Research on Excellent Cases of "Artificial Intelligence + Higher Education" Application Scenarios in Chinese Universities

Wang Qiang[1,*]

[1]Institutional affiliation: Faculty of Education, Beijing Normal University, Beijing, P. R. China

*Correspondence: Institutional affiliation: Faculty of Education, Beijing Normal University, No.19, Xinjiekouwai St, Haidian District, Beijing, 100875, P. R. China. E-mail: drywq@hotmail.com

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Abstract

Currently, digital technology is becoming a leading force driving global education reform. The integration of artificial intelligence and education has brought opportunities for innovation and improvement in education. The level of AI ability of teachers and students determines the level of digitalization and intelligence in the development of higher education. This study applied the UNESCO “AI competency framework for teachers” and “AI competency framework for students” to analyze 18 excellent cases of "Artificial Intelligence + Higher Education" announced by The Ministry of Education of the People’s Republic of China. The case reflects the comprehensive integration of artificial intelligence technology into the development of higher education. This study analyzes the specific application scenarios of artificial intelligence in the process of higher education and examines the AI proficiency levels of university teachers and students. This study points out the direction for the development of teachers and students' abilities, and provides suggestions for the development framework of AI abilities for future university students.

Keywords: AI competency for teachers, AI competency for students, higher education, application scenarios, sustainable development

1. Background

Currently, digital technology is becoming a leading force driving global education reform. The United Nations Educational Reform Summit has listed digital education reform as one of the five key actions, indicating that digital education reform has become a global consensus and trend of the times. UNESCO has been committed to enhancing the positive impact of digital technology on morality, society, economy, and utilizing its potential in education. The Chinese government attaches great importance to the key role of digitalization in promoting educational reform. The main contents of the national education digitalization strategy actions implemented include: building a national education digitalization public service system, promoting the implementation of AI enabled education actions, and strengthening international exchanges and cooperation (Feng et al., 2024).

“Artificial Intelligence + Higher Education” is a comprehensive concept. It refers to a new educational model that deeply integrates artificial intelligence technology into the field of higher education, optimizes the educational environment through intelligent means, and promotes fundamental changes in traditional educational models, teaching methods, and learning experiences. Narrowly speaking, “Artificial Intelligence + Higher Education” means using artificial intelligence technology to assist in various aspects such as teaching, management, evaluation, and feedback, in order to achieve more efficient and personalized educational services. In a broader sense, “Artificial Intelligence + Higher Education” is not limited to technological applications, but represents a revolution in educational philosophy and models. The scenario of “Artificial Intelligence + Higher Education” is the main carrier for various activities in universities, and it is an important basis for understanding the internal behavior patterns and overall development of education in universities (Si, 2024).

The deep integration of artificial intelligence and higher education is driving a comprehensive reform of educational models and teaching methods. Applications such as intelligent teaching systems, educational data analysis, personalized learning, and virtual experiments can not only improve the effectiveness and flexibility of teaching, but

also provide students with more opportunities for self-directed learning and exploration (Zhou & Zhao, 2024). As disseminators of knowledge, leaders of innovation, and guides for student growth, the role and responsibilities of university teachers are particularly crucial and complex in the context of the AI era. Artificial intelligence has brought pressure and challenges to Chinese university teachers, forcing them to continuously improve their information literacy, technological integration ability, and educational innovation ability to cope with the profound changes in education models (Wang & Lei, 2024). At the same time, some students blindly reject

artificial intelligence tools due to their "fear of technology", or fall into the trap of blindly worshiping artificial intelligence due to "following the trend of technology". Generative artificial intelligence may exacerbate the integrity crisis of cheating and academic misconduct (Wang et al., 2024). Improving students' artificial intelligence literacy to enhance their adaptability and creativity in intelligent environments has become a new task in education.

In 2024, UNESCO issued the world's first "AI competency framework for teachers" and "AI competency framework for students". Two frameworks aim to guide teachers and students in various countries to understand the potential and risks of artificial intelligence, in order to apply it in a safe, ethical, and responsible manner in education and other fields. The AI competency determines the effectiveness and quality of "artificial intelligence + higher education". It is necessary to conduct in-depth analysis of the AI literacy of teachers and students (Liu et al., 2024).

