Efficacy Study of ALEKS Adventure In a Pennsylvania School District

Michael A. Cook, PhD, Jane M. Eisinger, MS,
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Alan Cheung, PhD, Steven M. Ross, PhD

Center for Research and Reform in Education
The Johns Hopkins University School of Education
2800 N. Charles St
Baltimore, MD 21218
https://education.jhu.edu/crre

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EXECUTIVE SUMMARY

In this descriptive mixed-methods study, we examined the impacts of McGraw Hill's ALEKS Adventure program on Grades 1-2 student math achievement in a Pennsylvania school district. The primary focus of this report was ALEKS Adventure's impacts on NWEA Measures of Academic Progress (MAP) math scores, as well as teacher perceptions of the ALEKS Adventure program.

- Beginning-of-year (BOY) to end-of-year (EOY) MAP math score gains were examined as the primary quantitative analyses, with gains also analyzed by subgroup. BOY to EOY MAP math gains in 2024-25 were also compared to those in the pre-program year, 2023-24. In addition, we examined associations between student-level digital ALEKS Adventure usage data and MAP math scores.
- The analytic sample consisted of 200 Grades 1-2 students from one elementary school in a Pennsylvania school district. In addition, the interview sample consisted of seven Grades 1-2 teachers that used ALEKS Adventure in the 2024-25 school year.
- McGraw Hill provided student-level digital usage data, including metrics such as total program time, course progress, and counts of skills learned. The teacher interview protocol captured teachers' perceptions of ALEKS Adventure.
- Descriptive analyses showed that students averaged nearly 21-point gains on MAP math scores from BOY to EOY of the 2024-25 school year. Further, MAP math gains in 2024-25 were significantly larger (3.6 points) than those in 2023-24, before ALEKS Adventure was implemented in the district.
- Students averaged nearly 26 hours of total program usage time across the 2024-25 school year, with Grade 1 students averaging nearly 5 hours more of usage than Grade 2 students. Additionally, measures of course progress and topics learned were significantly positively associated with EOY MAP math scores.
- Teachers reported that program use enhanced student confidence and engagement in math. Teachers observed that students felt proud of their accomplishments and were motivated to tackle advanced concepts, with many preferring the program over other resources due to its engaging, game-like design.
- Teachers described ALEKS Adventure as effectively accommodating a wide range of student abilities, allowing for differentiated instruction where students could learn at their own pace.
- Teachers appreciated the program's reinforcement of classroom instruction through its alignment with daily lessons.

INTRODUCTION

Overview of ALEKS Adventure

In the fall of 2024, McGraw Hill partnered with the Center for Research and Reform in Education (CRRE) at Johns Hopkins University to test the impact of ALEKS Adventure in a Pennsylvania school district. As described by McGraw Hill, ALEKS Adventure is a math program intended for early elementary grades and consists of an artificially intelligent learning and assessment system that identifies a students' strengths and weaknesses in math and provides targeted coverage of prerequisite skills. It intermittently reassesses students to ensure retention of those skills as they advance to new topics. ALEKS Adventure also provides teachers with class management tools for monitoring student progress and directing learning remotely. To increase motivation and engagement, the program creates a game-like environment, in which students complete lessons to earn coins that can be spent on customizing their avatar and spaceship.

Overview of the Evaluation

To evaluate the impact of ALEKS Adventure, CRRE collected NWEA MAP score data from all Grades 1 and 2 students from the district's one elementary school. As all district Grades 1-2 classrooms used ALEKS Adventure, no comparison group was available. Thus, descriptive and correlational approaches were used to examine program efficacy. MAP math increases from fall to spring of the 2024-25 school year were analyzed descriptively and compared to MAP math score increases from the prior school year. Student-level digital program usage from the ALEKS Adventure platform was also analyzed descriptively and correlationally to the relationship of various program dosage indicators to achievement gains. In addition, teachers were interviewed to gain qualitative perspectives regarding teacher perceptions of the program.

The mixed-methods design addressed these research questions:

1. What are teachers' perceptions of ALEKS Adventure?
2. To what extent is ALEKS Adventure associated with increased achievement for individual students?
3. Are there patterns of usage associated with achievement?
4. Are there student characteristics associated with achievement?

METHOD

Research Design

The main outcome measure of this study was the NWEA MAP Growth Grades 1 and 2 math scores from spring of 2025. One elementary school participated in the study. Math achievement gains were also examined by grade level and student subgroup. Further, we compared MAP Growth scores in 2024-25 to those of the pre-program year, 2023-24. Supplemental analyses were conducted to examine associations between digital ALEKS Adventure program usage data and math achievement gains. Additionally, teachers participated in a voluntary interview regarding their perceptions of the ALEKS

Adventure program.

Participants

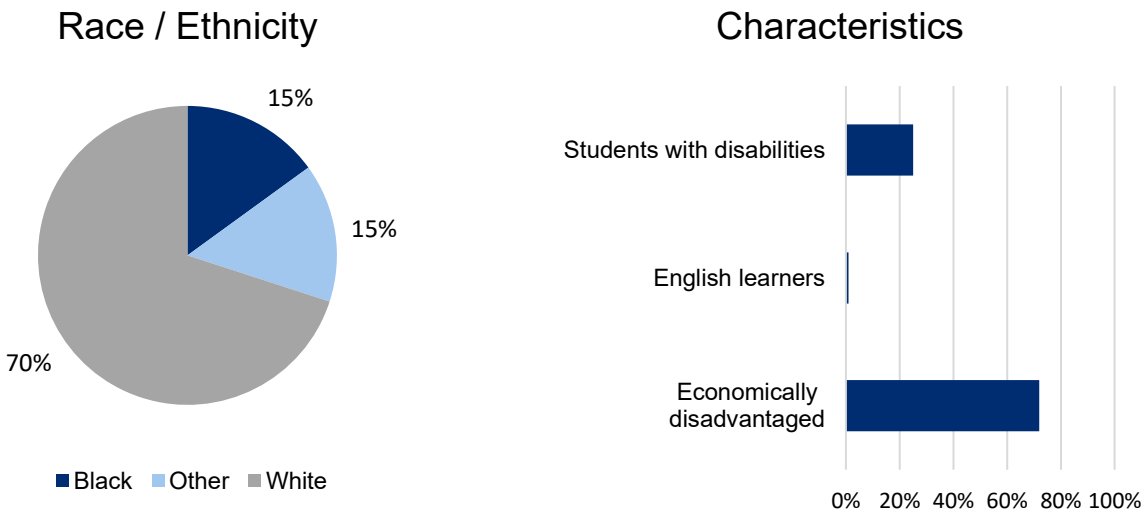
Details about study participants are presented below.

