

Randomized Controlled Trial of Edgenuity's Pathblazer in Floyd County Schools

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EXECUTIVE SUMMARY

Randomized Controlled Trial of Edgenuity's Pathblazer in Floyd County Schools

Program Description

[Pathblazer](#) is a supplemental, online intervention program that helps struggling learners in grades K–8 achieve grade-level proficiency in mathematics and reading. Pathblazer offers students individualized learning progression paths with fun, motivating content that addresses skill and concept gaps. Using existing student data or results from a screener, Pathblazer immediately identifies where students are struggling and provides the targeted instruction they need to close early learning gaps. The instruction in math and reading is designed to help engage students, accelerate them to grade-level mastery, and increase student self-efficacy in learning. All lessons are built around a gradual release instructional model of explicit instruction, supported practice, independent practice, and assessments. The data Pathblazer collects as students complete their work also help teachers monitor student progress and adapt their instruction. Intervention reports in Pathblazer track student progress toward standards mastery, inform small-group instruction, and help teachers plan for one-on-one time with students.

Research Design

[Edgenuity](#) contracted with the [Center for Research and Reform in Education \(CRRE\)](#) at Johns Hopkins University to estimate the impact of Pathblazer on student reading achievement by conducting a cluster randomized controlled trial of Pathblazer during the 2019–2020 school year in Floyd County, Georgia. The study was designed to meet the Every Student Succeeds Act (ESSA)'s "[strong](#)" or [Tier 1](#) evidence. For six public elementary schools, approximately half of each 3rd to 5th grade teacher's classes were randomly assigned to participate in the reading component of Pathblazer, and the remaining half were assigned to the control group. Therefore, the analysis determined whether students in Pathblazer classrooms improved their reading more than those in control classrooms, controlling for teacher effects, student prior achievement, and other student covariates. The study did not examine the impact of the mathematics component of Pathblazer.

The study also examined how teachers implemented Pathblazer, and how educators and students perceived the effectiveness and usefulness of the program. To do so, qualitative data were collected during in-person visits to two elementary schools. Site visits included classroom observations, teacher focus groups, student focus groups, and principal interviews. Teacher surveys were also administered to all Pathblazer teachers.

Study Sample

The study sample for the analysis of the impact of Pathblazer on student reading achievement included 1,524 students in the 3rd to 5th grade classrooms of 31 teachers across six elementary schools. The majority of students were White, and just over 60 percent qualified for free and reduced meals. Interview and focus group data were collected from 3 principals or assistant principals, 9 teachers, and 17 students. Survey data were also collected from 22 teachers who participated in the program.

Program Impact on Student Reading Achievement

Pathblazer had a positive and statistically significant impact on student reading achievement in winter, controlling for fall achievement, other student characteristics, and classroom and teacher effects. More specifically, students who participated in Pathblazer outperformed similar control peers by around one point (0.977) on the winter 2020 NWEA Measures of Academic Progress (MAP) Growth in reading. The effect size was +0.07, which indicates a small and positive effect. This finding satisfies ESSA's ["strong" or Tier 1](#) evidence.

As shown in Figure 1, reading achievement improved for Pathblazer students relative to control students overall, and for particular student subgroups. Pathblazer appeared to be particularly beneficial for students with low prior achievement (+2.88 points) and special education students (+2.68 points) relative to similar control peers. Pathblazer students in grade 4 also outperformed their control peers.¹

¹ Pathblazer students in grade 4 were initially higher achieving than control peers (>0.25 standard deviations), but attrition standards were met according to WWC (2020).