2. Aim & Objectives

This study aims to analyze excellent cases of Chinese universities using artificial intelligence to empower education, understand the current development status of Chinese universities in using artificial intelligence to empower higher education, and provide meaningful references for the digital development of higher education in the world.

Objective 1 Analyze the current level of artificial intelligence capabilities among Chinese university teachers and students, and identify areas where their abilities fall short.

Objective 2: Based on the analysis results, provide relevant suggestions for improving the artificial intelligence capabilities of Chinese university teachers and students.

Objective 3: To propose relevant suggestions for AI competency framework based on the development of artificial intelligence capabilities among university teachers and students.

3. Literature review

3.1 The Problems Faced by University Teachers of China in the Era of Artificial Intelligence

The rapid iteration and update speed of technology far exceeds the expectations of many teachers. Teachers need to invest a lot of time and energy in learning and practicing new technologies, which often conflicts with their daily teaching tasks, research activities, and family life. It is difficult for them to find a balance between these multiple roles. The complexity of technology has intensified the teaching difficulty for teachers. Many teachers lack a background in computer science or information technology, which exacerbates their anxiety. More and more intelligent teaching resources and systems are being introduced into the classroom, which puts higher requirements on teachers' information literacy and data processing abilities (Gao, 2024).

In traditional teaching models, teachers are the center and symbol of authority in the classroom. With the widespread application of intelligent teaching resources and systems, students can obtain knowledge and information through various channels, and even be more proficient than teachers in certain aspects, gradually challenging the central position of teachers. Teachers may not be clear on how to better guide their teaching, how to stimulate students' learning interest and creativity, and this uncertainty may lead to a lack of confidence and motivation in their teaching, which in turn affects teaching effectiveness (Wu & Tan, 2023). This change may make teachers feel that their value and status are threatened, leading to confusion and anxiety about their identity. In addition, teachers need to pay attention to their career development path and promotion opportunities under the new evaluation system. In the era of artificial intelligence, teachers who can actively adapt to technological changes and innovate teaching methods are more likely to have opportunities and platforms for career development, but there is also anxiety about the uncertainty of future development. The direction and path of teacher career development under the new development background are not yet very clear (Wu et al., 2021).

3.2 The Problems Faced by University Students of China in the Era of Artificial Intelligence

In the era of artificial intelligence, information acquisition is more convenient, resources are more abundant, and

learning is more flexible. Intelligent push, intelligent assessment, intelligent learning companions, intelligent tutoring, etc. will gradually become a norm. Self selection of learning content, self paced learning, human-machine dialogue learning, etc. will become very common (Wu et al., 2023). The new teaching ecology in the context of generative artificial intelligence requires higher learning literacy from students, urgently requiring them to have better self-regulation and management abilities, which will also lead to changes in students' learning motivation. Positive motivation can promote students' self-directed and personalized learning, but negative motivation may bring trust risks such as cheating (Qi & Wang, 2024).

Students often lack effective learning strategies and methods when faced with a large amount of learning tasks and information, resulting in poor learning outcomes. For students, adapting to new teaching and learning methods is a challenge. Some students may be accustomed to traditional classroom teaching methods and need a certain period of adaptation to online and personalized learning. Meanwhile, mastering new information technologies is also a challenge. Therefore, how to help students better adapt to new teaching and learning methods is a problem that needs attention (Feng, 2024).

According to an online questionnaire survey of college students in the Education College of a Chinese university for ethnic minorities, it was found that about 50% of students need to further improve their information awareness, knowledge, moral literacy, and information abilities (Liu, 2024). Zhou, Xu, and Cai (2024) conducted an AI literacy questionnaire survey on 575 students from Chinese universities in the fields of engineering, comprehensive, language, and teacher education. The students scored slightly lower in AI attitudes and values than in knowledge and skills, indicating a moderate to high level of AI literacy among college students.

