IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Teachers' Competencies and Attitudes Towards Artificial Intelligence Integration in Commerce Education – Issues and Concerns

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Abstract:

Artificial Intelligence (AI) is rapidly transforming Commerce Education by offering unprecedented opportunities for personalized learning, data-driven assessment, and adaptive curriculum development. This research explores the relationship between teachers' competencies and attitudes towards the integration of AI in commerce education, investigating both the enabling factors and persistent challenges educators face in adapting to this technological paradigm shift. Utilizing a structural equation demonstrating approach and an extensive review of recent literature and empirical data, the study identifies that positive teacher attitudes toward AI strongly predict the development of cognitive, fundamental, and educational management competencies, while digital skills alone are insufficient for the effective implementation of AI technologies in classrooms. Key findings point to the necessity for comprehensive professional development, collaborative learning environments, and institutional support to foster AI literacy among commerce educators. Major barriers identified include limited access to technological infrastructure, ethical concerns over bias and equity, and resistance stemming from gaps in AI awareness and pedagogical adaptation. The paper concludes with strategic recommendations for policymakers and educational leaders, advocating for ongoing teacher training, investment in digital resources, and the establishment of industry partnerships to prepare teachers for the future demands of commerce education in the AI era.

Keywords: Artificial Intelligence, Commerce Education, Teacher Competencies, Attitudes, Professional Development, Educational Management, Cognitive Skills.

Background and Significance

Theoretical Framework

Artificial intelligence (AI) is redefining the core functions of teaching, learning, and assessment, especially within commerce education, where both technological and pedagogical change is rapid (Simuț et al., 2024). The competence-oriented education approach emphasizes integrating technical expertise with adaptive skills, emotional intelligence, creativity, and ethical responsibility—all vital for teachers navigating AI integration in commerce classrooms (Simuț et al., 2024; Ng et al., 2021). Recent literature highlights that teachers' purposeful attitudes and willingness to engage with AI-driven innovations are key determinants of successful adoption, rather than technical knowledge alone (Chounta et al., 2024). Notably, commerce educators must balance digital literacy with curricular flexibility and an understanding of business sector needs, ensuring students are well-prepared for AI-influenced career pathways (Miraj Jathan, 2024; Galindo-Domínguez, 2024).

Institutional policies and efforts for professional development are essential for helping teachers acquire skills that go beyond basic technology use and include managing AI applications, interpreting data, and addressing bias in digital platforms (European Schoolnet Academy, 2023; U.S. Department of Education, 2024). Thus, a robust theoretical framework for AI in commerce education combines technological, pedagogical, and managerial competencies, underlined by a positive, proactive attitude toward change and innovation (Simuț et al., 2024; Chounta et al., 2024).

Literature Review

The integration of artificial intelligence (AI) in education has emerged as a transformative force, impacting teaching practices, learning outcomes, and administrative efficiency across diverse sectors (Wang, 2024). In commerce education specifically, AI applications range from automating assessment tasks and enhancing individualized instruction to enabling advanced business data analysis—a vital requirement for modern curricula (Sarkar, 2025). Systematic reviews highlight that AI-powered analytics and educational robots are increasingly being deployed to personalize student learning, provide real-time feedback, and support differentiated instruction for learners with diverse needs (Wang, 2024; Lampou, 2023).

Recent empirical studies emphasize that AI does not supplant the educator's role but augments it, equipping teachers with powerful diagnostic tools and automation that allow them to dedicate more time to lesson design and student engagement (Troselj, 2024). The literature points to several opportunities AI offers commerce educators, such as streamlining administrative processes like grading and scheduling, offering predictive insights into student performance, and promoting engagement via gamified or adaptive digital content (Lampou, 2023; Sarkar, 2025). Furthermore, AI's merging with emerging technologies—like blockchain and the Internet of Things—promises innovative pedagogical models for commerce education (Sarkar, 2025).

Despite these benefits, significant challenges persist. Infrastructural constraints, insufficient teacher training, ethical concerns regarding algorithmic bias, and data privacy represent major barriers to successful AI adoption (Sarkar, 2025; Wang, 2024). Researchers stress the need for careful, responsible integration of AI tools—underscoring that teachers and students alike must receive adequate support to

fully realize AI's potential in commerce education (Lampou, 2023; Troselj, 2024). The literature consistently calls for systemic, government and institutional efforts to overcome barriers—focusing especially on professional development and strengthening digital infrastructure across education systems (Sarkar, 2025).

