Malaysian Journal of Social Sciences and Humanities (MJSSH) (e-ISSN : 2504-8562)
2024, Volume 9, Issue 11, e003112
DOI: https://doi.org/10.47405/mjssh.v9i11.3112

REVIEW ARTICLE

Educational Transformation in the Age of AI: A Framework and Implementation Path for AI competency for University Instructors

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KEYWORDS:
AI
University instructors
AI competency
Educational transformation
Implementation paths

CITATION:
Bai, X., & Rosy Talin. (2024). Educational Transformation in the Age of AI: A Framework and Implementation Path for AI competency for University Instructors. *Malaysian Journal of Social Sciences and Humanities (MJSSH), 9*(11), e003112. https://doi.org/10.47405/mjssh.v9i11.3112

ABSTRACT

Higher education is changing dramatically as a result of the quick advancement of artificial intelligence (AI) technologies. This study intends to provide a framework for instructor competency in higher education that is tailored to the AI era and suggest a matching implementation path using the method of literature analysis. After defining AI competency conceptually, the study creates a multifaceted framework with four essential components: knowledge, skills, application, and values. The application dimension concentrates on the use of AI in teaching practice; the knowledge dimension highlights comprehension of the fundamentals of AI; the skills dimension emphasises instructors' proficiency with AI tools; and the values dimension includes a thorough comprehension of AI ethics and social responsibility. The development of an interdisciplinary knowledge system, the development of competence and practical application, and the moral awakening and responsibility are the three main techniques that this study suggests for the implementation path. These tactics aim to improve university instructors' AI competency so they can use AI technology for student learning and development more successfully. The study's findings imply that by systematically putting the measures to assist the transformation of higher education into practice, instructors' AI competency may be effectively raised.

Contribution/Originality: The paper's primary contribution is to construct a framework of AI literacy for college teachers and put forward a practical implementation path, which provides theoretical guidance and practical programs for educational transformation.

1. Introduction

Artificial intelligence (AI) has emerged as one of the major technologies propelling economic and social advancement in the third decade of the twenty-first century. The

education sector is changing dramatically due to the widespread use and ongoing advancement of AI technology (Zhang & Aslan, 2021). In addition to altering the subject matter of education, this shift has also altered how it is taught. Along with altering the methodology and substance of education, this shift also presents new demands on instructors, particularly those at universities. The quality of education and students' future competitiveness are closely correlated with the AI competency of university instructors, who make up the majority of higher education.

Examining the AI literacies that university instructors ought to have as well as how to develop and improve them is very crucial in this regard. In addition to being able to comprehend and use AI technology, AI literacy also entails having a thorough awareness of AI ethics, societal impact, and creative instructional applications (Qian et al., 2024). In addition to being necessary for university instructors' professional growth, developing and improving these literacies is also a necessary prerequisite for future talent development and adaptation to changes in education (Sperling et al., 2024).

This research aims to provide an AI competency framework for university instructors and investigate the implementation path. We will first examine the potential and difficulties faced by university instructors in the era of AI, as well as the significance of AI competency in the field of education. Then, using the four aspects of knowledge, application, skills, and values, we will build a framework of AI competency for university instructors. In order to offer direction and references for the development of AI competency for university instructors, we will lastly examine the implementation paths of the creation of an interdisciplinary knowledge system, the development of competence and practical application, and the moral awakening and responsibility.

In the current era of globalization and information technology, university instructors' proficiency with AI is not only essential for raising educational standards but also serves as the foundation for developing creative and globally competitive talent (Chiu et al., 2024). In addition to tactics and recommendations for the pedagogical transformation of higher education institutions in the AI era, we anticipate that this study will offer fresh concepts and approaches for the professional growth of university instructors.

