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AN INTELLIGENCE-BASED ARTIFICIAL INTELLIGENCE FRAMEWORK FOR ELEMENTARY TEACHERS IN THE DIVISION OF COTABATO

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ABSTRACT

This study aimed to develop an intelligence-based artificial intelligence (AI) framework for elementary teachers in the Division of Cotabato by examining the relationship between AI competencies and decision-making, as well as exploring teachers' perceptions and experiences in integrating AI into classroom instruction. A mixed-methods research design was employed, combining a descriptive-correlational approach for quantitative data and a phenomenological approach for qualitative insights. The findings revealed that ICT coordinators demonstrated high levels of competence across all AI domains, particularly in data literacy and transdisciplinary knowledge, which significantly influenced their decision-making processes. Furthermore, teachers perceived AI as a valuable tool for enhancing instruction, although challenges such as limited training and ethical concerns were identified. Based on these results, a dissemination plan was proposed to strengthen AI integration in elementary education. The study contributes to the advancement of AI literacy among educators and supports the achievement of quality education.

INTRODUCTION

Artificial intelligence has become increasingly integrated into educational systems, transforming the way teachers deliver instruction, engage learners, and assess performance. While AI offers innovative opportunities to improve educational outcomes, the role of teachers remains essential in guiding the learning process. Teachers must possess not only technical knowledge but also ethical awareness, critical thinking, and pedagogical skills to ensure that AI is used effectively and responsibly in the classroom. This highlights the need for a structured framework that supports the development of AI literacy among educators.

Recent studies emphasize that AI literacy extends beyond the use of digital tools and includes understanding how AI systems function, evaluating their outputs, and applying them ethically in educational contexts. However, existing research primarily focuses on secondary and higher education, leaving a gap in understanding how elementary teachers, particularly in rural areas such as the Division of Cotabato, develop and apply AI competencies. Additionally, there is limited attention given to the integration of ethical considerations, interdisciplinary knowledge, and contextual relevance in AI education.

In response to these gaps, this study proposes an intelligence-based AI framework that integrates multiple competencies, including AI ethics, AI thinking, computational thinking, digital literacy, data literacy, and transdisciplinary knowledge. By examining how these competencies influence decision-making and teaching practices, the study aims to provide a comprehensive model that supports teacher readiness and enhances the effective integration of AI in elementary education.

METHODS

This study employed a mixed-methods research design to provide a comprehensive analysis of AI competencies and their influence on decision-making and teaching practices. The quantitative phase utilized a descriptive-correlational design to assess the levels of intelligence-based AI competencies among ICT coordinators and to determine the relationship between these competencies and their decision-making processes. This approach allowed for the collection of measurable data that described current conditions and identified significant associations between variables.

The qualitative phase adopted a phenomenological approach to explore the lived experiences of elementary teachers in integrating AI into classroom instruction. This method enabled the researcher to capture in-depth insights into teachers' perceptions, challenges, and competencies, providing a richer understanding of how AI is applied in real educational settings.

The study involved 300 ICT coordinators selected through stratified sampling to ensure representation across three congressional districts in the Division of Cotabato. In addition, 25 teachers participated in in-depth interviews to provide qualitative data. Data were collected using a structured survey questionnaire with Likert-scale items and an interview guide

designed to explore teachers' experiences. Ethical considerations were strictly observed, including informed consent, confidentiality, anonymity, and respect for participants' rights. Quantitative data were analyzed using statistical tools such as mean, Pearson correlation, and regression analysis to determine relationships and predictive influences among variables. Qualitative data were analyzed through thematic analysis to identify recurring patterns and themes related to AI integration in teaching.

RESULTS

The results of the study revealed that ICT coordinators demonstrated a high level of competence across all dimensions of intelligence-based artificial intelligence. AI ethics recorded the highest level, indicating strong awareness of ethical responsibilities such as data privacy, transparency, and responsible use of AI in education. Similarly, AI thinking, computational thinking, digital literacy, data literacy, and transdisciplinary knowledge were all rated as highly competent, reflecting the readiness of ICT coordinators to engage with AI technologies in educational settings.

In terms of decision-making, ICT coordinators consistently demonstrated high levels of competence across technical and operational, instructional and pedagogical, strategic and administrative, and ethical and data governance dimensions. This suggests that they are capable of making informed decisions that support both technological and educational goals. The correlation analysis revealed a strong and significant relationship between AI competencies and decision-making. Among the various competencies, data literacy emerged as the strongest predictor, followed by transdisciplinary knowledge and computational thinking. These findings indicate that the ability to analyze and interpret data plays a crucial role in enhancing decision-making processes in educational contexts.

Regression analysis further confirmed that data literacy, AI thinking, AI ethics, and computational thinking significantly influence decision-making, while digital literacy alone did not show a significant effect in certain areas. This suggests that higher-order competencies are more critical than basic technical skills in an AI-integrated educational environment.

Qualitative findings revealed that teachers perceive AI as a valuable tool for improving teaching efficiency, supporting personalized learning, and enhancing student engagement. However, challenges such as limited training, lack of resources, and concerns about data

privacy and ethical use were also identified. These insights highlight the need for continuous professional development and institutional support to ensure effective AI integration.

DISCUSSION

The findings of this study emphasize the importance of intelligence-based AI competencies in shaping effective decision-making among ICT coordinators and educators. The strong relationship between data literacy and decision-making suggests that modern educational practices are increasingly driven by data-informed strategies. This aligns with the growing emphasis on evidence-based teaching, where educators use data to guide instructional decisions and improve student outcomes.

The high levels of competence observed among ICT coordinators indicate that they are well-prepared to support AI integration in schools. However, the qualitative findings reveal that teachers still face challenges in applying these competencies in classroom settings. This highlights a gap between knowledge and practice, which may be addressed through targeted training and professional development programs.

The limited influence of digital literacy on decision-making suggests that basic technological skills are no longer sufficient in the context of AI integration. Instead, educators must develop higher-order competencies such as critical thinking, ethical reasoning, and interdisciplinary knowledge. These skills enable teachers to evaluate AI systems, understand their implications, and apply them effectively in diverse learning environments.

Ethical considerations also emerged as a critical component of AI integration. The emphasis on data privacy, transparency, and responsible use reflects the need for ethical frameworks that guide the use of AI in education. Ensuring that AI technologies are used in a manner that respects human values and promotes equitable learning opportunities is essential for sustainable educational development.

CONCLUSION

This study concludes that ICT coordinators in the Division of Cotabato possess high levels of intelligence-based AI competencies, which significantly influence their decision-making processes. Data literacy was identified as the most influential factor, highlighting the importance of data-driven approaches in modern education. Teachers recognize the potential

of AI to enhance teaching and learning; however, challenges related to training, resources, and ethical concerns must be addressed.

The development of an intelligence-based AI framework provides a structured approach to integrating AI in elementary education, ensuring that teachers are equipped with the necessary competencies to navigate technological advancements. By strengthening AI literacy and promoting ethical practices, the framework contributes to improving educational quality and supporting the broader goals of educational development.