1 elementary school

200 Grades 1-2 students

7 Grades 1-2 teachers

Demographic snapshot of student participants



The study was conducted in a small suburban Pennsylvania district that serves approximately 1,500 students across three schools. The single district elementary school participated in the study. Most of the students in the study sample were White (70%), followed by Black and Other Race students (15% each). Approximately 25% of students were classified as SPED, and 72% were classified as economically-disadvantaged students, while only 1% of students were classified as English learners.

The study also included interviews of teachers who used ALEKS Adventure in the 2024-25 school year. A total of 13 teachers were interviewed across Grades K-2. As the focus of this evaluation was on Grades 1-2, we report on the results of interview data analysis for the seven Grades 1-2 teachers in the main section of this report. The results of data analysis from the six Grade K teacher interviews can be found in Appendix B.

Measures

To address the research questions, the study team gathered and analyzed data including student math achievement data, student-level digital program usage data, and teacher interview data (see Table 1).

Table 1
Research Questions With Data Sources and Measures

Research questions	Student achievement data	ALEKS Adventure usage data	Teacher interviews
1. What are teachers' perceptions of ALEKS Adventure?			✓
2. To what extent is ALEKS Adventure associated with increased achievement for individual students?	✓		
3. Are there patterns of usage associated with achievement?	✓	✓	
4. Are there student characteristics associated with achievement?	✓		

NWEA MAP Growth Math. The district provided CRRE with 2023-24 and 2024-25 BOY and EOY NWEA MAP Growth mathematics assessment scores for all Grades 1-2 students in the district elementary school that used ALEKS Adventure. MAP Growth RIT scores are vertically scaled so that scores can be directly compared across grade levels.

ALEKS Adventure digital usage. McGraw Hill provided CRRE with student-level digital usage data from the ALEKS Adventure program platform. The main program usage metric was student time spent on the ALEKS Adventure program. We also examined metrics relating to counts of skills learned and total progress (called pie progress within ALEKS Adventure). These data were available for all students that used ALEKS Adventure, and usage data were linked with achievement data to allow for analyses of associations between ALEKS Adventure program usage and math achievement.

Teacher interview. The semi-structured interview protocol (see Appendix A) consisted of 23 questions that solicited participants' perceptions regarding implementation; usability; perceived benefits of ALEKS Adventure for students and teachers; strengths, weaknesses, and recommendations for future use. The seven teachers implementing the program in either 1st or 2nd grade were interviewed.

Analytical Approach

Achievement data for students in Grades 1-2 were analyzed descriptively by examining patterns in NWEA MAP mathematics scores for students who used ALEKS Adventure. The MAP math score in each school year was defined as a pretest measure, while the EOY MAP Growth math score in each school year was defined as a posttest measure. We analyzed pretest-to-posttest gains descriptively for the entire sample by grade level and by student subgroup. Additionally, we compared gains from the 2023-24 and the 2024-25 school year to examine whether BOY to EOY MAP score gains increased with the introduction of ALEKS Adventure. We also performed correlational analyses examining associations between ALEKS Adventure digital usage and achievement gains.

RESULTS

We begin this section of the report with findings related to student math achievement gains across the 2023-24 and 2024-25 school year. Then, we present results pertaining to associations between ALEKS Adventure digital usage and math achievement gains. We conclude with results from the teacher interviews.

Math Achievement Gains

To what extent is ALEKS Adventure associated with increased achievement for individual students?

Key Findings

- Students who used ALEKS Adventure made significant gains on NWEA MAP math from BOY to EOY, with students gaining 21 points on average.
- BOY to EOY MAP math score gains were significantly larger in 2024-25, when ALEKS Adventure was implemented in the district, with average BOY to EOY gains 3.6 points larger in 2024-25 than they were in 2023-24.

2024-25 Analyses

Results of descriptive analyses of BOY to EOY NWEA math score gains for all Grades 1-2 students in the 2024-25 school year are presented in Table 2. We conducted dependent *t*-tests to examine the statistical significance of BOY to EOY score gains.

Table 2
Average MAP Math Scores, Overall and by Grade Level, 2024-25 School Year

Group	BOY score	EOY score	Change
Overall (*n* = 156)	164.79	185.41	20.62
Grade 1 (*n* = 65)	155.11	176.41	21.30
Grade 2 (*n* = 91)	171.74	191.86	20.12

Note: All BOY to EOY gains were significant at p < .001.

Across all students the gains were significant, with the average gain being nearly 21 points. Gains were comparable across grade levels, with slightly larger average gains observed in Grade 1 (21.3 points) than in Grade 2 (20.1 points). In relation to 2020 NWEA MAP Growth norms, gains in both grade levels were well above NWEA norms, which are 16.35 points and 14.38 points, respectively. It is important to note that NWEA's Growth norms are computed for mean (approximately 50th percentile) scores. Both Grade 1 and Grade 2 BOY scores in 2024-25 were slightly below NWEA national averages. Thus, it is possible that gains across both grade levels might be slightly larger than expected due to students starting at a lower-than-average MAP math score, though the magnitude of the gains observed here in relation to national norms suggests that observed student gains were larger than those expected by national norms, regardless of prior achievement level.