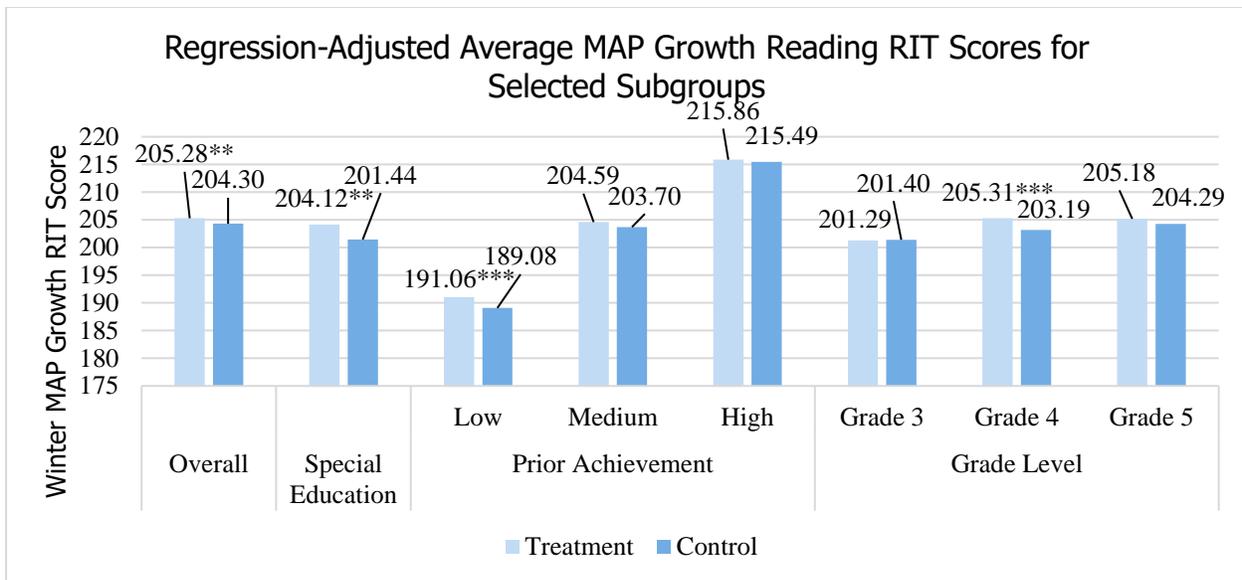


Figure 1. Average MAP Growth regression-adjusted reading RIT scores by subgroup
 Notes: 1. * p<.05, **p<.01, ***p<.001. 2. The statistical significance refers to the difference between the Pathblazer and control groups for each group, controlling for other variables.

Pathblazer Usage

Teachers were asked to assign Pathblazer to students for at least 60 minutes a week over approximately 20 weeks. For the most part, teachers indicated that this threshold had largely been met, with students often using Pathblazer in 15- to 20-minute intervals. The average time students spent using Pathblazer ranged from 9 to 23 hours, and varied by school and grade, as shown in Figures 2 and 3.

