

AI Integration in Pedagogical Practices: A Quantitative Analysis of the Competence of College Teachers

Joan P. Guinto, University of the Cordilleras, Philippines
Shayne Klarisse E. Dinamling, University of the Cordilleras, Philippines
Ibrahim F. Hanbal, University of the Cordilleras, Philippines
Don Harl C. Malabanan, University of the Cordilleras, Philippines
Dionisio R. Tandingan Jr., University of the Cordilleras, Philippines

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Abstract

In the last few years, Artificial Intelligence (AI) became a driving force for globalization and economic shifts. Particularly, its impact on the educational sector became a major consideration with the paradigm shift of many educational institutions around the world. The purpose of this study is to examine the extent of competence of teachers with the integration of AI tools in their pedagogical practices. Through quantitative descriptive design, a survey questionnaire was administered to 388 college teachers. It was found that the college teachers are competent in terms of the use of various AI tools. This result is supported by best practices such as the provision of AI-focused faculty development programs and establishment of an AI team in the institution.

Keywords: AI integration, AI tools, AI use, pedagogical practices, college teachers

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Introduction

In the last few years, Artificial Intelligence (AI) became a driving force for globalization and economic shifts. Particularly, its impact on the educational sector became a major consideration with the paradigm shift of many educational institutions around the world. It became a disruptive innovation that changed various educational processes particularly with teaching-learning activities such as assessment and content development.

Literature Review

Generally, AI is defined as a technology that enables machines to perform with human-like abilities (Sheikh et al., 2023). Due to its fast development, it has been applied widely in educational practices such as intelligent tutoring systems, adaptive learning systems, and personalized learning (Kamalov et al., 2023; Ouyang & Jiao, 2021). Specifically, many teachers began to reconsider its integration towards their own pedagogical practices such as in their teaching practices and classroom management (Huang et al., 2021).

Even before it became popular in 2023, AI has been integrated in different facets of education for the last 15 years. Zhai et al. (2021) analyzed a total of 100 research articles from 2010 and found that there are three main dimensions in which AI is used in education. They described these three dimensions as development (i.e.: classification, recommendation, and deep learning), extraction (i.e.: feedback, reasoning, and adaptive learning), and application (i.e.: role playing, immersive learning, and gamification). In addition, Holmes and Tuomi (2022) identified three foci on how AI is commonly used in various educational institutions namely: student-focused AI (i.e.: AI-assisted simulations, chatbots, and dialogue-based tutoring systems), teacher-focused AI (i.e.: plagiarism detection, smart curation of learning materials, and automatic summative assessment), and institution-focused AI (i.e.: admissions, course planning, and school security).

Despite its numerous potentials, AI integration in education still presents issues and challenges. The popularity of generative AI such as ChatGPT presented issues on ethical and responsible use of AI in education (Bibi et al., 2024). Issues in data privacy and transparency present questions on the collection and analysis of vast amounts of student data (Bibi et al., 2024; Chima et al., 2024).

Similarly, the Philippines also faces issues about data privacy concerns. However, unlike other countries, there are also other pressing problems that should be addressed such as digital divide, unequal access, and lack of faculty training and development (Dalan, 2023; Estrellado & Miranda, 2023). Hence, this study aims to address these research gaps through exploring the familiarity and competence of college teachers in integrating AI in their pedagogical practices.

This study sought to examine how college teachers of the University of the Cordilleras integrate Artificial Intelligence (AI) tools in their pedagogical practices. Specifically, this study sought to answer the following questions:

1. What is the extent of familiarity of college teachers with the use of AI tools?
2. What is the extent of competence of college teachers with the integration of AI tools in their pedagogical practices?

Methodology

This study employed descriptive quantitative research design to examine the familiarity of college teachers with the use of AI tools and their extent of competence with the integration of AI tools in their pedagogical practices.

A two-part survey questionnaire entitled Artificial Intelligence Training Needs Assessment (AI-TNA) Tool was developed. The first part consists of 6 indicators focusing on the familiarity of the teachers with AI tools whereas the second part consists of 9 indicators focusing on the level of competence of teachers in AI integration. This survey questionnaire was distributed online through the use of Google form.

The study was conducted at the University of the Cordilleras, Philippines. The survey questionnaire was administered to 388 college teachers from 10 colleges, namely: College of Accountancy, College of Architecture and Fine Arts, College of Arts and Sciences, College of Business Administration, College of Criminal Justice Education, College of Engineering, College of Hospitality Tourism and Management, College of Information Technology and Computer Sciences, College of Nursing and Allied Health Services, and College of Teacher Education.