We also descriptively analyzed BOY to EOY NWEA MAP math score gains for student subgroups including gender, race/ethnicity, special education status, ELL status, and economically-disadvantaged status. The results of these analyses can be found in Table 3.

Table 3
Average MAP Math Scores, by Subgroup, 2024-25 School Year

Group	BOY score	EOY score	Change
Female (*n* = 79)	163.08	183.31	20.23
Male (*n* = 77)	166.55	187.55	21.00
White (*n* = 113)	167.88	188.82	20.94
Black (*n* = 20)	156.81	178.62	21.81
Other Race (*n* = 21)	157.59	174.91	17.32
SPED (*n* = 45)	158.48	176.65	18.17
ELL (*n* = 5)	152.67	177.50	24.83
Economically disadvantaged (*n* = 112)	163.14	183.24	20.10

Note: All BOY to EOY gains were significant at p < .001.

Math achievement gains for students in various subgroups were comparable to those observed across the overall sample, with average gains ranging between 17-25 points. Some of the sample sizes for subgroups were quite small (*n* < 25), so some caution should be exercised in interpreting these results.

2023-24 and 2024-25 MAP Math Gains

Next, we compared BOY to EOY MAP math score gains from the 2023-24 and 2024-25 school years. This analysis allowed us to examine if BOY to EOY score gains were larger in 2024-25, when ALEKS Adventure was adopted for use with all Grades 1-2 students. Dependent *t*-tests comparing BOY to EOY gains in 2023-24 and 2024-25 were conducted to test the statistical significance of the differences in these gains across school years. Average gains in both school years, along with results of the dependent *t*-tests can be found in Table 4. It is important to note that sample sizes are somewhat smaller in these analyses than in the foregoing 2024-25 analyses, as only students with non-missing BOY and EOY scores in both school years were included.

Table 4
Average MAP Math Score Gains, Overall and by Grade Level, 2023-24 and 2024-25 School Years

Group	23-24 Gain	24-25 Gain	Difference
Overall (*n* = 127)	16.58	20.20	3.62**
Grade 1 (*n* = 53)	18.57	20.22	1.65
Grade 2 (*n* = 74)	15.15	20.19	5.04***

Note: ** *p* <. 01; *** *p* < .001.

Across all students MAP gains in 2024-25 were significantly larger in 2024-25 than in 2023-24, averaging 3.6 points higher. Although 2024-25 gains were higher in both grades, the advantage, slightly over 5 points, was more pronounced and statistically significant in Grade 2. In Grade 1, the advantage was a nonsignificant 1.6 points. As noted in the previous section, the 2024-25 gains exceeded MAP norms, thereby further suggesting program benefits, as 2023-24 gains were generally comparable to national MAP math score norms.

We also descriptively analyzed differences in BOY to EOY MAP math score gains by school year for the same student subgroups we examined in the previous set of analyses. The results of these analyses can be found in Table 5.

Table 5
Average MAP Math Score Gains, by Subgroup, 2023-24 and 2024-25 School Years

Group	23-24 Gain	24-25 Gain	Difference
Female (*n* = 65)	15.21	19.47	4.26**
Male (*n* = 62)	18.02	20.97	2.95
White (*n* = 100)	17.04	20.48	3.44**
Black (*n* = 11)	16.25	21.92	5.67
Other Race (*n* = 15)	13.94	17.19	3.25
SPED (*n* = 34)	16.17	17.51	1.34

Economically disadvantaged (*n* = 89)	16.17	19.86	3.69*

Notes: 1. * p <. 05. 2. ** p < .01; ELL is not included in this analysis due to *n* = 1 for that subgroup.

Across all subgroups, MAP math score gains were larger in 2024-25 than in 2023-24, though the magnitudes of these differences varied by subgroup. Significant differences in BOY to EOY gains were observed for female, White, and economically-disadvantaged students, with 3-4 point larger gains in 2024-25 than in 2023-24. The results therefore suggest that these subgroups were especially likely to benefit from a second year in the program.

Associations Between Program Usage and Achievement

Are there patterns of usage associated with achievement?

Key Findings

- Students averaged approximately 26 hours of usage, 35 skills learned, and 71% progress through the ALEKS Adventure course.
- Grade 1 students averaged approximately 5 more hours of usage, while Grade 2 students averaged 4% more course progress.
- Course progress and counts of skills learned were significantly positively associated with spring MAP scores. Correlations with BOY to EOY MAP math score gains were considerably smaller in magnitude, especially for measures of course progress.

Table 6 shows the results of descriptive analyses of ALEKS Adventure digital program usage.

Table 6
Average ALEKS Adventure Usage, Overall and by Grade Level

Grade level	Total minutes	Skills learned	Pie progress*	*N*
Overall	1532.30	34.86	71%	143
Grade 1	1635.19	34.89	70%	87
Grade 2	1363.42	34.81	73%	56

Note: *A program metric reflecting counts of skills learned and total progress.

Across the entire sample, students averaged approximately 25.5 hours of ALEKS Adventure program usage during the school year, which entailed slightly less than 35 skills learned and slightly more than 71% progress through the course (pie progress). Notably, Grade 1 students averaged nearly 5 additional hours of total program usage than did Grade 2 students. Counts of skills learned were nearly even across both grade levels, while Grade 2 students averaged slightly more course progress.

Next, we examined the results of Pearson correlations measuring the associations between ALEKS Adventure usage and MAP math achievement. These results, which are summarized for the overall sample and by grade level, can be found in Table 7.