1.1. Background

AI has emerged as this century's fundamental grammar because of the quick advancements in contemporary technology. It is changing the way we think, speak, and behave, much like a new language. We can no longer view AI as only a technological tool in this age of transformation; rather, it is a force that has a significant impact on society and our daily lives (Sedkaoui & Benaichouba, 2024). In the age of AI, education is likewise experiencing previously unheard-of developments. According to UNESCO's AI competency framework for instructors, "the education sector is undergoing an unprecedented transformation in the era of AI. To adjust to this change and employ AI technologies to enhance the effectiveness and quality of teaching and learning while maintaining educational fairness and inclusivity, higher education instructors must be proficient in AI" (Miao & Cukurova, 2024). Enhancing their AI competency is especially important for higher education instructors, who are both direct participants and facilitators of this change.

1.1.1. Development of AI Technologies and Educational Transformation

The advancement AI competency encompasses more than just the capacity to comprehend and use AI technology; it also entails a thorough awareness of AI ethics, societal im of AI (AI) technology has infiltrated many strata of society, including the education sector. The implementation of AI technologies, including intelligent teaching systems, customized learning platforms, and virtual teaching assistants, is transforming conventional methods of education. These technologies enhance instructional efficacy while offering students a more individualized and adaptable learning experience (Almasri, 2024).

The advancement of AI technology has significantly enhanced the content and methods of teaching. The implementation of AI technology, including intelligent teaching systems, customized learning platforms, and virtual teaching assistants, is transforming conventional teaching and learning methods (Laak & Aru, 2024). These technologies enhance instructional efficacy while offering students a more individualized and adaptable learning experience. For example, AI Agents have been widely employed in the education field to assist instructors in teaching design, curriculum construction, and various teaching administration duties, such as establishing teaching plans and rationally allocating teaching resources.

The growth of AI technologies has also encouraged innovation in educational evaluation and decision-making. Through big data analysis, instructors may more properly identify the learning progress and needs of students, therefore giving more targeted coaching. At the same time, AI technology can also help educational institutions make more effective resource allocation and strategic planning (Wang, 2021). For example, digital technologies such as Generative AI (GenAI), 5G, meta-universe, and blockchain are leading educational advances and driving the digital transformation of education.

The role of AI competency in education is becoming increasingly crucial in the process of educational transition competency not only comprises the ability to understand and apply AI technology, but also entails a thorough awareness of AI ethics, societal ramifications, and novel applications in teaching practice (Al-Zahrani & Alasmari, 2024; Bellas et al., 2024; Holmes et al., 2022). The cultivation and enhancement of these literacies is not only a need for personal professional development for university instructors but also an inescapable prerequisite for adjusting to educational changes and cultivating future talents.

1.1.2. Challenges and Opportunities for Higher Education Instructors

In the era of AI, the role of university instructors is undergoing fundamental changes. With the rapid development of AI technology and its wide use in the field of education, instructors not only need to master traditional teaching abilities but also must have a certain degree of AI competency to adapt to the changing needs and challenges of education.

In the context of AI technology pushing educational reform, university instructors are experiencing unprecedented problems. Knowledge updating has become increasingly urgent. The rapid evolution of AI technology demands instructors to regularly update their knowledge system, including their understanding of the principles, development history, and future trends of AI. Instructors need to stay up with the pace of

technological change through continual learning, which is a challenge for both time and energy (Sperling et al., 2024). A transition into teaching mode is imminent. Traditional teaching approaches are being revolutionized by AI technologies such as intelligent teaching systems and personalized learning platforms. Instructors need to adapt to these new teaching methods and learn how to employ these technologies for instructional design and delivery, which may require them to shift long-established teaching habits. The deployment of AI technologies also creates ethical and privacy problems. Instructors need to secure the protection of students' personal information when teaching with AI technology, as well as educate them about data privacy and cyber ethics (Karpouzis, 2024).

However, these challenges also present new opportunities. Improvement of teaching efficiency, AI technologies can assist instructors handle instructional activities more effectively, such as tracking and assessing students' learning progress through intelligent teaching systems, thus enhancing teaching efficiency. The realization of personalized teaching, AI technology can provide personalized learning resources and paths according to students' learning habits and abilities, and instructors can use these technologies to better meet students' personalized learning needs (Karpouzis, 2024). In new fields of interdisciplinary research, the development of AI technology gives instructors new areas of research, such as educational data analysis and the design and development of intelligent educational systems, which provides new chances for instructors' professional development (Salas-Pilco et al., 2022). The promotion of educational equity and AI technology have helped to decrease the gap in educational resources, enabling more students to acquire high-quality education through online learning platforms and distance education tools (Dogan et al., 2023).