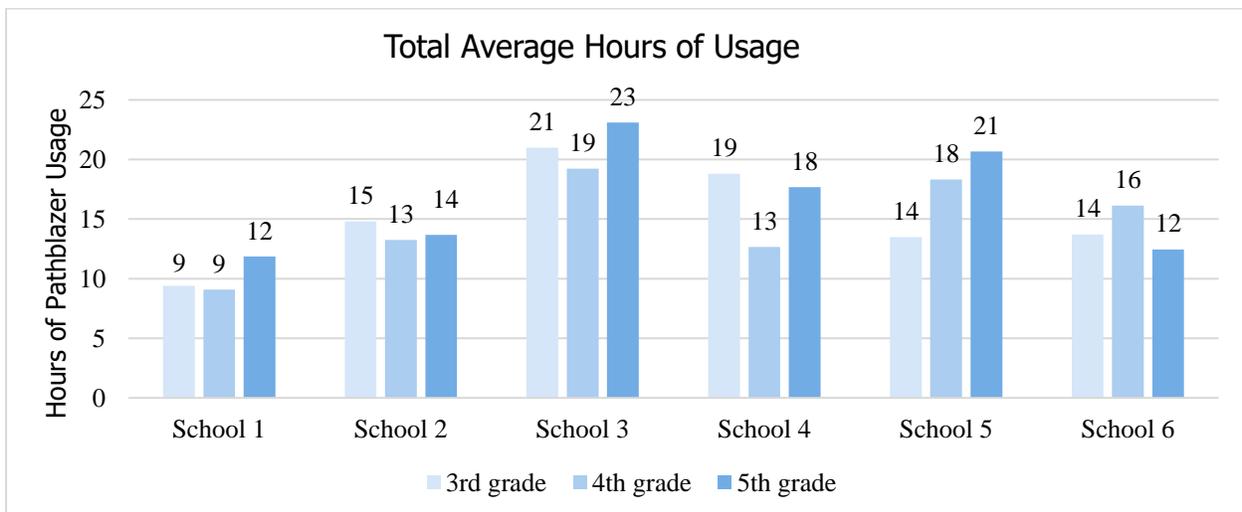


Figure 2. Average hours of Pathblazer usage by school and grade

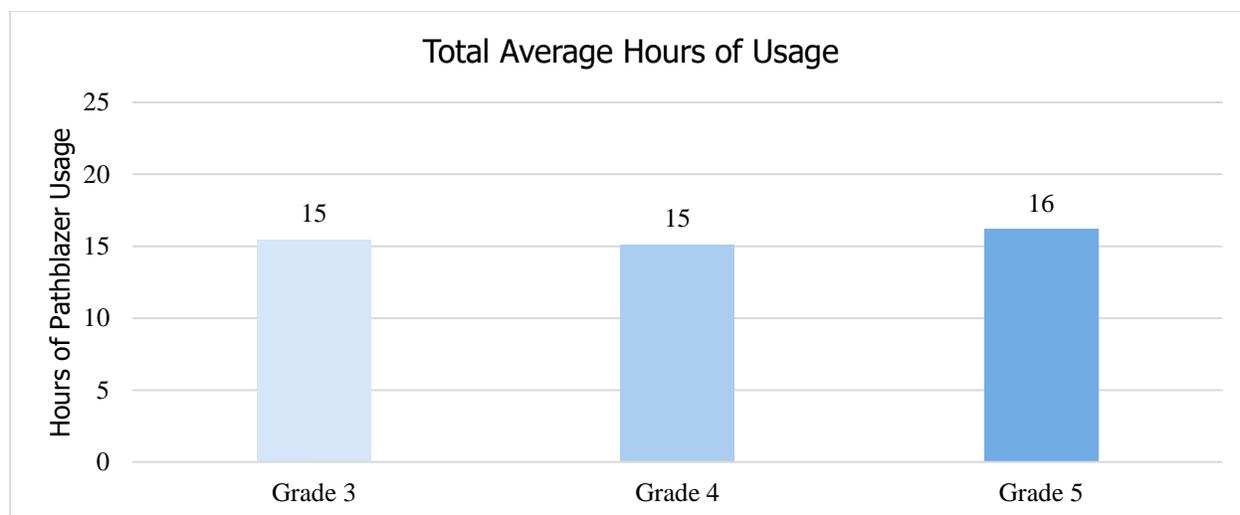


Figure 3. Average hours of Pathblazer usage by grade

Increased use of Pathblazer was associated with improved reading performance. Each Pathblazer activity completed was associated with an increase of 0.020 points in winter MAP Growth reading RIT scores. Put another way, approximately 50 completed activities was associated with a one-point MAP Growth RIT score increase. Total hours of Pathblazer usage was also significantly associated with winter MAP Growth reading RIT scores, as each hour of Pathblazer use was associated with a nearly half-point increase in scores. These findings show improved reading performance for students who used Pathblazer.

Student and Educator Perceptions

Principals, teachers, and students would recommend the Pathblazer program to others. Teachers liked that the program addressed gaps in students' knowledge and skills. Teachers believed Pathblazer improved student progress in reading, particularly for low- and high-achieving students.

Students generally indicated that they liked Pathblazer and felt it helped them with their reading. For example, students reported that using Pathblazer made reading easier. However, students recommended that the program be augmented with more incentives and rewards, such as games, badges, and contests, to potentially increase student motivation to use the program. Teachers agreed that students found Pathblazer engaging but indicated that Pathblazer had not changed student engagement one way or another. Classroom observations corroborated the current level of student engagement, as students were generally seen to be on task while working with Pathblazer.

Teachers reported that incorporating Pathblazer did not require them to change their instructional practices, and they were grateful for the time Pathblazer saved them

by being integrated with students' MAP Growth RIT scores. Teachers reported some changes to specific instructional strategies, such as adjustments to how they grouped students on skill levels and a greater focus on student independent work, goal-setting, and self-reflection. Most teachers also reported using Pathblazer data to enhance instruction and identify gaps in student skills.