Table 7
Associations Between ALEKS Adventure Usage and Math Achievement

Usage variable	EOY MAP score	BOY to EOY MAP gain	*N*
All students			
Pie progress	+.49**	+.23*	143
Total minutes	-.06	+.07	143
Skills learned	+.24**	+.20*	143
Grade 1			
Pie progress	+.56**	+.21	87
Total minutes	.00	+.03	87
Skills learned	+.31*	+.20	87
Grade 2			
Pie progress	+.52**	+.25	56
Total minutes	-.07	+.10	56
Skills learned	+.25	+.21	56

Note: * $p < .05$; ** $p < .01$.

Total pie progress (course progress) was moderately-to-strongly associated with EOY MAP scores ($.49 < r < .56$), whereas counts of skills learned were weakly-to-moderately associated with EOY MAP scores ($.24 < r < .31$). The magnitudes of these associations decreased considerably when usage was correlated with BOY to EOY MAP score gains, with all correlations having a magnitude of .25 or less (though the associations remained significant across the entire sample). Total program time was not meaningfully associated with MAP math scores or score gains (all *r*'s < .10). The attenuation of correlations likely indicates that students with higher EOY MAP math scores tended to use ALEKS Adventure to a higher degree, but they did not necessarily make considerably larger gains than other students since they started at a higher baseline level of mathematics achievement.

Teacher Perceptions of ALEKS Adventure

This section of the report begins with findings related to teachers' perceptions of ALEKS Adventure. Then, we present results pertaining to what extent ALEKS Adventure is associated with increased student learning and engagement.

What are teachers' perceptions of ALEKS Adventure?

Key Findings

- Teachers liked ALEKS Adventure for its ability to provide differentiated instruction, allowing students to work at their own pace on skills suited to their individual levels.
- They praised the program as a valuable tool for small group instruction and classroom management, enabling them to effectively focus on targeted groups while other students engaged in meaningful practice.
- Suggested improvements to the program emphasized the need for a stronger progression and mastery system to ensure students demonstrate understanding before advancing.

Seven teachers who implemented ALEKS Adventure volunteered to relate their experiences with and reactions to the ALEKS Adventure program in an interview. Five taught first grade and two taught second grade, with one teacher from each grade teaching a special education (SPED) classroom. We begin with findings on participants' implementation experiences and then present their perceptions of the program's quality and impact on math outcomes.

Teachers overall described ALEKS Adventure as primarily supporting their math instruction by providing differentiated and independent learning opportunities. Teachers consistently noted that students could work at their own pace and on skills matched to their individual levels, which helped address a wide range of abilities in the classroom. The program also served as a valuable tool for small group instruction, allowing teachers to focus on targeted groups while other students remained engaged in meaningful practice. One teacher remarked, "It's been a lifesaver for small group instruction. Students are able to work on something quietly at their seats and I'm able to pull small groups back." Additionally, teachers used the program as a supplemental resource, reinforcing classroom learning and offering both remediation and enrichment. Teachers appreciated the program's ability to review previously taught skills, support students working across multiple grade levels, and function as a flexible center activity. Overall, the program was seen as a versatile support for personalized instruction and classroom management.

As described by the teachers, implementation of the program varied across the different grades as seen in Table 8.

Table 8
Modalities of Implementation by Grade

Modalities of Implementation	Grade 1 Classrooms	Grade 2 Classrooms
How ALEKS Adventure is implemented during the school day	Varied by class. Students used ALEKS Adventure during small group instruction, station	Varied by class. The program was used in centers,

	rotations, as morning work, personalized learning, and occasionally at home.	personalized math, and during station rotations.
Devices students use to access the program	iPads	iPads
Device accessibility (1:1/shared)	1:1	1:1
Length of typical session	8-20 minutes	10-12 minutes
Presentation-type (whole class, groups, rotations, etc.)	Small group instruction, centers, and station rotations; 3 of 5 classrooms occasionally used as a whole-class activity.	Centers, personalized math, and station rotations. One class occasionally used the program as a whole class activity.
Barriers to implementation (Wi-Fi, device accessibility, etc.)	Occasional Wi-Fi issues. Device accessibility was not a barrier	Wi-Fi was not a barrier. Device accessibility was not a barrier. Occasional technical problems accessing the whole number line game within ALEKS Adventure.
Core math curriculum	Reveal Math	Reveal Math
Math programming replaced by ALEKS Adventure	Go Math! and MobyMax in one classroom each.	Go Math! in one classroom.
Other math programming/materials used in the classroom	None other than teacher-created slides for variety and some games for hands-on play.	Reflex for math facts and MobyMax for additional practice.

Students in both first and second grade accessed ALEKS Adventure using 1:1 Chromebooks. Some classrooms occasionally used the program as a whole-class activity, typically during unscheduled “extra” time but more typically in station rotations and small group instruction. Generally, few barriers to implementation were noted although second grade teachers recalled students running into technical glitches when using a favorite program game about the whole number line. One teacher elaborated by saying, “[The] number line, like, it told them to plot a number, and it wouldn't go far enough for them to plot that number.”

Usage of the program's data and reports varied between teachers, with four teachers having used this feature more regularly/extensively than the other three. Most commonly, teachers used the data to guide instruction, helping them identify concepts students had mastered and those needing more attention. This information allowed them to adjust pacing, incorporate targeted review into daily lessons, and tailor instruction to meet student needs. Several teachers also used the data to form student groups, particularly for stations or small group work, often combining it with other sources like classroom observations or Reveal Math data. One teacher emphasized using the data to motivate students, encouraging them to set goals and reflect on their progress. A couple of teachers mentioned using the reports to gauge student understanding, though their use was more occasional or exploratory, with plans to increase usage in the future. Finally, one teacher used the data simply to review the topics on which students were working. Overall, while usage varied, the data was most frequently applied to instructional planning and grouping strategies.

