

Beyond Digital Skills: Reframing Future Faculty Competencies in the Era of Digital Intelligence

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Abstract As Big Data and AI technologies continue to evolve rapidly, fundamental social structures, knowledge production models, and the logic of talent cultivation are undergoing profound transformation. The traditional roles of faculty members, once focused on knowledge transmission, are now evolving into learning designers, ethical mentors, innovation facilitators, and lifelong learners. This paper examines the restructuring of faculty members' roles and proposes a framework of five core competencies for future educators in higher education. It also explores the *Future Faculty Training Program* implemented by Wuhan University. Characterized by digital intelligence, personalized learning, and continuous professional development, this program offers valuable insights into translating the theoretical framework of faculty development into practice.

Keywords future faculty, competencies and development models, digital intelligence, training program

1 Introduction

Since the beginning of the 21st century, the technological revolution, represented by cloud computing, Big Data, and generative AI, has accelerated the transition toward the era of digital intelligence. Fundamental changes are occurring in knowledge acquisition, social and industrial structures, and individual learning models (Selwyn, 2016; OECD, 2018; UNESCO, 2021). As the scope of generative AI applications expands, the traditional lecture-based model of knowledge transmission faces unprecedented challenges in higher education. Currently, the academic profession is undergoing a transformation, with AI beginning to take on routine teaching tasks such as knowledge retrieval, exercise

generation, and data analysis (Chen & Liu, 2025). However, while the fundamental purposes of education remain unchanged, the role of faculty members has become increasingly critical, particularly in fostering students' moral and character development, providing emotional support, and cultivating innovative thinking (Gu, 2023). AI is unlikely to replace teachers; rather, it is reshaping the nature of teaching work and demanding new competencies of faculty members. The key question is no longer whether faculty members possess sufficient knowledge or digital skills, but what competencies are required for them to thrive in an educational environment progressively defined by digital intelligence. Future faculty members are expected to shift from being knowledge transmitters to learning designers, value-oriented mentors, innovation facilitators, and lifelong learners. They are expected to balance human-driven and AI-driven teaching in higher education; therefore, their professional development must emphasize the integration of disciplinary expertise, digital and AI literacy, pedagogical innovation, ethical awareness, and continuous learning capability. In other words, the emergence of digital intelligence calls for a reframing of faculty competencies from technology-oriented skills toward a more holistic, human-centered, and future-oriented competency framework. This paper proposes a framework of five core competencies, including educator spirit, digital literacy, innovation competence, lifelong learning competence, and ethical literacy. These competencies are elaborated in detail below. Accordingly, faculty development models will evolve from experience-driven and standardized approaches toward data-driven, personalized models, enabling faculty members to leverage intelligent technologies while preserving the humanistic mission of education.

In light of these developments, addressing the following four key issues carries considerable theoretical value and practical significance for advancing educational modernization: clarifying the future role of faculty members, reframing faculty competencies and

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professional qualities beyond digital skills, promoting the symbiotic relationship between faculty and technology, and systematically analyzing the composition and development models of future faculty competencies.

2 Restructuring the Role of Faculty Members

2.1 | Knowledge Production Transformation Drives Faculty Role Restructuring

Traditional education rested on two fundamental premises, namely that knowledge was a scarce resource, and that faculty members were its authoritative source. With the evolution of the internet and AI technologies, students can access vast amounts of information at any time through various channels. Faculty members are no longer the sole source of knowledge; their role has shifted from authoritative knowledge providers to knowledge organizers and learning facilitators. Accordingly, the core task of future faculty members is not merely to transmit knowledge from the textbook but also to use AI-supported learning environments to guide students in critically evaluating information, assessing its credibility, and constructing their own knowledge frameworks. This approach cultivates critical thinking and innovative abilities, facilitating a transition from knowledge transmission to competency development.