Teachers would like to continue using Pathblazer but outlined a few technical issues that could be improved within the program. Teachers also reported that the initial training was very useful but requested short and on-demand refresher videos, because a lot of material was covered in the initial training. Teachers felt that there was benefit to them in learning how to better navigate the teacher dashboard.

Conclusion

This study provides ESSA "strong" or Tier 1 evidence of the efficacy of Pathblazer in improving student achievement in reading for students in grades 3–5. Students who participated in Pathblazer scored about one point higher on the winter 2020 administration of MAP Growth in reading than did similar control peers. Participation in Pathblazer was also particularly effective for low-achieving and special education students; each subgroup scored about two points higher on the winter 2020 MAP Growth reading assessment than did similar control peers.

Findings from qualitative data supported these findings, and educators believed that Pathblazer was most beneficial for low- and high-achieving students. For low-achieving students, Pathblazer helped fill in gaps in students' knowledge and skills. For high-achieving students, teachers believed Pathblazer provided access to more advanced content than gifted students would not otherwise have had.

Principals, teachers, and students had suggestions for program improvement, but all were eager to continue using the program in the future. Teachers particularly appreciated the time savings due to the Pathblazer feature that automatically integrates with students' MAP Growth RIT scores. Educators would recommend the program to other teachers, but feel that more training would be needed to take advantage of all of Pathblazer's features.

Randomized Controlled Trial of Edgenuity's Pathblazer in Floyd County Schools

Pathblazer is a supplemental, online intervention program that helps struggling learners in grades K–8 achieve grade-level proficiency in mathematics and reading. Pathblazer offers students individualized learning progression paths with fun, motivating content that addresses skill and concept gaps. Using existing student data or results from a screener, Pathblazer immediately identifies where students are struggling and provides the targeted instruction they need to close early learning gaps. The instruction in math and reading is designed to help engage students, accelerate them to grade-level mastery, and increase student self-efficacy in learning. All lessons are built around a gradual release instructional model of explicit instruction, supported practice, independent practice, and assessments. The data Pathblazer collect as students complete their work also help teachers monitor student progress and adapt their instruction. Intervention reports in Pathblazer track student progress toward standards mastery, inform small-group instruction, and help teachers plan for one-on-one time with students.

[Edgenuity](#) contracted with the [Center for Research and Reform in Education \(CRRE\)](#) at Johns Hopkins University to conduct a cluster randomized controlled trial of Pathblazer during the 2019–2020 school year in Floyd County, Georgia. This study was designed to meet the Every Student Succeeds Act (ESSA)'s "[strong](#)" or [Tier 1](#) evidence. The study addressed the following research questions:

1. What is the impact of using Pathblazer on student reading achievement in grades 3–5, relative to the business-as-usual condition?
2. Do effects of Pathblazer vary by student subgroup (e.g., gender, race/ethnicity, socioeconomic status, English language classification, special education classification, and prior achievement)?
3. To what extent is the level of Pathblazer use associated with improvement in reading performance?
4. How do teachers implement Pathblazer? What factors help or hinder the implementation of Pathblazer?
5. What are student and teacher perceptions of Pathblazer, as well as recommendations for program improvement?

Methods

Research Design

The current study used a mixed-methods evaluation design, including a cluster randomized controlled trial (CRT), to examine the impact of Pathblazer on reading achievement for students in grades 3–5. For six public elementary schools in Floyd County, Georgia, approximately half of each 3rd to 5th grade teacher’s classes were randomly assigned to participate in Pathblazer, and the remaining half were assigned to the control group. Teachers in grades 3–5 in these schools were departmentalized, and therefore had more than one classroom.² The analysis determines whether students in Pathblazer classrooms outperformed those in control classrooms, controlling for teacher, student prior achievement, and other student covariates.

Qualitative data were also collected during in-person visits to two elementary schools, to better understand how Pathblazer was being implemented as well as how it was received by educators. Site visits included classroom observations, teacher focus groups, student focus groups, and principal interviews.