Instructors in higher education face the challenges of updating their knowledge systems, adapting to new teaching models, and dealing with ethical and privacy issues in the age of AI, while also having opportunities to improve teaching efficiency, personalize teaching, open up areas of interdisciplinary research, and promote educational equity (Celik et al., 2022). The AI competency of university instructors is important to the change of education in the age of AI. Instructors need to strengthen their AI competency through continual professional development and training to make the most of these opportunities, handle the problems, and drive innovation and development in education.

1.2. Problem Statement

The advent of the artificial intelligence (AI) era has ushered in a transformative phase for the educational landscape, necessitating a reevaluation of the competencies required by higher education faculty to effectively integrate AI into teaching and learning (Jin et al., 2024). Despite the increasing recognition of AI's potential to enhance educational outcomes, there remains a significant gap in the literature regarding a comprehensive framework for AI competency among university instructors. This gap is particularly pronounced in the context of actionable pathways for developing and implementing such competencies within the constraints of existing educational systems.

Current educational paradigms often struggle to keep pace with the rapid advancements in AI technology, leading to a mismatch between the skills demanded by the modern workforce and those imparted by traditional curricula. This disconnect is further exacerbated by the lack of a standardized AI competency framework for educators,

which hampers the development of a cohesive strategy for integrating AI across various disciplines (Walter, 2024).

Moreover, the implementation of AI in education is not merely a technical challenge; it also involves pedagogical, ethical, and societal considerations. Educators must navigate the complexities of data privacy, algorithmic bias, and the ethical implications of AI-driven decision-making in educational settings (Alqahtani & Wafula, 2024). The absence of a clear roadmap for educators to develop the necessary AI competencies and to address these multifaceted issues poses a significant barrier to the successful integration of AI in higher education.

Against this backdrop, the problem statement for this research is twofold: First, to develop a robust AI competency framework tailored to the needs of higher education faculty, encompassing technical, pedagogical, and ethical dimensions. Second, to delineate practical implementation pathways for this framework within the existing educational infrastructure, taking into account the diverse needs and capacities of various academic institutions.

This research aims to address these challenges by examining the current state of AI integration in higher education, identifying the key competencies required for educators to effectively leverage AI, and proposing a structured approach for the development and implementation of these competencies. By doing so, the study seeks to contribute to the broader discourse on educational transformation in the AI era and to equip educators with the tools necessary to foster a skilled and ethically aware workforce prepared for the future.

2. Methodology

This study employs a systematic literature analysis to construct a comprehensive framework for AI competency among university instructors and to delineate practical implementation pathways. The methodology is designed to be rigorous and transparent, ensuring that the findings are based on a thorough examination of existing scholarly work.

2.1. Research Design

The research design is structured as a systematic literature review, which involves a systematic search, critical appraisal, and synthesis of relevant scholarly literature. This approach allows for a comprehensive understanding of the current state of knowledge regarding AI competency in higher education and the challenges associated with its integration.

2.2. Literature Search

A comprehensive search strategy is developed to identify relevant literature. This includes searching multiple databases such as Web of Science, Scopus, Google Scholar, and educational-specific databases like ERIC and JSTOR. The search terms are carefully selected to capture the essence of AI competency and its application in higher education. Keywords and their combinations include "artificial intelligence," "AI competency," "higher education," "university instructors," "educational transformation," and "implementation pathways." The search period is from January 1, 2014 to November 18,

2024. Search terms: (artificial intelligence or AI or digital literacy or intelligence literacy), (AI literacy or artificial intelligence literacy), (college teacher * or university teacher * or high school teacher * or instructor *), (educational reform or educational transformation), (implementation pathways or implementation path or implementation approach).

