THE IMPACT OF EMPLOYING EDUCATIONAL ARTIFICIAL INTELLIGENCE APPLICATIONS ON DEVELOPING MATHEMATICAL LOGICAL THINKING SKILLS AMONG THIRD-GRADE BASIC STUDENTS IN THE UNIVERSITY DISTRICT DIRECTORATE OF EDUCATION

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Abstract: This study aimed to investigate the impact of employing educational artificial intelligence (AI) applications on developing mathematical logical thinking skills among third-grade basic students in the University District Directorate of Education in Jordan during the academic year 2025/2026. To achieve the objectives of the study, the researcher employed the experimental method using a quasi-experimental design. The study sample consisted of 60 students from the third basic grade, who were randomly divided into two groups: an experimental group of 30 students and a control group of 30 students. To collect data from the participants, a Mathematical Logical Thinking Skills Test was used after verifying its validity and reliability. The results indicated statistically significant differences in the performance of the two groups on the test, with the experimental group outperforming the control group across all six logical thinking skills (analysis, inference, logical connection, problem-solving, critical thinking, and logical organization). In light of these findings, the study recommends employing educational AI applications in teaching mathematics and organizing workshops and training courses for teachers to enhance their ability to integrate these technologies into learning activities, thereby contributing to the development of students' logical thinking skills.
Keywords: Artificial Intelligence; Mathematics; Logical Thinking Skills; Third Basic Grade; Educational Applications.

Introduction

Education in the current era is witnessing significant developments in the integration of Artificial Intelligence (AI) as an educational tool capable of enhancing learning quality and personalizing it according to individual student needs. This is achieved through data analysis and machine learning techniques to provide interactive and adaptive learning outcomes. AI's role extends beyond merely delivering educational content; it also involves designing intelligent learning environments that respond to the student's level, identify strengths and weaknesses, and provide suitable instructional strategies for each case, thereby promoting personalized learning and making the teaching process more effective and precise (Russell & Norvig, 2020).

In the context of teaching mathematics, which is considered one of the most challenging subjects due to its abstract nature, achieving a deep understanding of mathematical concepts requires the development of logical thinking skills. These skills form the foundation of mathematical cognition and are essential for building the mental capacities necessary to solve complex mathematical problems and analyze relationships among different mathematical phenomena (Chiu, 2025). Effective mathematics education is not limited to rote memorization; it must include the development of reasoning, classification, and critical analysis skills, which require continuous practice and stimulating learning environments that adapt to the student's capacity for comprehension.