Sample

Quantitative sample. As discussed above, 71 classrooms of 31 teachers of grades 3–5 across six elementary schools were randomly assigned to either participate in Pathblazer or serve as the control group. Table 1 outlines the classroom and teacher samples by treatment condition and grade level.

Table 1
Classroom and teacher sample

	Pathblazer Classroom N	Control Classroom N
Grade 3	12	13
Grade 4	12	12
Grade 5	11	11
Total	35	36
	Pathblazer Student N	Control Student N
Grade 3	247	258
Grade 4	266	265
Grade 5	243	245
Total	756	768

The student sample included 756 Pathblazer students and 768 control students in grades 3–5 across six elementary schools (out of nine) in Floyd County Public Schools in Georgia. The district is relatively small, and mostly serves White students (82

² All but one teacher had more than one classroom, and this teacher was randomly assigned to the control condition.

percent), followed by smaller percentages of Hispanic (8 percent) and Black (7 percent) students. The district also serves a large percentage of low-income students (62 percent). The student sample was generally representative of the district as a whole. Table 2 shows student characteristics for the analytic sample.

Table 2
Student characteristics for analytic sample³

	Pathblazer	Control
% White	76.32	75.13
% Hispanic	11.90	12.76
% Black	7.14	8.33
% Other Race	4.63	3.78
% Female	48.28	47.27
% Free and reduced meals	62.17	62.50
% Students with IEPs	12.70	14.19
% English learners	7.54	7.94
N	756	768

Pathblazer and control students were very similar on nearly every demographic characteristic, and there were no significant differences between Pathblazer and control students on any demographic variable. Pathblazer and control students were also similar in terms of prior reading achievement, as shown in Appendix C.

Site visit sample. In-person site visits were conducted at two elementary schools in the district. One school served 515 students in grades 3–5. This was a Title 1 school and had a large proportion of students (68.74 percent) in families that were under the poverty line. The school served a majority of White students (79.61 percent), with small populations of Hispanic (9.23 percent) and Black (6.41 percent) students. The school also served special education students (16.89 percent) and a few English language learners (4.66 percent). At the time of data collection, the principal had been in her current position for four years and was a former elementary school teacher, as well as an assistant principal in a different elementary school in the district.

The second site visit school served 514 students in grades K–5. Similar to the first site visit school, this school served a majority low-income (57.59 percent) student population. The school had a majority of White students (90.47 percent), with small percentages of Black (4.86 percent) and Hispanic (3.70 percent) students. The school served 14.79 percent special education students and a few (3.11 percent) English language learners. At the time of data collection, the school principal had currently been in her position for five years. She had previously been an assistant principal at this elementary school, along with another elementary school.

³ Percentages may not add up to 100% due to rounding error.

Data and Measures

Quantitative and qualitative data were collected from the following sources.

Student achievement and demographic data. CRRE collected Overall MAP Growth reading RIT scores in fall 2019 and spring 2020.⁴ Fall 2019 reading scores were used to establish baseline equivalence, and winter 2020 scores were used to estimate Pathblazer program impact. Student demographic information was also collected from the school district.

Pathblazer usage data. Usage data were collected from Pathblazer for all students in classrooms implementing Pathblazer. To estimate the relationship between usage of Pathblazer and improved student performance in reading, we defined and used the following usage metrics: number of completed activities, proportion of completed activities out of assigned activities, average activity score, and total hours of usage.

Teacher surveys. Brief online surveys were administered by CRRE to all teachers in the spring of 2020 to gain a better understanding of the learning context and Pathblazer usage in the classrooms. Since classrooms were randomly assigned within teachers, all but one teacher implemented Pathblazer in at least one of his/her classrooms. The survey covered classroom learning environments, factors that helped or hindered Pathblazer implementation, educator perceptions of Pathblazer, instructional practices, and other topics. The survey contained both Likert-scale items as well as yes and no questions. The survey also asked teachers to allocate the percentages of time they spent on various instructional activities, which had to sum to 100 percent. Teacher survey responses were analyzed using descriptive statistics (e.g., percentages).