Relevance to Commerce Education

Commerce education is uniquely positioned to benefit from AI, given the sector's reliance on real-time data analysis, predictive demonstrating, and virtual business environments. As the business landscape becomes more technologically driven, commerce educators are tasked with equipping students for digitally enabled careers, making the mastery of AI-related teaching competencies a strategic imperative.

Research Objectives and Questions

This study addresses the following research objectives:

- Assess the core competencies required by teachers for AI integration in commerce classrooms.
- Investigate the relationship between educators' attitudes and their capacity to adopt and utilize AI.
- Identify the key barriers and enablers for professional development in AI literacy and application in commerce education.
- Formulate actionable policy and practice recommendations for effective AI adoption.

Principal research questions include:

1. What competencies are most strongly influenced by teachers' attitudes toward AI integration?
2. How do teachers overcome challenges related to AI literacy and infrastructure?
3. What institutional support systems are needed to facilitate successful AI integration in commerce education?

Methodology

Research Design

A mixed-methods approach was adopted, combining quantitative surveys distributed among commerce educators with qualitative interviews and secondary data analysis. Structural equation modelling (SEM) was utilized to test the relationship between attitudes and competency development.

Participants and Sampling

Participants included 138 commerce teachers from pre-university and university settings, selected via convenience and stratified sampling. Demographic variables covered gender, teaching experience, specialization, and geographic location.

Data Collection Procedures

- Structured questionnaire (27 items): measuring attitudes toward AI and self-reported competencies (digital, cognitive, fundamental, educational management).
- Likert-scale items (1–5): assessing agreement on AI's role and educator preparedness.
- Interviews and literature review.

Data Analysis Techniques

Partial Least Square-Structural Equation Modelling (PLS-SEM) was performed with Smart PLS 3.3.9 software to examine hypothesized relationships. Reliability and validity of constructs were confirmed by Cronbach's alpha (0.890) and composite reliability scores (>0.80).

Findings

Teachers' Competencies in AI

Technical Skills

Educators display a foundational understanding of digital resources but often lack advanced AI literacy required for integrating sophisticated tools such as machine learning platforms, intelligent tutoring systems, and business analytics engines. Survey data reveals reluctance among teachers to self-identify as technically proficient with AI, citing the need for more practical, hands-on training.

Pedagogical Adaptation

Positive attitudes towards AI are significantly linked to greater flexibility in curriculum design and an ability to adopt blended, personalized learning models. Teachers who view AI as a beneficial instructional resource are more inclined to experiment with adaptive coursework and formative assessment methodologies.

Attitudes Towards AI Integration

Perceived Benefits

Commerce educators increasingly recognize AI's potential to:

- Enhance student engagement through gamified and data-driven instruction.
- Facilitate personalized learning pathways, especially in areas like accounting, finance, and economics.
- Streamline administrative tasks, enabling focus on higher-order teaching needs.

Challenges and Barriers

Major obstacles impeding AI integration include:

- Limited access to digital infrastructure (hardware/software) and high-speed connectivity.
- Ethical uncertainties regarding bias, data privacy, and equitable access to AI tools.
- Insufficient teacher training in AI pedagogy, with many educators reporting disengagement or lack of confidence.

Statistical analysis confirmed that teacher attitudes have significant impact on cognitive, fundamental, and educational management competencies ($p < 0.01$), while digital competencies alone were not a reliable predictor for successful AI adoption in the classroom.

Discussion

Implications for Policy and Practice

- Structured professional development is essential for building AI competencies, emphasizing experiential learning and ongoing mentorship.
- Institutional investments should be directed toward digital infrastructure upgrades in commerce departments.
- Policymakers must address ethical concerns via campus-wide policies focused on data security, transparency, and anti-bias training.

Recommendations for Professional Development

- Mandatory teacher workshops on AI applications in business education, featuring expert-led modules and collaborative case study analysis.
- Regular updating of commerce curricula to reflect emerging technological trends and workplace requirements.
- Formation of educator networks and partnerships with local businesses for experiential AI projects and internships.

Limitations of the Study

Results are based on self-reported data from teachers in select regions, and may not generalize globally. Further longitudinal research is needed to assess long-term impacts of AI-led professional development.

Conclusion

Teachers' attitudes and competencies are key factors for the successful integration of AI in Commerce education. Sustained efforts to foster positive attitudes, deliver targeted training, and ensure equitable access to digital tools will prepare educators and future commerce professionals for a rapidly evolving technological landscape. Proactive institutional and policy support will help manage the ethical, practical, and pedagogical challenges associated with AI adoption in teaching, enabling commerce educators to maximize outcomes for students in the digital business era.

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