Academic exploration of the faculty members' roles and competencies has a long-standing tradition. Shulman (1986) pointed out that faculty members should develop strong disciplinary expertise and acquire pedagogical content knowledge (PCK) on that basis. Building upon the traditional framework of PCK, Mishra and Koehler (2006) proposed the technological pedagogical content knowledge (TPACK) framework, which emphasizes the integrated mastery of technological knowledge, pedagogical knowledge, and content knowledge. Celik (2023) subsequently extended this line of reasoning and argued that the era of digital intelligence requires faculty members to integrate AI technologies into subject-specific learning and that this development in turn necessitates mastery of "Intelligent-TPACK." Taken together, these frameworks suggest that future faculty members must not only develop strong disciplinary expertise and pedagogical proficiency but also acquire the fundamental skills needed to integrate AI technologies into their instructional practice.

2.2 | AI Drives Transformation of Classroom Organization

Future learning environments are increasingly characterized by flexible temporal and spatial boundaries.

Faculty members establish integrated learning spaces that blend digital and in-person instruction, real and virtual environments, and lecturer-AI collaboration. AI systems can analyze student learning data to build personalized learning profiles, which enable differentiated instruction. In practice, AI systems may automate tasks such as data collection, feedback processing, and learning assessment, while faculty members focus on setting learning objectives, guiding problem-solving, and shaping values, thereby creating an AI-assisted, faculty-guided, and student-centered educational framework.

2.3 | Values-Based Education Drives Faculty's Holistic Mentoring Role

Although AI can efficiently handle knowledge-based tasks, it cannot readily perform educational functions such as emotional communication and value guidance. At the same time, challenges such as algorithmic bias, information silos, and technological alienation are becoming increasingly evident. Higher education therefore assumes the responsibility for fostering sound character, a sense of public responsibility, and ethical judgment. UNESCO (2021) emphasizes that the purpose of education expands beyond the transmission of knowledge to the cultivation of global citizens equipped with empathy, critical thinking, and a spirit of collaboration. Thus, future higher education can no longer be limited to knowledge transmission but should place greater emphasis on character development and the cultivation of capabilities. Future faculty members support students' holistic development by fostering ethical awareness, critical thinking, and social responsibility. They serve as mentors who guide students' moral and personal development, and encourage them to reflect on the meaning and purpose of learning and life. Through such guidance, students may develop a stronger sense of personal purpose and social responsibility.

3 Competencies of Future Faculty

Based on current trends in AI and the practical experience of future faculty training at Wuhan University, this paper proposes a framework of core competencies for future faculty members to address the developmental needs of an intelligent society. This framework comprises five core competencies, namely educator spirit, digital literacy, innovation competence, lifelong learning competence, and ethical literacy (see Figure 1).

3.1 | Educator Spirit

Educator spirit refers to a noble character and sense of responsibility that takes fostering virtue and nurturing