Teacher observations. During site visits to two elementary schools, the research team also conducted seven observations in classrooms across grades 3–5 to assess whether Pathblazer teachers were implementing the desired instructional strategies. The research team used an adapted version of the OASIS-21 (Observation of Active Student Learning in Schools in the 21st Century) instrument, which was developed by CRRE to conduct snapshot classroom observations and adapted by CRRE in collaboration with Edgenuity to focus on instructional strategies that are particularly relevant to Pathblazer implementation and use.

Interviews and focus groups. During the site visits to two elementary schools, three structured principal and assistant principal interviews, three student focus groups, and two teacher focus groups were conducted with Pathblazer users. The purpose of the interviews and focus groups was to obtain educator and student

⁴ Due to COVID-19, the spring 2020 administration did not happen.

reactions to Pathblazer, discuss benefits for students, examine strengths and weaknesses in Pathblazer implementation, and obtain recommendations for program improvement. Interview and focus group data were analyzed via standard qualitative techniques to identify emerging trends and themes across participant responses. Table 3 outlines the number of educators and students who participated in either interviews or focus groups.

Table 3
Site visit interview and focus group sample⁵

	N	% of Sample
Principals/Asst. Principals	3	10.3%
Students	17	58.6%
Teachers	9	31.0%
Total	29	100%

Analytical Approach

Hierarchical linear modeling with students nested within classrooms was used to examine differences in winter 2020 MAP Growth reading achievement between Pathblazer and control students, controlling for fall 2019 MAP Growth reading achievement and other covariates. We initially included all student demographic variables included in Table 2 as covariates; however, only grade level, gender, ethnicity, special education status, and low-income were significant predictors. Thus, all other demographic variables were dropped from subsequent regression models. Because classrooms were randomly assigned to a treatment condition within each teacher, we also added dummy variables for each teacher to the models to meet [What Works Clearinghouse \(WWC\)](#) (2020) standards. The implication is that student performance in reading was compared for Pathblazer and control students, controlling for teacher effects and quality.

To examine associations between the extent of Pathblazer use and improvement in student reading achievement, we also conducted similar analyses in which the Pathblazer indicator was replaced with one of the usage variables. This analysis allowed us to examine which usage variables were associated with improvement on Pathblazer students' reading achievement, in relation to the achievement of control students. Student achievement data were analyzed using quantitative analysis software (Stata).

⁵ Percentages may not add up to 100% due to rounding error.

Quantitative Findings

We begin by descriptively analyzing patterns of Pathblazer usage across grades and schools. We then discuss the overall impact of Pathblazer on students' MAP Growth reading achievement, as well as selected usage and subgroup analyses.

Usage of Pathblazer

This section describes descriptive Pathblazer usage patterns. We examined four metrics related to Pathblazer usage. Completed Pathblazer activities refers to the average number of Pathblazer activities completed by each student. Percent completed activities is the percentage of completed activities out of total assigned activities. Average score is the average percent score on all Pathblazer activities. Average minutes of usage is the average total amount of time, in hours, a student spent using Pathblazer.

Table 4 displays average Pathblazer usage, by grade. Grade 3 students completed the most activities and had the highest scores on Pathblazer activities, on average. Grade 5 students had the highest average total minutes of usage. Based on these numbers, it appears that activities for grade 5 students took longer to complete than did activities for grades 3 and 4 students.

Table 4
Average Pathblazer usage by grade

	Average Number of Completed Activities	Percent Completed Activities	Average Activity Score	Average Hours Usage
3rd grade	73.31	63.97	85.27	15.48
4th grade	65.24	62.26	82.11	15.12
5th grade	65.07	63.14	81.74	16.15

We next examined Pathblazer usage patterns by school. We found substantial variation in Pathblazer usage among the six elementary schools included in this study. Table 5 displays average Pathblazer usage, by school. School 1 had the lowest average minutes of usage and appeared to be a bit of an outlier due to its considerably lower levels of usage compared to the other schools. School 3 had the most usage in terms of minutes and completed activities. Other schools had medium levels of usage.