Before the data gathering collection, the researchers requested the Vice-President of Academics for the approval to float the AI-TNA Tool to the various colleges. During the data gathering collection, the researchers provided a letter of consent for the respondents for them to know the basic ethical standards applied in the study. After the data gathering collection, the collected data were tallied, analyzed, and interpreted.

Weighted mean was used to identify the extent of familiarity of college teachers with the use of AI tools and their extent of competence with the integration of AI tools in their pedagogical practices. Table 1 presents the extent of familiarity of college teachers with the use of AI tools whereas Table 2 presents the extent of competence of college teachers with the integration of AI tools in their pedagogical practices.

Table 1

Statistical Range on the Extent of Familiarity of College Teachers With the Use of AI Tools

Statistical Range	Descriptor	Interpretation
3.25–4.00	Very Familiar	The college teachers have comprehensive understanding and knowledge about the use of AI tools.
2.50–3.24	Familiar	The college teachers have adequate understanding and knowledge about the use of AI tools.
1.75–2.49	Slightly Familiar	The college teachers have limited understanding and knowledge about the use of AI tools.
1.00–1.74	Not Familiar	The college teachers have little to no knowledge about the use of AI tools.

Table 2

Statistical Range on the Extent of Competence of College Teachers With the Integration of AI Tools in Their Pedagogical Practices

Statistical Range	Descriptor	Interpretation
3.25–4.00	Highly Competent	The college teachers demonstrate comprehensive knowledge, skills, and abilities in AI tools integration.
2.50–3.24	Competent	The college teachers demonstrate adequate knowledge, skills, and abilities in AI tools integration.
1.75–2.49	Slightly Competent	The college teachers demonstrate limited knowledge, skills, and abilities in AI tools integration.
1.00–1.74	Not Competent	The college teachers demonstrate little to no knowledge, skills, and abilities in AI tools integration.

The researchers were given a notice to proceed by the ethics committee of the University of the Cordilleras. In their letter of consent, the researchers informed their respondents about data privacy and confidentiality. They assured the respondents that the data will solely be used for the purpose of the study and that the respondents will not receive remuneration for their participation.

Results and Discussion

This part of the study presents the results, interpretation, and discussion of the data collected. Table 3 presents the analysis of data on the extent of familiarity of college teachers with the use of AI tools whereas Table 4 presents the extent of competence of college teachers with the integration of AI tools in their pedagogical practices.

Table 3*Extent of Familiarity of College Teachers With the Use of AI Tools*

AI Tools	Weighted Mean	Descriptive Equivalent
Generative Tools (i.e.: ChatGPT, Google Gemini, and Microsoft Copilot)	3.46	Very Familiar
Grammar Checking Tools (i.e.: Grammarly and QuillBot AI)	2.97	Familiar
AI for Data Analysis (i.e.: Excel Copilot, ChatGPT, and MathGPT)	2.90	Familiar
Creative Tools (i.e.: Canva Ai and Microsoft Designer)	2.88	Familiar
AI-Assisted Research Tools (i.e.: NotebookLM, Elicit, ChatPDF, and Research Rabbit)	1.78	Slightly Familiar
Learning Management Systems (LMS) with AI Features (i.e.: Magic School AI and Khanmigo)	1.78	Slightly Familiar
General Weighted Mean	2.81	Familiar

Generally, the college teachers are familiar (2.81) with the use of AI tools. This means that the teachers have adequate understanding and knowledge about the use of AI tools. This result supports the study of Kurshumova (2024) in which the majority of Bulgarian teachers have higher levels of familiarity with AI technology. According to College Teacher 9, the university's Institute of Teaching and Learning conducted a series of AI capacity building workshops that helped her become more familiar with the AI tools mentioned in the survey questionnaires. In addition, College Teacher 20 specifically mentioned programs such as AI institutional trainings and programs such as Technological Consortium for Awareness, Readiness, and Advancement Knowledge in Innovation (TARAKI) led by the Department of Science and Technology (DOST) and the university's Office of the Vice-President for Research and Innovation.

Specifically, the college teachers are very familiar (3.46) with the use of generative tools (i.e.: ChatGPT, Google Gemini, and Microsoft Copilot). Most of the teachers use generative tools for the preparation of reports (College Teacher 1), creation of syllabus (College Teacher 9), and development of learning materials (College Teacher 12). Based on these statements, the use of generative tools has indeed increased throughout the years as they are perceived as valuable tools not only for teachers but also for students (Bibi, Yamin, Natividad, Rafique, Akhter, Fernandez, & Samad, 2024; Kaplan-Rakowski, Grotewold, Hartwick, & Papin, 2023).