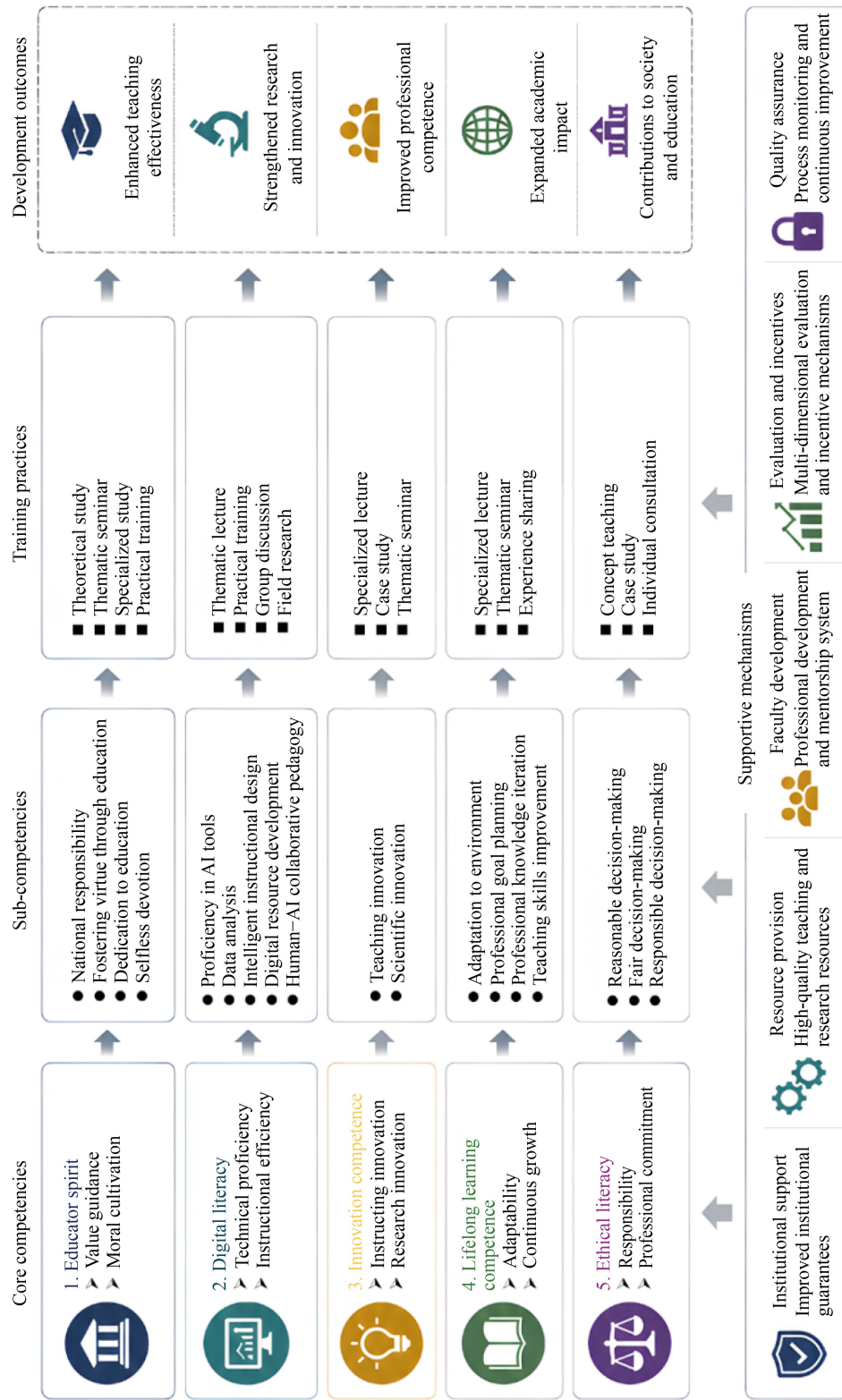


Figure 1 Wuhan University's competencies and development model for future faculty.

talent as its fundamental mission, cherishes the nation and the people, and is dedicated to the teaching profession. It embodies the courage to explore and innovate, the willingness to make selfless contributions, and an unwavering commitment to cultivating a new generation for the times, advancing the cause of education, and promoting national rejuvenation. The *Outline of Plan for Building China into a Leading Country in Education (2024–2035)* explicitly calls for promoting the spirit of educators and building a high-quality, professional teaching force ([The Central Committee of the Communist Party of China & The State Council of the People's Republic of China, 2025](#)). The *Future Faculty Training Program* (FFTP) at Wuhan University cultivates this spirit through a series of faculty ethics education activities, including theoretical study, thematic seminars, specialized study, and practical training ([Li, 2025](#)).

3.2 | Digital Literacy

Digital literacy refers to the knowledge and skills required to deeply integrate digital and intelligent technologies, such as AI, Big Data, and virtual reality, throughout the teaching and research process. It encompasses five dimensions:

- (1) Proficiency in AI tools, which refers to the ability to skillfully utilize mainstream AI teaching tools;
- (2) Data analysis and learning assessment capabilities, which involve using student performance data to inform teaching decisions and research data to inform research decisions;
- (3) Intelligent instructional design capabilities, which involve integrating AI into the design of the entire teaching process;
- (4) Digital resource development, which involves developing discipline-specific digital learning resources tailored to disciplinary teaching and research;
- (5) Human–AI collaborative pedagogy, which involves effectively managing blended learning scenarios.

The FFTP at Wuhan University invites experts in digital intelligence education and pioneers of educational reform to jointly explore digital and intelligent teaching technologies and their application strategies through various formats, including thematic lectures, practical training courses, group discussions, and field research ([Zhang, 2025](#)).