The seven teachers described a range of things about ALEKS Adventure that favorably surprised them. The most common was how engaging and kid-friendly the program was, as noted by six teachers. They were impressed by the cartoon-like presentation, character selection, and interactive features that kept students interested and motivated. Several teachers were surprised that students genuinely enjoyed using the program, often asking to use it over other options, and that their enthusiasm didn't fade quickly. Another frequent discovery, mentioned by three teachers, was how the program challenged students and allowed them to progress beyond grade-level expectations. Teachers observed that some students were exposed to advanced concepts typically not taught in their current grade, which they saw as a positive opportunity for enrichment. A couple of teachers also noted that some students completed the program quickly, which raised concerns about the depth and length of the content, especially in the second-grade version. Finally, one teacher was particularly impressed by how well-written and grade appropriate the program was compared to their core curriculum, appreciating its clarity and accessibility for students.

Teachers had mixed views on how helpful the program's built-in scaffolds were for students struggling with math concepts. The most common theme, mentioned by five teachers, was that the on-screen manipulatives (like 10 frames, base 10 blocks, and number lines) were generally helpful to students. These visual tools supported understanding, especially when students were stuck or needed a concrete representation of abstract ideas. However, the textual hints and scaffolds were seen as less effective, with four teachers noting that students either didn't notice them, didn't understand them, or didn't use them. Some students would ignore the hints and immediately seek help from the teacher, while others seemed unaware that this support was available. A small number of teachers admitted they were not very familiar with the scaffolds themselves, which limited their ability to guide students in using them effectively.

Teachers were unanimous in stating that they would recommend ALEKS Adventure to other educators, and they provided several reasons for their endorsement. The most frequently cited benefit was the program's ability to support small group instruction.

Teachers appreciated how it allowed them to work with targeted groups while other students remained engaged and productive. As one teacher commented:

> *I would recommend ALEKS Adventure for other educators. It's great for differentiation. It's great for small group instruction and giving those other kids something to do. It's good for pushing kids but also remediating for others as well. So definitely, I think it's a good tool in helping teachers to keep kids engaged and active, while you can still pull small groups and address the needs as well.*

Many of the other teachers echoed the opinion that one of the program's principal strengths was in differentiation, noting that it effectively challenged "high-flyers" while providing remediation for those who needed extra support. In fact, when teachers were asked what they saw as the major strengths of ALEKS Adventure, the most frequently mentioned strength was differentiation and personalization, with teachers praising how the program adapted to individual student needs, provided appropriate challenges, and prevented students from accessing content they were not ready for which helped to reduce frustration. Student engagement was another widely noted strength, with teachers stating how much students enjoyed the program's interactive and visually appealing design. Several teachers also noted that the program reinforced classroom instruction and was aligned closely with daily lessons which helped students either catch up or move ahead. As one teacher noted:

> *It just goes over all of the skills in the same way that we're teaching it. So, it's reinforcing everything we're doing daily. So, if they aren't there yet, they're being reinforced in it. If they're beyond that, they're being accelerated to what they need for the next year.*

The program's kid-friendly design made it easy for students to navigate and connect with what they were learning in class. Additionally, the program was seen as a valuable tool for supporting small group instruction, allowing teachers to work with targeted groups while their other students worked independently. Finally, some teachers noted the program's comprehensive coverage of math skills, making it a reliable resource for reinforcing and extending learning across the curriculum.

Several suggestions emerged for improving the math program, with some themes appearing more frequently than others. The most common recommendation, mentioned by three teachers, was to strengthen the progression and mastery system. Teachers suggested requiring students to complete knowledge checks before advancing, automatically prompting review of weak areas, and enabling more automated transitions between grade levels. They also expressed concern about uncertainties in how mastery is reported with one teacher saying, "I think some students can get to 2nd grade prematurely." Two teachers recommended adding more content and enrichment, especially for second grade. They wanted more repetition, clearer goals, and additional material to prevent students from finishing too early in the school year. Two teachers also focused on enhancing student engagement, suggesting improvements to graphics and animations, more interactive games, and seasonal updates or rewards to

keep students motivated. Other individual suggestions included making student progress, like usage time, more visible to encourage ownership, and improving clarity in reporting, as one teacher found the feedback confusing when students were marked both as meeting goals and needing help. Overall, the most frequent suggestions centered on improving mastery tracking, expanding content, and boosting engagement to better support both students and teachers.

Program's Association with Increased Student Learning and Engagement

To what extent is ALEKS associated with increased student learning and engagement?

Key Findings

- Teachers were unanimous in reporting that ALEKS Adventure had increased student confidence in math.
- They appreciated the program's ability to provide differentiated and personalized learning opportunities, accommodating a wide range of student abilities.
- Although recognizing that a supplemental program may not be sufficient by itself to promote full mastery of concepts, the teachers overall viewed ALEKS Adventure as facilitating students' learning of math skills.

All seven teachers reported that ALEKS Adventure boosted student confidence in math. For example, one teacher noted a previously timid student who had gained confidence after completing all the program's islands. Another teacher added the following anecdote:

> *When [students] get to that next level, or they complete a pie piece, they are really proud of themselves, and they feel success, and they want to show me, and they want to talk about it. I think they're finding their own place with it, and success and confidence.*

Teachers observed that the program encouraged students to tackle more advanced concepts, and celebrated small successes, such as completing levels or earning rewards, which reinforced this confidence. Collaborative sharing of achievements among peers also enhanced motivation and engagement. However, opinions on the program's effectiveness in promoting mastery of math concepts were mixed. Many teachers expressed concerns that students might progress without truly mastering the material, often advancing through "lucky guesses." While some noted improvements in foundational skills, a collective desire emerged for more opportunities to engage deeply with content before moving on. Interestingly, the two SPED teachers were divided on

the program's effect on mastery of topics. One noted improvement in this area for some of their students, as the program helped them work toward specific goals. The other SPED teacher was uncertain that mastery had improved through program use.