2.3. Inclusion and Exclusion Criteria

Clear criteria are established for the inclusion and exclusion of literature. Inclusion criteria may include peer-reviewed articles, books, and conference proceedings published within the last decade that directly address AI competency or its components in the context of higher education. Exclusion criteria may involve non-academic sources, literature not focused on higher education, or studies that do not specifically address AI competency.

2.4. Data Extraction

A standardized data extraction form is used to systematically record relevant information from each selected literature, including author(s), publication year, research design, key findings, and any frameworks or models presented. This form helps to ensure consistency and reliability in the analysis of the literature.

2.5. Quality Assessment

The quality of the included literature is assessed using established criteria, such as the credibility, relevance, and rigor of the research methods. This assessment helps to ensure that the synthesis is based on high-quality, trustworthy sources.

2.6. Thematic Analysis

The extracted data is analyzed thematically to identify patterns, trends, and gaps in the literature regarding AI competency frameworks and implementation strategies. This analysis involves coding the data into themes and subthemes, which are then used to construct a comprehensive framework.

2.7. Synthesis of Findings

The findings from the thematic analysis are synthesized to develop a holistic framework for AI competency among university instructors. This synthesis also includes recommendations for implementation pathways, drawing on the insights gained from the literature.

2.8. Rigor and Validity

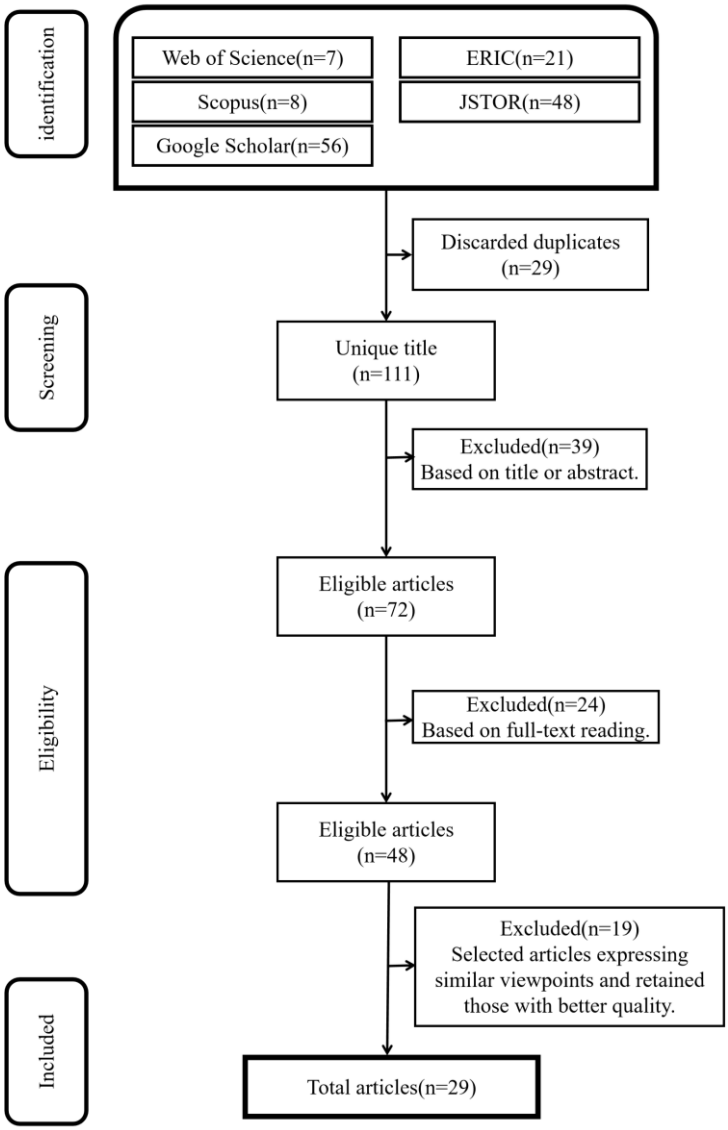
To ensure the rigor and validity of the findings, the literature review is conducted by multiple researchers, and inter-rater reliability is assessed. Additionally, the findings are cross-checked against multiple sources to ensure consistency and accuracy.