3.3 UNESCO "AI competency framework for teachers"

In the field of education, artificial intelligence has transformed the traditional teacher-student relationship into a dynamic relationship between teachers, artificial intelligence, and students. This transformation requires teachers to adapt to their new roles in the era of artificial intelligence and cultivate relevant abilities. However, many educators lack appropriate guidance. Therefore, UNESCO has proposed the "AI Competence Framework for Teachers" which defines the knowledge, skills, and values that teachers must master in the era of artificial intelligence. Teachers need to have critical thinking about artificial intelligence and understand its potential impact on human society and the environment. Teachers should maintain a human centered value system in the design and use of artificial intelligence, and have the ability to evaluate the appropriateness of AI tools. Teachers should always maintain human dominance in the process of AI assisted decision-making (Jiao, 2024).

"AI Competence Framework for Teachers" has significant implications for the development of education in China. It defines artificial intelligence security risks through classification and explicitly states that schools and classrooms should not become experimental fields for AI tools with unknown risks. It emphasizes the ethical compliance and educational applicability verification of educational artificial intelligence tools, balances the strategic positioning of artificial intelligence in educational goals, and guides decision-making at all levels regarding when it should not be used. It suggests moderate adjustments to the curriculum and evaluation objectives, as well as the structure of class hours, to eliminate concerns about increased teaching burden (Miao, 2024).

3.4 UNESCO "AI competency framework for students"

Artificial intelligence is increasingly becoming an indispensable part of people's lives, so incorporating AI learning goals into official school curricula is crucial for students worldwide to use AI correctly. The "AI competency framework for students" aims to define the core concepts of student artificial intelligence capability structure and its interrelationships, advocating for the cultivation of students as responsible applicants, collaborative designers, and creative social citizens of artificial intelligence. "AI competency framework for students" proposes to cultivate students' critical thinking methods towards artificial intelligence. Students should recognize and understand the advantages and limitations of artificial intelligence, and use AI tools responsibly. Students should dispel the misconception that artificial intelligence can solve all problems. They should become conscious artificial intelligence decision-makers. Countries around the world are entering the era of artificial intelligence at different speeds, and students from various countries are or will be citizens in the context of artificial intelligence. They should not only comply with relevant laws, regulations, and ethical standards, but also contribute to the development of artificial intelligence standards and regulations. One of the main threats of artificial intelligence applications is that it may weaken human agency and hinder the development of human intellectual skills (UNESCO, 2024).

"AI competency framework for students" aims to help students understand the types of data that artificial intelligence may collect from them and the impact it may have on their privacy and lives, encouraging students to

enhance their autonomy through complex artificial intelligence systems. It explores solutions to mitigate the environmental impact of artificial intelligence use and training by guiding students in designing and implementing project-based learning. The Framework emphasizes that all students should have a fair opportunity to learn about artificial intelligence. Students should learn how to integrate inclusive principles into the design of artificial intelligence and strive to establish an inclusive AI society. “AI competency framework for students” suggests that teaching related to artificial intelligence should cultivate students' core AI abilities, enabling them to master AI knowledge and use new AI technologies to solve problems in new environments. Encourage students to unleash their creativity, optimize existing artificial intelligence models, or co create more meaningful artificial intelligence (Lan et al., 2024).

4. Methodology

UNESCO “AI competency framework for teachers” has elaborated on the artificial intelligence capabilities that teachers need to possess from five aspects, namely "Human-centred mindset", "Ethics of AI", "AI foundations and applications", "AI pedagogy", and "AI for professional development". For these five skill aspects, they are divided into three levels: Acquire, Deepen, and Create. The framework is shown as follows:

Table 1. UNESCO “AI Competency Framework for Teachers”

Aspects	Progression		
	Acquire	Deepen	Create
1. Human-centred mindset	Human agency	Human accountability	Social responsibility
2. Ethics of AI	Ethical principles	Safe and responsible use	Co-creating ethical rules
3. AI foundations and applications	Basic AI techniques and applications	Application skills	Creating with AI
4. AI pedagogy	AI-assisted teaching	AI–pedagogy integration	AI-enhanced pedagogical transformation
5. AI for professional development	AI enabling lifelong professional learning	AI to enhance organizational learning	AI to support professional transformation

