on the practical implementation of AI in university settings. It includes monitoring and evaluating AI implementation and providing training and support for teachers, staff, and students in AI literacy. Teaching and Learning and IT staff are responsible for managing and maintaining AI technologies, ensuring their effective integration into the educational environment, and addressing any technical issues. They play a critical role in providing training and support, ensuring equal access to AI technologies, and facilitating ongoing improvements. This dimension emphasizes the importance of continuous evaluation and adaptation of AI strategies to meet evolving needs and insights. The framework underscores that responsibility within each dimension should not be viewed in isolation. Collaboration and communication among all stakeholders—including universities, teachers, students, staff, and external agents such as accreditation bodies—are essential for the successful implementation of AI policies. Active participation from all groups is necessary to achieve the desired outcomes in university teaching and learning.

## **VII. Conclusions**

This study aimed to establish a comprehensive AI education policy for university teaching and learning, specifically addressing the challenges posed by text-generating AI technologies such as ChatGPT, which raised significant concerns related to academic integrity, including cheating and plagiarism. The research identified ten crucial areas for policy development, leading to the creation of the AI Ecological Education Policy Framework. This framework served as a structured guide for integrating AI technologies into educational settings, ensuring that their implementation aligned with academic standards and promoted ethical use. However,

the study's approach had several limitations. The small sample size may not have fully captured the diverse perspectives and experiences of all stakeholders involved in higher education. Additionally, the focus on text-based generative AI technologies did not encompass the broader spectrum of AI tools and their varied applications in educational contexts. Text-based AI, while significant, was just one facet of the rapidly evolving AI landscape. The study proposed an AI Ecological Education Policy Framework organized into three dimensions: Pedagogical, Governance, and Operational. The Pedagogical dimension concentrated on using AI to improve teaching and learning outcomes, while the Governance dimension tackled issues related to privacy, security, and accountability. The Operational dimension addressed matters concerning infrastructure and training. This framework fostered a nuanced understanding of the implications of AI integration in academic settings, ensuring that stakeholders were aware of their responsibilities and could take appropriate actions accordingly. Future research should expand beyond text-generating AI to include a wider range of AI technologies. This broader exploration would provide a more comprehensive understanding of the implications and challenges associated with different types of AI, such as image recognition, predictive analytics, and autonomous systems. By examining these technologies, researchers could develop more robust and inclusive policies that address the full spectrum of AI's impact on education. Furthermore, this study underscored the need for a balanced approach to AI integration in education. It was crucial not only to advocate for the adoption of AI but also to rigorously evaluate the technologies used, their implementation methods, and their actual capabilities. Effective AI education policies must consider the potential benefits and risks, ensuring that AI tools enhance the educational experience without compromising academic integrity. By addressing these factors, universities could create an environment where AI supported learning and innovation while maintaining high standards of academic honesty.

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