2.9. Data Management

All literature is managed using reference management software EndNote.20 (Clarivate Analytics), and a database is created to store and organize the extracted data. This database facilitates easy access and retrieval of information during the analysis and synthesis stages.

The literature with strong relevance was screened according to the research topic and research questions. Initially, 140 pieces of literature were obtained, and the articles were screened by the researcher by reading the titles and abstracts in order to exclude 68 pieces of literature in the duplicate category or of low quality, and 72 pieces were initially determined to be included. Then the researcher read the full text of the literature with unclear literature topics, and again deleted the 24 literature that were not related to the research topic, and again compared the content of the articles, and screened the articles that expressed similar views in content, and retained the articles with better quality, and ultimately included 29 pieces of literature (Figure 1).

Figure 1: Literature search and screening



3. Results

The systematic literature analysis conducted for this study has yielded a rich dataset that provides insights into the AI competency framework and implementation pathways for university instructors.

3.1. Connotation of AI competency of Higher Education instructors

3.1.1. Broadly defined AI competency for university instructors

AI competency in a broad sense comprises not just the ability to understand and apply AI technology, but also involves multi-dimensional content such as ethical principles, values, and a feeling of societal responsibility. This sort of competency demands instructors to be able to adapt to the social and productive life of the smart era, as well as the character and capacity of individual development. It highlights the endogenous development of instructors in the digital transformation of the education environment, translating external social needs into internal driving forces for the two-way integration of education. Instructors need to possess not just information and abilities, but also non-intellectual spiritual pursuits and value molding, such as social behavioral attitudes (connection construction, sense of collaboration and sharing, etc.). The invention of this competency development goal and concept necessitates the transformation and upgrading of instructors' professional ability to respond to the necessities of the smart era. AI competency in the broad sense requires university instructors' comprehensive adaptability in the AI era, which goes beyond the pure technical operation level and covers a deep understanding of the understanding, application, ethics, and social impact of AI technology (Zhao et al., 2022). This form of competency demands instructors to be able to not only master and apply AI technology but also to think critically about the influence of AI technology on society, culture, economy, and education, as well as how to foster students' sense of AI ethics and social responsibility in teaching.

To be more precise, AI competency for university instructors in the broadest sense calls for them to comprehend AI technologies, including their fundamentals, history, current applications, and future trends, as well as how they impact education; to apply AI technologies, to able to incorporate AI technologies into teaching practices, such as using data analysis tools, intelligent teaching platforms, etc., in order to improve the teaching effect and the learning experience of students; to understand AI ethics and its impact on society, instructors must be aware of the ethical issues that AI technologies may bring about, such as algorithmic bias, data security, privacy protection, etc., and to foster in their students a sense of social responsibility (Karpouzis, 2024).

3.1.2. Narrowly defined AI competency for university faculty

In a more narrower sense, AI competency is more concerned with instructors' capacity to employ AI tools in their instruction. The ability to effectively use AI tools and resources in instructional design and execution, as well as the direct manipulation and deployment of AI technology, are included in this (Bhimdiwala et al., 2022). Instructors must be knowledgeable about the use of AI in education, specifically in the areas of technology operation, where they must learn how to use AI tools and platforms like virtual labs, online assessment tools, and intelligent teaching systems; instructional design, where they must be able to create learning activities that incorporate AI

elements, like project-based learning, simulation experiments, and data analysis tasks; learning support, where they must use AI technology to give students individualized learning support, like intelligent recommendation systems, learning analysis tools, etc.; and assessment and feedback competence, where they must be able to use AI technology to conduct learning assessments and give prompt feedback to help students learning progress. This competency places a strong emphasis on instructors' comprehension of the educational value and potential of AI technologies, as well as their ability to apply them in certain educational contexts.

3.2. AI Competency Framework for Higher Education Instructors

In the era of AI, university instructors' AI competency framework is multifaceted, encompassing not only an academic grasp of AI technology, but also its application, skill mastery, and the formation of values.

