

ALEKS Usage and Mathematical Achievement Gaps in Ninth-Grade Students: A Quantitative Analysis

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ABSTRACT

This study will examine the relationship of using ALEKS in ninth-grade mathematics learning on pre-existing achievement gaps shown in algebra one honors and geometry honors students. This is an important area to look at because achievement gaps in mathematics become noticeable when large groups of students come from varying mathematical backgrounds and abilities in their transition to high school. This study will employ a multivariate regression analysis using SPSS. Deidentified data from a charter high school will be used. The goal of this research is to help contribute to the field of mathematics education by looking at the impact of using AI-enhanced interventions like ALEKS on achievement gaps in ninth-grade mathematics students.

INTRODUCTION

Because ninth graders enter high school with varied math preparation creating achievement gaps, they need to be addressed in high school. That's why this study examines the associations of using ALEKS with ninth-grade math students and mathematical achievement gaps shown from middle school math performance. Many studies have shown that digital learning platforms can increase student achievement through personalized learning experiences, and they can help teachers to manage teaching processes more effectively (Yıldız & Körpeoğlu, 2025; Cirneanu & Moldoveanu, 2024). However, less is known about how these platforms impact students with varying levels of mathematical abilities and backgrounds and whether they help to narrow achievement gaps amongst students. Looking at AI-enhanced digital technology in mathematics education, specifically ALEKS, will help to determine if these types of learning interventions help to narrow these achievement gaps or not. Looking at the two groups (algebra one honors and geometry honors) will allow for a more accurate representation of ninth grade students.

IRB Approval Pending

ALEKS

"ALEKS (Assessment and Learning in Knowledge Spaces) is a personalized math learning accelerator that helps K-12 students reach mastery more than 90% of the time. Backed by more than 25 years of research, this transformative program pinpoints the math concepts each student does and doesn't understand before generating the individual support required to achieve mastery" (McGraw Hill, 2026).



PROPOSED METHODS

Participants



Ninth grade Algebra 1 Honors and Geometry Honors students at a charter high school.

Materials

Data will be analyzed in SPSS using multivariate regression.



Variables

- 8th Grade FAST scores
- ALEKS Knowledge Check scores
- Number of topics completed
- Grades from the enrolled course
- Attendance throughout the course



Procedure

Data will be analyzed to determine ALEKS usage trends and changes in achievement gaps.

CURRENT LITERATURE

Impact of technology on mathematics achievement

- Digital tools can personalize instruction (Cirneanu & Moldoveanu, 2024).
- AI platforms can increase engagement and mastery (Serin, 2023).

Integration of technology into mathematics instruction

- Access, integration, and digital skills can influence outcomes (Viberg et al., 2023).
- Technology should be used meaningfully in mathematics education and not because of societal expectations (Kanandjebo & Lampen, 2022).

The role of AI-driven learning platforms like ALEKS in mathematics education.

- Alkhasawneh (2025) found that AI-based mobile educational platforms can have a positive impact on mathematics achievement.
- Programs like ALEKS highlight these innovations by providing individualized knowledge checks, personalized learning paths, and limitless practice with explanations (McGraw Hill, n.d.).

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