UNESCO “AI competency framework for students” elaborates on the artificial intelligence abilities that students need to possess from four aspects, namely "Human-centred mindset", " Ethics of AI", "AI techniques and applications”, and “AI system design". The four aspects of abilities are divided into three levels: Understand, Apply, and Create. The detailed information of framework is as below:

Table 2. UNESCO “AI competency framework for students”

Competency aspects	Progression levels		
	Understand	Apply	Create
1. Human-centred mindset	Human agency	Human accountability	Citizenship in the era of AI
2. Ethics of AI	Embodied ethics	Safe and responsible use	Ethics by design
3. AI techniques and applications	AI foundations	Application skills	Creating AI tools
4. AI system design	Problem scoping	Architecture design	Iteration and feedback loops

This study applied “AI competency framework for teachers” and “AI competency framework for students” to analyze the specific application areas of 18 excellent cases of "Artificial Intelligence + Higher Education" application scenarios announced by The Ministry of Education of the People's Republic of China in 2024. The case information from 18 Chinese universities is as follows:

Table 3. The List of 18 Excellent Cases of "Artificial Intelligence + Higher Education" in China

NO.	Name of University	Case	Application scenarios
1	Peking University	Oral Virtual Simulation Intelligent Laboratory	Laboratory teaching
2	Tsinghua University	Artificial intelligence empowers teaching pilot	Whole process teaching
3	Beihang University	A fully interactive online teaching platform empowered by artificial intelligence throughout the entire process	Whole subject and whole process teaching
4	Beijing Institute of Technology	Construction and Application of Knowledge Graph Driven Smart Teaching System	Whole subject and whole process teaching
5	Beijing University of Posts and Telecommunications	MashOn intelligent programming teaching application platform	Professional Teaching
6	Beijing Normal University	Innovative 'AI' Classroom Teaching Intelligent Evaluation System	Supervision of Teaching Quality
7	Communication University of China	AIGC empowers the inheritance and innovation of traditional culture	Professional Teaching
8	Harbin Institute of Technology	Project for Electrical and Electronic Experiment Teaching	Professional Teaching
9	East China Normal University	Metasequoia Online Learning Platform	Whole subject and whole process teaching
10	Southeast University	Intelligent AI teaching assistant system for college physics courses	Professional Teaching
11	Zhejiang University	Wiscean Artificial Intelligence Education Platform	Professional Teaching
12	Huazhong University of Science and Technology	Intelligent academic warning and collaborative assistance mechanism	Academic Failure Warning
13	Huazhong Agricultural University	Smart Laboratory Experimental Teaching Management System	Laboratory teaching
14	Central China Normal University	Xiaoya Intelligent teaching platform	Whole subject and whole process teaching
15	Xi'an Jiaotong University	New mechanism for teaching management of the "Four Refined Model" through evaluation, supervision, and assistance	Supervision of Teaching Quality
16	Xidian University	AI Empowered Supervision New Model	Supervision of Teaching Quality
17	Northwest A&F University	Practice of intelligent crop production	Practice Management
18	The Open University of China	Innovative Practice of Personalized English Teaching with Large Models Based on AI Technology	Professional Teaching

5. Findings

5.1 Distribution of Main Application Areas and Types of Artificial Intelligence in Excellent Cases

The main areas in which universities apply artificial intelligence to empower higher education include: the construction and application of smart laboratories and smart classrooms, online mobile teaching platforms, intelligent evaluation of classroom teaching, remote teaching experimental platforms, interactive online training platforms, artificial intelligence teaching assistant systems, digital teaching resources, academic intelligence warning models,

intelligent knowledge graph construction, multi-dimensional portraits (class portraits, group portraits, student portraits), intelligent analysis of discussion activities, intelligent homework correction and evaluation, teacher classroom video cloud translation, intelligent analysis of teacher-student classroom behavior, construction of smart facility agriculture experimental platforms, construction of smart agricultural experimental farms, English oral intelligent training systems, virtual teacher course resources. The types of excellent cases mainly focus on optimizing school administrative management processes, AI assisted curriculum innovation, AI empowered learning environments, AI enhanced learning assessments, building rich and open digital educational resources and practices, conducting in-depth research on AI empowered higher education, and building a platform for government school enterprise cooperation to promote the development of "AI + higher education".