3.2.1. Knowledge dimension

The knowledge dimension of AI competency requires university instructors to have an in-depth understanding of the fundamental ideas, principles, history of development, current applications, and future developments of AI. Understanding the fundamental AI technologies—such as machine learning, deep learning, and natural language processing—and how they might be applied to the educational sector is part of this. The basics of machine learning, such as how to identify items in an image by algorithmically building a model, are for instance something that instructors must comprehend. Instructors can help students grasp the real-world uses of these technologies, including medical image analysis, by introducing pertinent case studies.

3.2.2. Application dimensions

The application dimension of AI competency places a strong emphasis on instructors' capacity to incorporate AI technology into their lesson practices in order to enhance both their own teaching effectiveness and students' learning experience. This entails supporting teaching and learning activities with AI tools including virtual labs, online assessment tools, and smart teaching platforms (Klami et al., 2024). For instance, in language instruction, instructors can develop interactive language learning applications that assist students in developing their speaking and writing abilities by utilizing natural language processing technology like machine translation and speech recognition.

3.2.3. Skills dimension

The skills dimension of AI competency requires instructors to have the ability to use AI tools and resources, as well as the skills to solve AI-related problems. This involves proficiency with AI software and platforms, data gathering and analysis, and model training and evaluation (González-Calatayud et al., 2021). For instance, in order to give students individualized learning recommendations, instructors can learn how to assess student learning data using data science tools like Python's Pandas package.

3.2.4. Value dimensions

The development of students' ethical awareness and social responsibility in teaching and learning, as well as instructors' knowledge of the ethical and social consequences of

AI, are all part of the values dimension of AI competency (Almasri, 2024; Jones, 2024). As a result, instructors must use AI technology while keeping in mind the potential ethical concerns, including algorithmic bias, data security, and privacy protection. To help students consider the societal effects of AI technology, instructors should incorporate ethical talks about AI into their course designs. For instance, they can use case studies to examine the morality of self-driving automobiles in emergency scenarios. A comprehensive approach, the AI competency framework for university instructors calls for instructors to grow in all four areas: knowledge, application, skills, and values. By using such a framework, instructors can better mentor their students and prepare them to be future members of society who are literate in AI, in addition to enhancing their own professional competence. The development of this kind of competency is essential for fostering educational innovation and raising educational standards, as well as for adjusting to the way that education is changing in the AI era.

3.3. Pathways to implementing AI competency for higher education instructors

3.3.1. Construction of Interdisciplinary Knowledge Systems

The development of an interdisciplinary knowledge system must be given particular consideration in the implementation path of AI competency for university instructors in the age of AI. In addition to the technical level, its architecture entails the thorough integration of several disciplines, including learning theory, ethics, and philosophy of education.

a) The need to build interdisciplinary knowledge systems

In the age of AI, university instructors must not only be proficient in AI technology but also comprehend its use and effects across several fields. Building an interdisciplinary knowledge system can help instructors gain a deeper comprehension of AI technology and successfully incorporate it into their research and teaching (Zhang & Aslan, 2021). Building such a system fosters the growth of creative thinking, gives pupils a more thorough education, and assists instructors in establishing linkages across various fields.

b) Strategies for building an interdisciplinary body of knowledge

Integration of educational resources. In order to develop interdisciplinary courses and programs, universities should integrate educational resources from different disciplines (Allen & Kendeou, 2024). To provide instructors with a thorough grasp of AI technology and its use in education, for instance, courses combining computer science, pedagogy, psychology, and ethics can be made available.

Encourage instructors' professional growth. In addition to encouraging instructors to take part in multidisciplinary seminars, workshops, and research projects, universities should offer chances for professional growth. By engaging in these activities, instructors can broaden their expertise and enhance their capacity to integrate AI technologies across several fields.

Form multidisciplinary research groups. Instructors can work together to do research on the application of AI technology in education by forming multidisciplinary research teams. This cooperation can enhance instructors' capacity to address challenging

educational issues and promote the sharing of information and expertise across disciplines (Zhang & Aslan, 2021).