3.3 | Innovation Competence

Innovation competence refers to faculty members' willingness and ability to experiment with digital and intelligent technologies in addressing practical teaching or research-related challenges, solving issues in creative

ways and pursuing continuous improvement. Building on AI training, the FFTP at Wuhan University adopts various formats, including specialized lectures, practical case studies, and thematic seminars, to guide faculty members in recognizing the practical value of AI in scientific research and innovation. It cultivates their awareness of and methods for applying AI in research, enabling them to generate innovative research outcomes and provide sustained support for technological innovation.

3.4 | Lifelong Learning Competence

Lifelong learning competence refers to faculty members' ability to adapt to constantly changing educational environments, reset professional development goals, continuously update their knowledge and skills, and apply what they have learned to teaching, research, and student development practices in response to the evolving needs of society, disciplinary advancement, and educational development. In the era of digital intelligence, as the pace of technological change accelerates, faculty members who cease learning will quickly fall behind the times. They are shifting from a static professional identity to continuous professional growth. Hargreaves (2003) pointed out that future faculty members will become creators of knowledge rather than mere transmitters of it, and lifelong learning is the fundamental driving force behind this transformation.

3.5 | Ethical Literacy

Ethical literacy refers to faculty members' ability and character needed to analyze problems based on moral principles and values when facing ethical dilemmas, and to make reasonable, fair, and responsible judgments. As AI becomes deeply embedded throughout the educational process, issues of technological ethics are becoming increasingly prominent and have emerged as a critical challenge that needs to be addressed. Faculty members need not only to possess the ability to make ethical judgments regarding technology but also to help students develop responsible digital citizenship, guiding students to critically evaluate information, reflect on ethical implications, and make responsible decisions in digital environments.

4 Future Faculty Development in the Era of Digital Intelligence

In the era of digital intelligence, faculty development models are transitioning from traditional training toward intelligent, ecosystem-based, and lifelong learning approaches, manifested in shifts from three aspects.

4.1 | From Experience-Driven to Data-Driven

In the era of digital intelligence, the accessibility of learning data has significantly improved. Future education will increasingly rely on the analysis and application of learning data, and data-driven approaches have become a key direction for faculty members' professional development.

Future faculty members need to possess a strong data-driven mindset, and be capable of analyzing students' learning behavior and achievement data to accurately identify their learning characteristics, weaknesses, and developmental needs. Based on this analysis, they can optimize instructional design and adjust teaching strategies to achieve personalized instruction. Meanwhile, faculty members should prioritize data ethics and privacy protection, standardizing data collection, usage, and management processes to ensure data security and prevent misuse. This ability to make evidence-based instructional decisions has become a key indicator of professional competence for future faculty members.

4.2 | From Standardized to Personalized Instruction

Traditional teaching often relies on standardized models, which may not always fully accommodate students' diverse learning needs and developmental trajectories. The widespread adoption of AI has made personalized learning possible, while also placing greater demands on faculty members' ability to deliver personalized instruction.

Future faculty members need to design differentiated learning pathways and instructional plans based on students' learning profiles, interests, and abilities, thereby implementing the principle of student-centered, differentiated instruction. Wuhan University has explicitly stated its commitment to shifting the goal of talent development from knowledge transmission to competency building. Achieving this goal depends on enhancing faculty members' personalized teaching capabilities—advanced skills in learning analytics, instructional design, and differentiated guidance—enabling every student to grow at a pace that suits them.

4.3 | From Professional Role to Educational Responsibility

Society's expectations for education grow with the advancement of technology, and expand beyond the transmission of knowledge to call for compassionate, thoughtful, and responsible educators capable of nurturing a new generation with sound character, innovative competence, and a sense of social responsibility.

In the era of digital intelligence, the value of faculty members has not diminished; on the contrary, it has become increasingly vital (Zhang, 2025). They engage in teaching and educational work with compassion, a sense of responsibility, and a spirit of innovation, fulfilling the fundamental task of fostering virtue and nurturing talent, thereby empowering both student growth and the advancement of education.

5 Future Faculty Development in Practice: FFTP of Wuhan University

Since October 2024, Wuhan University has responded proactively to initiatives on educational digitalization and initiated a new model of future faculty development by launching the inaugural of the FFTP, explicitly designating the promotion of digital and intelligent transformation of education as the core focus of future faculty training. The initiative is a pragmatic measure to adapt to educational reforms in the new era; it clarifies competency standards for future faculty members, charts the course for future faculty training in higher education, and serves as a model for such training. The main components of the FFTP are listed in Table 1.