5.2 Application Scenarios of Artificial Intelligence in Higher Education

5.2.1 In terms of “smart management”

Many schools have implemented real-time intelligent monitoring and feedback on classroom arrangements, attendance, and class situations, reducing the workload for teachers. Some schools have established smart service platforms, which have improved administrative efficiency and teacher-student satisfaction. In terms of environmental control, smart classrooms are relatively common in higher education institutions, but only a few schools have conducted comprehensive real-time monitoring, information feedback, and scientific regulation and management of the overall campus environment such as classrooms, laboratories, training rooms, and libraries.

5.2.2 In terms of “smart teaching”

Most higher education institutions actively apply artificial intelligence to build teaching platforms, emphasizing the use of artificial intelligence to optimize teaching, integrating and optimizing high-quality teaching resources, and exploring innovation in teaching modes and methods. Some schools use intelligent teaching assistants to assist in the entire teaching process, including pre class lesson plan generation, problem and teaching resource push, in class teaching effectiveness testing, interactive communication and classroom activities, post class homework assignment, feedback information collection and learning resource push, achieving tailored teaching.

5.2.3 In terms of “smart learning”

Higher education institutions focus on applying artificial intelligence to improve students' learning quality and efficiency, and some institutions have formed a smart learning loop before, during, and after class. Before class, preview and think ahead through learning resources and classroom questions pushed by artificial intelligence. In class, artificial intelligence is applied to assist in the learning of subject knowledge, enabling students to promptly identify problems in their own learning process and obtain corresponding answers. At the same time, students can achieve timely communication with teachers and real-time collaboration among group team members through artificial intelligence, enhancing their cognitive level and learning interest. After class, students consolidate and improve their learning knowledge based on personalized learning resources provided by artificial intelligence, further enhancing their learning effectiveness.

5.2.4 In terms of “smart testing and evaluation”

Some higher education institutions focus on applying artificial intelligence to evaluate the process of students' learning outcomes, involving intelligent testing push, submission, grading, and analysis, and recommend relevant learning resources and key knowledge points to provide students with accurate guidance. However, many higher education institutions have not paid high attention to the satisfaction assessment of students using artificial intelligence for learning, and their understanding of students' information literacy level is not deep enough. At the same time, there is insufficient information collection in higher education institutions regarding the specific difficulties and demands faced by teachers, and a lack of training and other forms to enhance teachers' information literacy, which affects the effectiveness of AI enabled teaching.

5.3 Analysis Based on the UNESCO AI Competency Framework for Teachers

5.3.1 The abilities of teachers in terms of "AI foundations and applications" and "AI pedagogy" are in a "semi deepen" stage

At present, the higher education institutions in the case mainly focus on developing teachers' abilities in two aspects: "AI foundations and applications" and "AI pedagogy". Among them, both levels are in an incomplete stage of "deepen". Specifically, regarding the "AI foundations and applications", teachers can proficiently operate the artificial intelligence tools used in educational environments, but have not achieved a deep understanding of various artificial intelligence technology related data and algorithm knowledge from the perspectives of ethics and teaching

responsibility. At the same time, in terms of the "AI pedagogy", most teachers in the case have incorporated artificial intelligence into student-centered teaching practice design, promoting active student participation in the classroom, strengthening teacher-student communication and interaction, and supporting differentiated learning. However, most teachers have not paid attention to the cultivation and improvement of students' empathy, critical thinking, and problem-solving abilities.

5.3.2 The abilities of teachers in terms of "Human-centred mindset" and "Ethics of AI" have not been given enough attention

The two aspects of “Human-centred mindset" and " Ethics of AI" covered by the teacher competency framework were not specifically discussed in the case study. The concept of "Human-centred mindset " emphasizes the need for teachers to establish correct values and attitudes towards the interaction between humans and artificial intelligence. The "Ethics of AI" proposes that teachers need to understand, apply, and assist in adjusting basic ethical principles, regulations, institutional laws, and relevant ethical norms. Different levels of capability represent different coverage areas of artificial intelligence capabilities, but these capabilities are interrelated, complementary, and interdependent. Strengthening the improvement of various levels of teachers' abilities can help promote the comprehensive progress of teachers' artificial intelligence capabilities.