Make use of technological platforms. Universities and universities can give faculty members the chance to interact and work together across disciplines by utilizing online learning and collaboration systems. Faculty members can use these forums to discuss problems, exchange resources, and work together to build multidisciplinary courses.

Enhancing social and ethical consciousness. When creating an interdisciplinary body of knowledge, special attention should be paid to the ethical and social ramifications of AI technology. In order to raise students' ethical awareness in their instruction, instructors must be aware of the ethical issues that AI technologies may raise, such as algorithmic bias, data security, and privacy protection (Nguyen et al., 2023).

c) Challenges in Implementing Interdisciplinary Knowledge Systems Building

First, the challenge of implementing interdisciplinary knowledge system building is reflected in disciplinary barriers, which may exist between different disciplines, and may hinder interdisciplinary cooperation and knowledge sharing. Universities must take action to remove these obstacles and encourage interdisciplinary collaboration and communication. Second, the distribution of resources reflects it. It's possible that interdisciplinary initiatives will need more money, time, and staff. In order to facilitate the development of multidisciplinary knowledge systems, HEIs must properly distribute their resources. Thirdly, it is evident in evaluation and acknowledgment. Interdisciplinary work could be challenging to gauge using conventional evaluation standards. To acknowledge and recognize the contributions of interdisciplinary work, HEIs must create new evaluation systems.

Building an interdisciplinary knowledge system is a crucial step in university instructors' deployment of AI competency. HEIs can successfully improve instructors' AI competency and get ready for educational transformation by incorporating educational resources, encouraging instructors' professional development, creating interdisciplinary research teams, utilizing technology platforms, and strengthening ethical and social awareness. To guarantee the success of creating an interdisciplinary body of knowledge, universities must simultaneously address implementation-related obstacles such as disciplinary barriers, resource allocation, and evaluation and recognition problems.

3.3.2. Capacity building and practical application

a) AI competency Competency Building for university instructors

Competency building involves the process of developing instructors' deep knowledge of AI technology and their application skills. This covers both the application of fundamental AI knowledge to instructional design, delivery, and assessment, in addition to mastering it (Bellas et al., 2024).

First, training for professional development. Universities can offer specific training in AI education to assist instructors in becoming proficient in the fundamental ideas, tools, and applications of AI. To support students' individualized learning, for instance, instructors can learn how to use AI tools through workshops, online courses, and seminars.

The second is cooperation across disciplines. Instructors are urged to work with specialists in other fields to create projects and courses that use AI. Instructors' perspectives are expanded and their comprehension of the various applications of AI technology is enhanced by this interdisciplinary partnership.

Third, accumulation of practical experience. Instructors can gain real-world experience by taking part in AI research or initiatives. This body of knowledge aids instructors in comprehending the applications and challenges of AI in real-world instruction.

b) Practical Application of AI competency for university instructors

In order to enhance teaching quality and the educational experience for students, the practical application places a strong emphasis on integrating AI competency into certain instructional practices.

First, enhance the use of smart teaching tools. To offer individualized learning materials and support, instructors can incorporate intelligent teaching tools, such as learning analytics tools, and intelligent recommender systems, into their lessons.

The second is the teaching mode's innovation. To increase student engagement and learning outcomes, instructors can use AI technology to investigate novel teaching approaches like blended learning and the flipped classroom.

Third, enhancements to feedback and evaluation technology can assist instructors in giving timely feedback and more accurate assessments of student learning. For instance, instructors can rapidly get feedback on students' learning progress and modify their teaching methods by utilizing intelligent assessment tools.

Fourth, the development of social and ethical consciousness. In practical applications, instructors also need to focus on the ethical and social implications of AI technology and develop students' ethical awareness and social responsibility. This includes discussing ethical issues of AI such as data privacy and algorithmic bias in teaching.

3.3.3. Moral Awakening and Responsibility

a) Moral awakening

Moral awakening entails instructors identifying and considering the potential ethical dilemmas posed by AI technology (Poli et al., 2023). This entails a more thorough comprehension of topics like algorithmic bias, machine autonomy, and data privacy, as well as how to encourage students to consider and address these challenges in the context of teaching and learning (Tsamados et al., 2021).