Several themes arose when teachers were asked how the program supported students in learning, practicing, and retaining concepts. An aspect highlighted by five teachers was the program's engaging and game-like nature, which kept students motivated and interested in their learning. Phrases like "fun for the kids" and "colorful" reflected how it captured students' attention, often making them prefer this program over other educational resources. Additionally, four teachers stated that the program provided helpful practice opportunities to students, allowing for repetition and retention. One teacher commented, "During our MAP test at the end of the year, they recognized things that were on the test that were on the program too." The importance of differentiated instruction was also noted by three teachers, who pointed out that the program accommodated various learning needs, allowing some students to learn independently while providing additional support for others who required it. Finally, two teachers highlighted the program's utility in teaching practical skills, such as counting money, which enabled students to engage with real-world applications even before these concepts are addressed in class.

When asked how ALEKS Adventure addressed their students' unique needs, personalized learning and assessment emerged as the most frequent response, with six teachers, including one of the SPED teachers, highlighting the program's ability to accommodate students at their own levels. One teacher spoke of their students' experience saying, "It is definitely meeting their needs. They're able to work at their level so nobody is getting that super frustration or that boredom. I am seeing the growth." Additionally, three teachers indicated that the program's recognition of progress, particularly through visual tools like pie charts, helped students understand their skill development and celebrate their achievements. Three teachers also noted the program's effectiveness in providing enrichment for advanced learners, as it allowed them to engage with more challenging material, such as working with larger numbers, which helped to keep them focused on their work.

Four of seven teachers reported seeing measurable progress in their students' math through use of the program. One teacher remarked, "I am seeing the growth. I had over 70% of my students hitting the benchmark this spring. We're a low-income school district. Fewer than half of my students do homework, there isn't much of a push from home." Four teachers commented on the role that their students' increased confidence had on their students' math skills, reporting noticeable improvements in students' abilities to recall math facts and shapes. Furthermore, three teachers observed that students were better at retaining and applying skills learned through the program. An equal number noted that students recognized concepts during class discussions and activities, demonstrating their ability to transfer knowledge across different contexts. While most students showed clear improvement, there was acknowledgment of variability in progress, particularly among those with severe disabilities, which was noted by the two SPED teachers.

Five teachers indicated that their students had goals they were working toward in the program and were actively involved in tracking their progress in various ways. These teachers were from the non-SPED classrooms and they stated that their students understood how to monitor their progress within the program, with several highlighting that students were aware they needed to complete four topics each week and enjoyed checking their reports. Incentive systems were also commonly implemented to encourage goal completion; one teacher mentioned giving certificates and small rewards for meeting weekly goals, along with recognition in school announcements, while another emphasized the importance of providing rewards and celebrating students' achievements as they filled in their pie charts. One teacher said that students set personal goals related to the number of topics they aimed to master, reinforcing their involvement in the learning process. In contrast, the two SPED teachers related that their students either had no set goals or were "moving at their own pace."

Teachers were unanimous in stating that the majority of students enjoyed using ALEKS Adventure with one saying:

> *They love the program. They are really interested in it. They love math and I think it is engaging for them that they're using this other tool. They like to use the iPads. It's a different approach for them and they're thriving with it.*

Four teachers noted that excitement about the program remained strong throughout the school year, especially among math enthusiasts. Several groups of students were identified as particularly benefiting from the program. Three teachers emphasized the advantages for higher-level learners, noting that these students were able to engage with new concepts independently while the teacher reviewed material with others. Additionally, two teachers mentioned the program's effectiveness for motivating average students, who found it engaging and were eager to improve their scores. There was also recognition from one teacher regarding the program's ability to help students who struggled with focus, as it kept them engaged and allowed them to work at their own pace. Most of the teachers acknowledged that they had small numbers of students who were less engaged by the program and generally characterized these students as low performers. Several noted that these students tended to struggle not only with math but also with broader engagement in school.

As previously noted, the kindergarten teachers volunteered to be interviewed regarding their experiences with ALEKS Adventure. Although kindergarten was not formally included in the present study, these comments provide interesting perspectives that generally closely conform to those of the Grades 1 and 2 teachers as examined above. For interested readers, the kindergarten teacher responses are reported in Appendix B.

DISCUSSION

The purpose of the present study was to evaluate the impact of ALEKS Adventure on Grades 1-2 student math achievement in a Pennsylvania school district. A mixed-methods evaluation was conducted in which NWEA MAP math scores from BOY and EOY of the 2023-24 and 2024-25 school years were analyzed descriptively to examine trends in achievement gains, and program teachers were interviewed regarding their perceptions of the program.

Math Achievement Gains

Descriptive results showed that Grades 1-2 students made significant gains on the NWEA MAP math test from BOY to EOY of the 2024-25 school year. Across both grades, gains similarly averaged 21 points. Additional descriptive analyses showed comparable BOY to EOY gains across all subgroups, with average gains ranging from 17 to 25 points. Notably, the average BOY to EOY MAP math gains from the 2024-25 school year were significantly larger than those in the pre-program school year, 2023-24. Further, although the latter, pre-program gains fell below the MAP norms for the associated grades, the program-year gains exceeded the MAP norms. This evidence suggests positive influences of adopting ALEKS Adventure in 2024-25 as a supplemental math program.