5.3.3 The abilities of teachers in terms of “AI for professional development” is in the stage of development from "acquire" to "deepen"

Regarding the topic of “AI for professional development”, most cases involve teachers using artificial intelligence to empower education and teaching, but very few cases mention schools providing corresponding digital literacy training for teachers. The ability level of most teachers is in a transitional stage from " acquire" to "deepen". The ability of teachers to apply artificial intelligence to promote lifelong professional learning, enhance human-machine collaboration, and customize and modify artificial intelligence tools to improve the effectiveness of teaching strategies still needs to be improved.

5.4 Analysis Based on the UNESCO AI Competency Framework for Students

5.4.1 There is a lack of ability among students regarding the “Human-centred mindset” and "Ethics of AI"

At present, the higher education institutions in the case have not mentioned the cultivation and guidance of students' artificial intelligence concepts and ethics. According to the requirements of the "Human-centred mindset", students need to have the ability to evaluate whether artificial intelligence meets expected goals, whether its use is legitimate, how humans should interact with it, and clarify the specific responsibilities of individuals and institutions, in order to contribute to building a safe, inclusive, and just artificial intelligence society. In terms of " Ethics of AI", students need to have the ability to make correct ethical value judgments, reflect, and possess social and emotional skills to guide their understanding and adaptation to principles and regulatory rules related to artificial intelligence. These two skill levels have laid a solid foundation for students to further participate in artificial intelligence in all aspects.

5.4.2 The ability requirements for "AI techniques and applications" and "AI system design" have a low degree of matching with the comprehensive development of higher education students

Regarding the " AI techniques and applications" and " AI system design", it mainly emphasizes that students can build age appropriate data, artificial intelligence algorithms, and programming understanding, create task-based artificial intelligence tools, possess system design thinking and comprehensive information technology required for designing, building, testing, and optimizing artificial intelligence systems. The two aspects of abilities are mainly aimed at students in basic education, primary education, and secondary education, focusing on the professional knowledge and skills that students need to learn in the field of artificial intelligence, laying a foundation for students to continue their studies in this field in the future. For the evaluation of artificial intelligence abilities of students in different disciplines in higher education, the applicability of the assessment of two aspects of abilities is relatively low.

6. Discussion and Suggestions

6.1 The Research Types of "artificial intelligence + higher education" Need to Be Further Expanded

Based on the existing distribution of case types, the scope of research on empowering higher education with artificial intelligence needs to be further expanded in the future, including the development of long-term and short-term artificial intelligence action plans at the university level, the cultivation of digital leadership in universities, the introduction of measures to prevent academic misconduct caused by artificial intelligence, the exploration of relevant

paths for artificial intelligence to promote sustainable social development, and the protection of the positive impact of artificial intelligence technology on the physical and mental health of teachers and students.

6.2 The Artificial Intelligence Capabilities of Higher Education Teachers Need to be Further Improved

6.2.1 It is necessary to attach great importance to the construction of the ability level of higher education teachers in the "Human-centred mindset" and "Ethics of AI"

The lack of extensive and in-depth discussion on the abilities of "Human-centred mindset" and "Ethics of AI" in existing cases reflects that the development of teachers' abilities in this field has not received corresponding attention. Therefore, higher education institutions need to strengthen the cultivation of teachers' abilities in the above two levels. In response to the "Human-centred mindset", teachers need to first recognize the importance of human agency and adhere to the principle that artificial intelligence is led by humans. In the "deepen" stage, teachers need to shoulder the responsibility of human development and hold a critical attitude towards the excessive promotion of using artificial intelligence to replace humans in making high-risk decisions in the field of education. In the "create" stage, teachers should actively participate in the construction of an artificial intelligence society, promote the design and use of artificial intelligence, and improve human welfare, inclusiveness, and social justice.

At the same time, teachers' abilities in the field of "Ethics of AI" need to be further improved. In the "acquisition" stage, teachers need to have a basic understanding of typical ethical issues related to artificial intelligence and human-computer interaction. In the "deepen" stage, teachers should use artificial intelligence safely and responsibly in the teaching process. In the “create” stage, teachers can contribute to the development of ethical standards for the application of artificial intelligence in education.