First, ethical education is incorporated. Higher education instructors should integrate ethics education into their curriculum design, make students aware of the ethical challenges of AI technologies, and develop their critical thinking skills through case studies, discussions, and project research.

The second is the development of ethical awareness. Instructors should set an example of ethics for their students by demonstrating ethical behavior. This involves stressing

principles like honesty, decency, and equity in their instruction as well as how these principles are represented in AI applications.

b) Responsibility

Responsibility emphasizes the responsibilities that instructors have in AI education, including their responsibilities to students, society, and the environment. It calls on instructors to pay attention to their pupils' social and ethical growth in addition to their academic performance.

First, emphasis is placed on social responsibility. In addition to encouraging students to consider how AI technologies might be utilized to advance social well-being, higher education instructors should teach students about the effects of AI technologies on society, including employment, social structure, and culture.

The second is being environmentally responsible. Instructors of AI education should stress the value of sustainability and teach students how to address environmental effects in AI applications, for example, by using eco-friendly algorithms and data collection techniques.

The third is the advancement of educational fairness. Regardless of their background or skill level, instructors should embrace AI technology to promote educational fairness and guarantee that all students have access to top-notch learning materials.

By following the path of moral awakening and responsibility, university instructors' AI competency can not only improve their own sense of ethics and responsibility but also develop students' sense of social responsibility and ethics as they use and create AI technology. The development of this kind of competency is essential for fostering educational innovation, raising educational standards, and adjusting to the way that education is changing in the AI era.

4. Conclusion

In order to guide university instructors' professional growth during this time of transition, this study explores the significance of AI competency for instructors in the age of AI and develops a thorough framework for AI competency. In order to propose a multi-dimensional AI competency framework, we analyze the four dimensions of knowledge, application, skills, and values. We also examine the implementation paths of interdisciplinary knowledge system construction, competence construction and practical application, moral awakening, and responsibility.

As AI technology continues to advance and is widely used in the field of education, university instructors' roles are changing significantly. Instructors have evolved into learning mentors, innovators, and moral instructors rather than merely imparting knowledge (Zhai, 2024). Consequently, a crucial element in determining whether educational transformation is successful or not is the level of AI competency among university instructors. In the age of AI, university instructors should be equipped with a framework of AI competency that encompasses not only a thorough understanding of AI technologies but also the capacity to integrate these technologies into their teaching practices and foster students' ethical consciousness and sense of social responsibility. Building an interdisciplinary knowledge system allows university instructors to expand

their knowledge base, incorporate ideas and approaches from several fields, and create a holistic AI teaching system. Through multidisciplinary collaboration, professional development training, and the accumulation of real-world experience, the route of ability construction and practical application pushes instructors to enhance their AI application skills. Instructors who follow the road of ethical awakening and accountability must always be mindful of the ethical and social ramifications of their use of AI technology.

Enhancing AI competency among higher education instructors is a continuous process that calls for collaboration from academic institutions, policymakers, and universities. In order to foster instructors' AI competency, HEIs should offer the required tools and assistance, including multidisciplinary collaboration platforms, professional training, and research possibilities. At the same time, in order to guarantee that instructors can stay up to date with the latest technology advancements, educational institutions should incorporate AI competency instruction into their current instructor education programs. Enhancing university instructors' AI competency would help them not only adjust to the rapid advancements in educational technology but also develop future citizens with creative thinking skills and a sense of moral obligation. Enhancing university instructors' AI competency would enable us to give students better educations and develop future-ready individuals who can handle the issues of society.

Ethics Approval and Consent to Participate

This study did not involve human or animal subjects, and thus, no ethical approval was required. The study protocol adhered to the guidelines established by the journal.

Acknowledgement

The authors thank Faculty of Education and Sports Studies, Universiti Malaysia Sabah, for technical support.

Funding

This study received no funding.

Conflict of Interest

The authors reported no conflicts of interest for this work and declare that there is no potential conflict of interest with respect to the research, authorship, or publication of this article.

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