The inaugural cohort of FFTP brought together 45 key faculty members from 33 colleges, forming a cross-disciplinary and cross-domain cohort with strong potential to serve as a model and catalyst for educational innovation. University leaders and administrative departments were deeply involved in the program, enhancing its institutional authority and impact. As shown in Table 2, participating faculty members developed innovative projects that integrated AI, digital technologies, and interdisciplinary approaches into teaching and research. For example, stomatology faculty from the medical discipline designed a stomatology EduQuest lab to promote immersive and inquiry-based learning. These outcomes illustrate that the FFTP not only enhances individual faculty members' digital literacy and innovation competence but also fosters a university-wide ecosystem for future-oriented teaching transformation and interdisciplinary collaboration.

6 Conclusions

With the rapid development of AI and digital technologies, the role of faculty members is undergoing a profound transformation. Teachers are no longer just knowledge transmitters, but rather learning designers, value-oriented mentors, innovation facilitators, and lifelong learners. The professional development of future faculty members adheres to the principle of

Table 1 Contents of the Future Faculty Training Program

Format	Hour	Contents
Lecture	21	• Future teachers and society • Innovation and transformation of higher education teaching in the era of digital intelligence • Construction of a digital intelligence education practice and innovation platform • Education and talent cultivation in the era of AI • Restructuring the role of future teachers in the era of digital intelligence • Challenges and practices in education and teaching in the era of AI • Exploration on the construction and application of a digital intelligence education practice innovation platform
Practice training	6	• AI for science practice • AI for education practice
Group discussion	6	• Future learning space • EduQuest Lab
Research	3	• Field trip to Xiaomi Automobile

Table 2 Final assessment task of the Future Faculty Training Program

Faculty discipline	Final assessment task	Thematic case
Information	Construction of the AI EduQuest lab	Artificial intelligence guidance and specialized course: EduQuest lab
Medical	Empowering with digital intelligence to deeply cultivate medical education	Clinical medicine and stomatology: smart course and EduQuest lab
Energy and power	A multi-disciplinary collaborative virtual laboratory for smart energy driven by a clearance-style task	Integration of industry and education: Field trip to Xiaomi Automobile
Social science	AI empowers graduate student training: process, capabilities, and practices	AI-assisted social science research

upholding tradition while embracing innovation: They adopt emerging teaching technologies and enhance their digital literacy, while also remaining true to the humanistic purposes of education and strengthening the spirit of professional ethics and educational responsibility; they drive pedagogical innovation and improve teaching effectiveness, while also upholding educational equity and promoting students' holistic development. The case of FFTP at Wuhan University demonstrates that the cultivation of future faculty members leverages digital and intelligent technologies to drive the restructuring of faculty competencies and the innovation of development models. By foregrounding educational philosophy in the process of higher education transformation, the program provides a valuable model for other universities.

From a long-term perspective, educational reform ultimately depends on the transformation of professional practice and educational relationships (Zhong & Cui, 2018). Future faculty members will not only determine the future form of the classroom but also shape the development of society. Institutions that proactively reconstruct faculty competencies and development models are likely to gain strategic advantages in educational transformation in the era of digital intelligence. Therefore, strengthening the training of future faculty members is a critical issue in educational reform. The case study of FFTP at Wuhan University

offers useful practical experience for higher education institutions in responding to the challenges of the times and advancing the development of the teaching workforce.

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Declaration on the Use of AI During the preparation of this manuscript, only Ruiyun (an educational large model) was used for grammar and stylistic revision. No research frameworks, data, core arguments or analytical content were generated by AI. All research ideas and findings are original works of the authors, who take full responsibility for the authenticity and academic compliance of this paper.

Author Contributions Pingwen Zhang and Zhen Yu designed the study; Zhen Yu and Xiaoliang Meng wrote the initial draft; Pingwen Zhang rewrote the discussion section. All authors reviewed and finalized the manuscript.

Conflicts of Interest The authors declare no competing interests.

Data Availability Statements The authors confirm that all data generated or analyzed during this study are included in this published article.

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