6.2.2 Continuously promote the high-level advancement of teachers' abilities in "AI foundations and applications" and "AI pedagogy" in higher education institutions

At present, teachers' abilities in "AI foundations and applications" and "AI pedagogy" are both in the "semi deepening" stage. In the future, teachers' abilities need to continue to be improved to a higher level of "deepen" and "create" to cope with broader challenges in the educational environment. Based on the teaching responsibilities and background abilities of teachers, deepen their understanding of various artificial intelligence technologies from an ethical perspective, enable them to proficiently customize or modify AI tools, plan and promote AI immersive learning scenarios, and create inclusive learning environments assisted by AI. At the same time, teachers can critically consider the impact of artificial intelligence on teaching, learning, and evaluation, continuously improve students' empathy, critical thinking, and problem-solving abilities in teaching, and use data and feedback to continuously explore student-centered teaching innovation.

6.2.3 Actively guide higher education teachers to rapidly improve their abilities in the field of "AI for professional development"

Regarding the "AI for professional development", most higher education institutions have not emphasized providing corresponding digital literacy training for teachers, and the ability level of teachers is currently in a slow development stage from "acquire" to "deepen". Higher education institutions should provide guidance and training on the information literacy and professional skills that teachers need to develop in the era of artificial intelligence, promote the correct use of artificial intelligence by teachers to promote lifelong learning in their professional fields, enhance the development of teachers' human-machine collaboration abilities, encourage teachers to effectively use artificial intelligence strategies in continuous testing and verification, and meet the professional development needs of themselves and social change.

6.3 Further Research Is Needed on the AI Competency Framework for Higher Education Students

The existing UNESCO student AI competency framework mainly focuses on the development of students in the field of artificial intelligence, which does not cover the competency requirements and social employment trends of higher education students. In the future, in-depth research could be conducted for constructing an AI competency framework for higher education students and further adjust the existing aspects of capability requirement in terms of "Human-centred mindset", "Ethics of AI", "AI techniques and applications", and "AI system design". This study suggests evaluating students' abilities from five aspects: "Human-centred mindset", "Ethics of AI", ". AI foundations and applications", "AI learning", and "AI for employment and entrepreneurship development". According to the requirements of the competency framework, comprehensive information literacy and social competitiveness of higher education students are able to be enhanced, and the employment rate in the era of artificial intelligence is expected to be improved. Regarding the progression levels, it can be divided by UNESCO's original three levels of ability: understand, apply, and create. Gradually improving students' corresponding artificial intelligence knowledge

and skills, promoting the improvement of students' learning quality and efficiency, and empowering students' employment and entrepreneurship development.

7. Conclusion

In the acceleration of higher education reform by artificial intelligence, we should focus on typical application scenarios such as intelligent teaching assistants, intelligent student assistance, intelligent research assistance, and intelligent management assistance. One is to empower teachers in teaching and encourage them to explore the use of artificial intelligence to achieve differentiated teaching, which also involves the construction of digital teaching materials; The second is to empower students to learn and achieve seamless data recording, analysis, and circulation throughout the entire process from pre class preparation, classroom learning, and homework; The third is to empower academic research, fully utilize artificial intelligence to improve research efficiency, and support the development of fields such as chemistry, biology, and energy; The fourth is to empower education management, improve management efficiency and scientific decision-making through artificial intelligence, and reduce work burden. In addition, the adaptation and updating of the evaluation system for the flexible application of intelligent technology are also worth considering (Huang, 2025).

The integration of artificial intelligence and education has brought opportunities for innovation and improvement in education. Not only does it provide support for the comprehensive cultivation of students' healthy growth and success, but it also makes personalized teaching and learning possible. The AI competency of teachers and students greatly affects the application of artificial intelligence technology. The AI competency of teachers and students needs to be further improved to promote the sustainable development of higher education. The future studies could conduct research on the construction of AI competency framework for teachers and students in higher education to more effectively promote the application of artificial intelligence in higher education and further enhance the effectiveness of teaching and learning.

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