On the other hand, the college teachers are only slightly familiar (1.78) with the use of LMS with AI features (i.e.: Magic School AI and Khanmigo). Despite the initiatives of the university, there are still some teachers who do not have training with the use of AI features in the LMS. Others like College Teacher 1 mentioned that some of the AI workshops in relation to the use of LMS are only introductory. In the Philippines, Heretape and Paglinawan (2025) enumerated challenges such as limited digital literacy, unstable internet connection, and sustainability of

student engagement as factors hindering the effective use of LMS and the integration of other AI and digital tools.

Table 4

Extent of Competence of College Teachers With the Integration of AI Tools in Their Pedagogical Practices

AI Competence Indicators	Weighted Mean	Descriptive Equivalent
I use AI ethically and responsibly in teaching and learning.	3.27	Highly Competent
I use AI-powered learning tools for academic productivity.	3.22	Competent
I apply my understanding on AI's impact on education and the workplace.	3.09	Competent
I use AI tools to assist in content creation.	3.07	Competent
I understand what AI is and its general application.	3.05	Competent
I evaluate the content generated by AI tools in terms of accuracy, bias, and reliability.	3.05	Competent
I promote digital and AI literacy among students.	2.97	Competent
I facilitate personalized learning and student engagement using AI tools.	2.89	Competent
I use AI to assist in research, data analysis, or publication support.	2.88	Competent
General Weighted Mean	3.02	Competent

Generally, the college teachers are competent (3.02) with the integration of AI tools in their pedagogical practices. This means that the college teachers demonstrate adequate knowledge, skills, and abilities in AI tools integration. In congruence, College 6 narrated that she integrates various AI tools in the courses that she handles. In his courses, College Teacher 18 exemplified his competence in AI integration as he uses AI tools in demonstrating how to use AI in creating and re-creating models and prototypes. Furthermore, College Teacher 16 emphasized that integrating AI to her pedagogical practices provides varied activities for different learning styles. Similar to these experiences, Ren and Wu (2025) argued that the competence of college teachers in AI technologies enables a more meaningful teaching-learning process such as AI-supported innovative pedagogy and AI-driven learning experience design and delivery.

Specifically, the college teachers are highly competent (3.27) with using AI ethically and responsibly in teaching and learning. Prioritizing ethical principles in AI integration promotes fairness, transparency, accountability, and inclusivity that can support the diverse needs and aspirations of students (Abbas, 2023; Chima, Onyebuchi, & Idowu, 2024). The ethical and responsible use of AI was also highlighted by College Teacher 2 as she discussed to the students

about the “careful” use of AI; however, despite this ethical awareness, she added that the creation of a standardized policy on AI use within the university is also needed. College Teacher 3 and College Teacher 9 also noted that a guideline on proper, ethical, and responsible use of AI is an important addition to AI integration.

On the other hand, the result shows that the lowest indicator is the college teachers’ use of AI to assist in research, data analysis, or publication support (2.88). Despite their competence on the said indicator, many of the college teachers such as College Teachers 1, 2, 3, 6, 7, and 15 mentioned that they need more training with the use of AI in research. In addition, College Teachers 1 and 19 also cited paid subscriptions and other funded support for the use of AI are needed to strengthen the competence of the college teachers in the integration of AI in research.

Conclusion

The introduction of AI is one of the most transformative integrations of technology in the field of education in the 21st century. With this change, teachers are expected to be the forerunners of AI as they themselves try to navigate this innovation. In this study, college teachers demonstrated both familiarity and competence in the use and integration of AI tools in their pedagogical practices. Initiatives such as capacity building through the university’s AI team provided the needed assistance for the college teachers in exploring various AI tools. As a result, the college teachers were able to use and integrate AI tools in various teaching and learning contexts. However, university support such as the creation of AI guidelines and subscription to various AI tools are still needed by the college teachers to further their knowledge and abilities in using and integrating AI tools in their teaching practices.

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Contact emails: jopucya@uc-bcf.edu.ph
sedinamling@uc-bcf.edu.ph
ifhanbal@uc-bcf.edu.ph
dcmalabana@uc-bcf.edu.ph
drtandingan@uc-bcf.edu.ph