ALEKS Adventure Usage

Across the entire sample, students averaged approximately 26 hours of ALEKS Adventure usage in the 2024-25 school year. Grade 1 students averaged approximately 5 hours more of total ALEKS Adventure usage than did Grade 2 students, while Grade 2 students averaged slightly more course progress than did Grade 1 students. Measures of total course progress and topics learned were significantly positively associated with spring 2025 MAP math scores, with observed correlations of .25 to .56 in magnitude. These same measures were also significantly correlated with BOY to EOY MAP math score gains, although the magnitudes of these correlations were considerably smaller, especially for overall course progress. These patterns suggest that students who were more frequent and successful users were also those who tended to perform higher on the EOY MAP. However, the relationship between program usage and MAP gain may have been attenuated due to some students, mainly higher achievers, completing the program more successfully but being less dependent on its activities for improving MAP achievement than were lower-achieving students. It is important to note that attenuation was much smaller for skills learned than for course progress; skills learned, therefore, may be a more consistent predictor of both MAP scores and MAP gains.

The usage results should be considered in interpreting the student achievement outcomes. As a supplemental program, ALEKS Adventure's time usage by students averaged only 26 hours (less than 45 minutes a week) across the school year. Still, as just described, promising evidence is offered by the positive direction of both Grades 1

and 2 gains relative to MAP norms, as well as the significant increase in math gains from the 2024-25 school year compared to the pre-program year.

Teacher Perceptions

The feedback from interviews with seven teachers provided insight into their perceptions of ALEKS Adventure and its effectiveness in supporting math instruction in first and second grade classrooms. Teachers described various modalities of implementation, reflecting flexibility that allows for a customized approach based on classroom needs. Both grade levels utilized small group instruction and station rotations as primary methods for integrating the program into their teaching. Teachers uniformly praised the program's ability to differentiate instruction for a wide range of abilities and appreciated that students could work independently on skills suited to their individual levels. They variably used program data and reports to inform instruction, with some teachers leveraging it more regularly than others. This discrepancy indicated that while the potential for data-driven teaching is evident, professional development may be needed to support teachers in utilizing these features more effectively.

High student engagement with the program emerged as a recurring theme. The engaging design and interactive elements held students' interests, sometimes motivating them to choose ALEKS Adventure over alternative resources. Teachers noted that students did not quickly lose enthusiasm, an important factor in sustaining effective learning.

Notably, differentiation and student engagement were the two most frequently cited program strengths. The ability of the program to cater to advanced learners while supporting those who required remediation was particularly noted. Another observation was the program's alignment with classroom instruction, confirming that it effectively reinforced what was being taught. However, while the built-in scaffolds were mostly viewed as beneficial for teaching abstract concepts, there were concerns regarding their usage and visibility among students.

Teachers offered several constructive suggestions aimed at enhancing the program's efficacy. Strengthening the progression and mastery system was a primary recommendation, focusing on ensuring that students demonstrate mastery before progressing. This feedback echoed concerns regarding accelerated advancement and the clear understanding of how mastery was reported. Enhanced content for second graders was another prevalent subject, with teachers suggesting the need for additional materials to better accommodate student reading levels and engagement. These refinements would serve to increase teachers' already favorable views toward the program and its impacts on engagement, personalization, and learning math in early grades.

APPENDIX A: Teacher Interview

Teacher Interview Protocol

1. What is the main purpose or way ALEKS Adventure supports your instruction?

2. If not addressed above: How are you currently implementing ALEKS Adventure? For example: are students using it during:
    - WIN time
    - Choice boards
    - Station rotation
    - Something else?

3. What devices do students use to access ALEKS Adventure? (iPads, Chromebooks…)
    a. Does each student have their own device, or do they share?
    b. Do all students use ALEKS Adventure at the same time? If not, how are the groups or rotations structured?
    c. Is access to devices or wifi ever a barrier to implementing ALEKS Adventure as you would like?

4. About how long is a student's typical session in ALEKS Adventure? (10 min, 15 min etc)

5. To what degree can students use ALEKS Adventure independently?

    a. [if applicable] What kinds of support do they require to use it?

6. How does ALEKS Adventure address your students' unique needs?

7. How do you feel ALEKS Adventure impacts students' confidence and mastery of math concepts?

8. How is ALEKS Adventure helping students to learn, practice, and retain concepts?

9. How helpful are the built-in scaffolds (hints, visual aids, manipulatives) for students who are struggling to grasp a concept?

10. Do you feel that ALEKS Adventure is engaging to students, i.e. do they look forward to using it, and can they stay focused on it throughout their session?

11. What progress or growth have you observed from students working in ALEKS Adventure?
    a. Do students have goals they are working toward? If so, how is the student involved in setting or tracking progress toward goals?

12. Are there any students you think ALEKS Adventure is particularly beneficial for?

13. Do you have students who are not motivated or engaged by ALEKS Adventure?
    a. If so, how would you describe these students – are they low or high performers? What unique needs do they have?

14. Do you use the data and reports in ALEKS Adventure? If so, how?

15. Is there anything about ALEKS Adventure that surprised you?

To Be Asked If Time Permits

16. To what degree do students enjoy using ALEKS Adventure math?

17. Would you recommend this program to other educators? Why or why not?

18. What do you see as the strengths of ALEKS Adventure Math?

19. What suggestions would you have to improve the program?

20. Is there anything else you would like to add?

21. Did ALEKS Adventure replace something that you were previously using or doing? If so, what?

22. Do you use a core math program?

23. Do you use other math programs (core program, intervention program, other digital supplemental tools or apps) in your classroom?
    a. What are they and what purpose(s) do they serve?

Appendix B: Kindergarten Interview Results

Six kindergarten teachers at the Pennsylvania elementary schools piloted first grade ALEKS Adventure with their students during the 2024-25 school year. While not formally a part of the evaluative study, they volunteered to participate in interviews with the research team and provided valuable insight on program use with their students. A brief summary of the results of those interviews follows.

In implementing ALEKS Adventure with their students, half the teachers opted to use it with a select group of their high-achieving students, while the others used it more widely within their classrooms. The program supported instruction by providing differentiation and enrichment opportunities for students, particularly those at higher achievement levels. Teachers found that the engaging, game-like format was key in encouraging students to tackle challenging concepts and that doing so increased their confidence in math. All teachers reported that their students could use the program independently, although they occasionally required clarification on unfamiliar concepts, prompting them to ask teachers for explanations. Teachers emphasized the importance of teaching students how to log in, as mastering this skill was crucial for accessing the program's features.

Generally, ALEKS Adventure was used for 15-20 minute sessions during small group instruction, centers, or station rotations, with students accessing the program via 1:1 iPads. Four of the six teachers said they utilized the program's data and reports to enhance instruction and monitor student progress. Several teachers acknowledged the potential benefit of further training to improve their understanding and use of the data features, suggesting that more comprehensive engagement with the data could enhance instructional effectiveness in the future.

The six teachers believed ALEKS Adventure effectively addressed their students' needs by providing tailored challenges that catered to various learning levels. They appreciated that ALEKS Adventure allowed advanced learners to progress at their own pace without being held back. All six teachers noted that the program positively impacted students' confidence and engagement, with higher-performing students expressing excitement about using it and sharing their successes with peers, thus fostering a supportive environment. Teachers expressed uncertainty about the program's impact on mastery of math skills since some skills were not also directly taught in class, but as one said, "Whether they're mastering it or not, they're still being exposed to it."

Teachers unanimously agreed that the program enhanced students' learning, practice, and retention of concepts. They noted that the program's interactive design, akin to a video game, helped maintain student interest and encouraged participation. Several teachers observed that the program allowed for valuable repetition, particularly with foundational skills like addition and subtraction, which aided in retention. For instance, one teacher mentioned that even after formal instruction ended, students continued to practice through the program, reinforcing their previous knowledge. They noted that

students looked forward to using it and were generally able to stay focused throughout their sessions, with one teacher mentioning features like “the boat race,” which contributed to the students' excitement. Furthermore, flexible seating arrangements and the use of whiteboards contributed to a relaxed learning environment, enhancing the overall experience.

Perhaps most importantly, teachers reported notable progress and growth in students who engaged with the program. They observed that many students demonstrated improved skills in counting, addition, and subtraction. For example, one teacher noted that students using the program showed quicker comprehension in counting to 100 and performed better at simple addition and subtraction compared to their peers who did not use the program. Several teachers highlighted specific students who stood out due to their enthusiasm for the program and their engagement at home, indicating that this practice contributed to their growth. Teachers also noted that lower-performing students exhibited increased attempts to solve problems independently rather than relying on guessing, signaling newfound confidence in their abilities.

The kindergarten teachers had mixed views on the effectiveness of the built-in scaffolds for their young students struggling to grasp concepts. Some teachers found that visual aids and manipulatives helped guide students through examples; however, others noted that students often turned immediately to them for help when faced with difficulties, suggesting reliance on teacher support. Nonetheless, all six teachers stated they would recommend the program to other educators for several reasons. One teacher commented, “I would highly recommend it. It is so engaging; it really meets the needs of the learner.” Teachers appreciated how the game-like design kept students motivated and interested. Another teacher emphasized that student engagement lead to better retention of skills and overall motivation, while a third teacher praised the program's rigor and challenge, especially for higher-performing students. Several teachers remarked on the interactivity of the program, which they felt contributed to student engagement, as well as the independence it fostered, allowing students to work without constant teacher intervention. Finally, one teacher mentioned the program's relevance in a technology-driven environment, suggesting that it aligned well with students' preferences for digital learning.

Differentiation emerged as the most frequently mentioned program strength, followed by engaging animation, a spiraling curriculum, the availability of comprehensive data, and the program’s motivational impact on kindergarten students. Referring to differentiation, one teacher remarked,

> *It's the differentiation. They are all on different levels, and it's meeting their needs. It helps teach them independently. The program walks them through, and it's on their level. It's not giving them stuff that's too easy, but they also aren't bored or frustrated.*

When asked if there was anything about the program that surprised them, the six teachers provided several noteworthy responses. One teacher expressed surprise at how well students grasped concepts that were at a higher level than what they were currently working on, indicating the program’s effectiveness in challenging learners.

Another teacher praised the pie chart feature, appreciating its usefulness in tracking student progress and identifying specific areas where students were struggling. Several teachers noted surprise regarding the rigor of the content, highlighting that some topics covered in first grade were more challenging than expected based on their previous teaching experiences.

Only three teachers had suggestions for improving ALEKS Adventure. One teacher noted that the program could be better tailored for kindergarten students, suggesting enhancements to ensure that all students experience success and benefit from its use. Another teacher advocated for more manipulatives, such as counters, and expressed a desire for incentives, like the boat race reward, to be more accessible for struggling learners to encourage their continued engagement without discouragement. Finally, one teacher proposed that the program be implemented as the core curriculum for kindergarten, replacing the current Reveal Math program.

Feedback from these kindergarten teachers suggests that first grade ALEKS Adventure was effective and beneficial when implemented with kindergarten students, particularly in providing differentiated instruction and engagement. Teachers observed that despite the challenges, students were able to grasp higher-level concepts when using the program. The program's ability to provide personalized learning experiences allowed younger students to engage with material that aligned with their abilities, helping to maintain interest. The program appeared to successfully challenge advanced younger learners while also providing necessary support and practice for those who struggled with fundamental math skills in addition and subtraction. Several teachers suggested the need for the program to be slightly more tailored to the developmental level of younger students, such as emphasizing foundational skills and providing additional instruction on concepts that were too advanced for them. Teachers also expressed interest in increasing the availability of manipulatives and rewards to support engagement and encourage struggling learners. Overall, while the program proved effective, further adjustments could enhance its applicability and success for younger students.