Table 5
Average Pathblazer usage by school

	Average Number of Completed Activities	Percent Completed Activities	Average Activity Score	Average Hours Usage
School 1	40.27	51.86	79.99	9.91
School 2	67.14	66.19	81.21	13.88
School 3	88.72	76.16	84.45	21.14
School 4	75.35	74.76	84.24	15.85
School 5	64.54	54.84	83.52	16.49
School 6	62.39	56.71	83.00	14.01

We also examined Pathblazer usage by grade within each school. This allows for a closer examination of usage patterns within each school. Selected usage metrics by school and grade are displayed in Figures 4 through 6, and full tables may be found in Appendix B. These figures and tables show interesting patterns of usage across grades and schools. For example, grades 3 and 4 students at School 1 were generally using Pathblazer at lower levels than were grade 5 students in the same school. School 2 students, meanwhile, showed fairly consistent levels of usage across all three grades. In general, most schools appear to have some grade(s) that had notably higher or lower levels of usage than did the other grades. However, when looking across all schools, usage was similar across grade levels, with only slightly higher average usage for students in grade 5 than for students in grades 3 and 4.

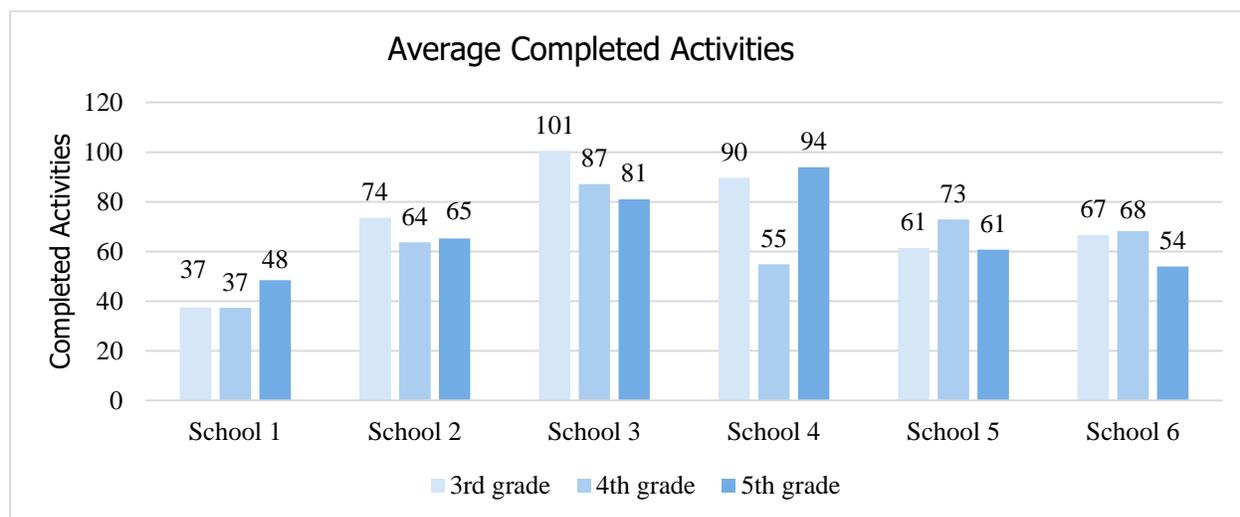


Figure 4. Average completed Pathblazer activities by school and grade

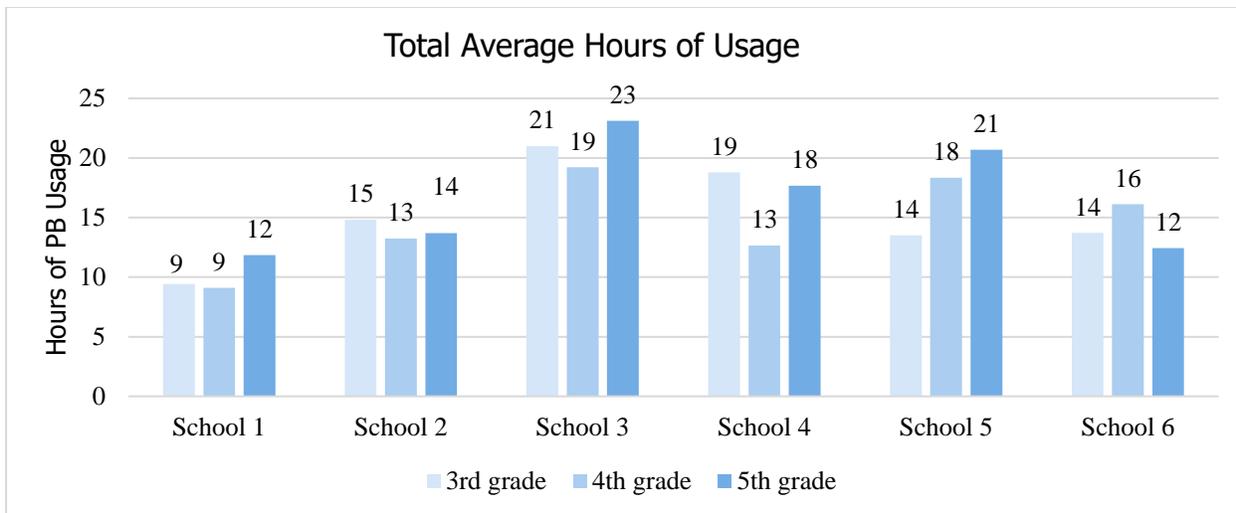


Figure 5. Average hours of Pathblazer usage by school and grade

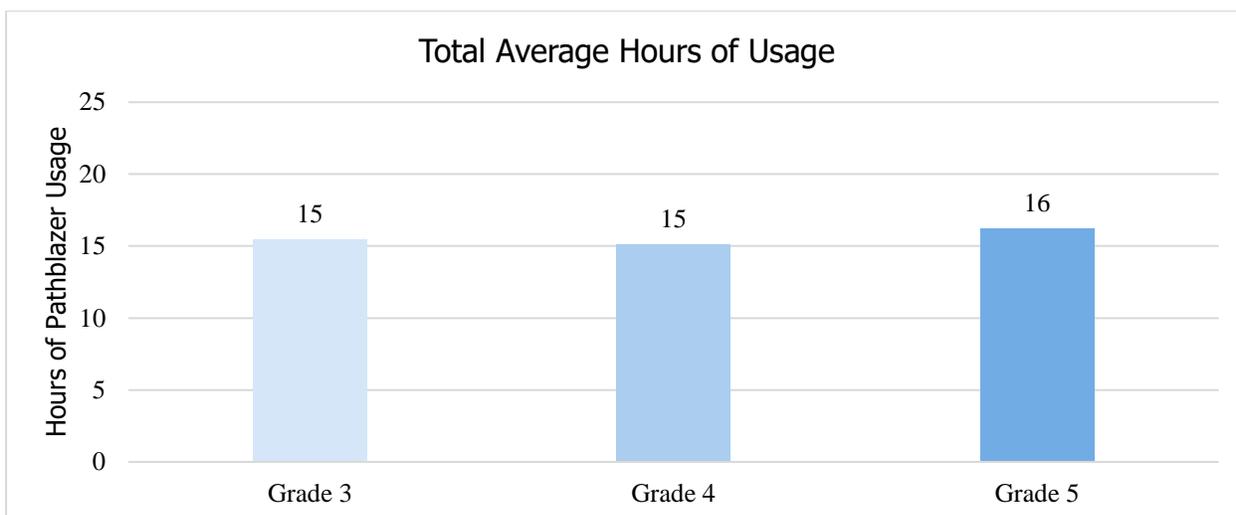


Figure 6. Average hours of Pathblazer usage by grade

Impacts on Student Reading Achievement

Overall, we found a positive and statistically significant impact of Pathblazer on students’ reading achievement, controlling for prior achievement, other student characteristics, and classroom and teacher effects. This finding satisfies ESSA’s [“strong” or Tier 1](#) evidence (see Appendix C). The next sections discuss the overall impact of Pathblazer on student reading achievement, as well as the associations between usage levels and improved performance in reading and effects of Pathblazer for various student subgroups. The overall and subgroup findings are summarized in Figure 7 below. Only subgroups with statistically significant differences between Pathblazer and the control group were included in the figure.

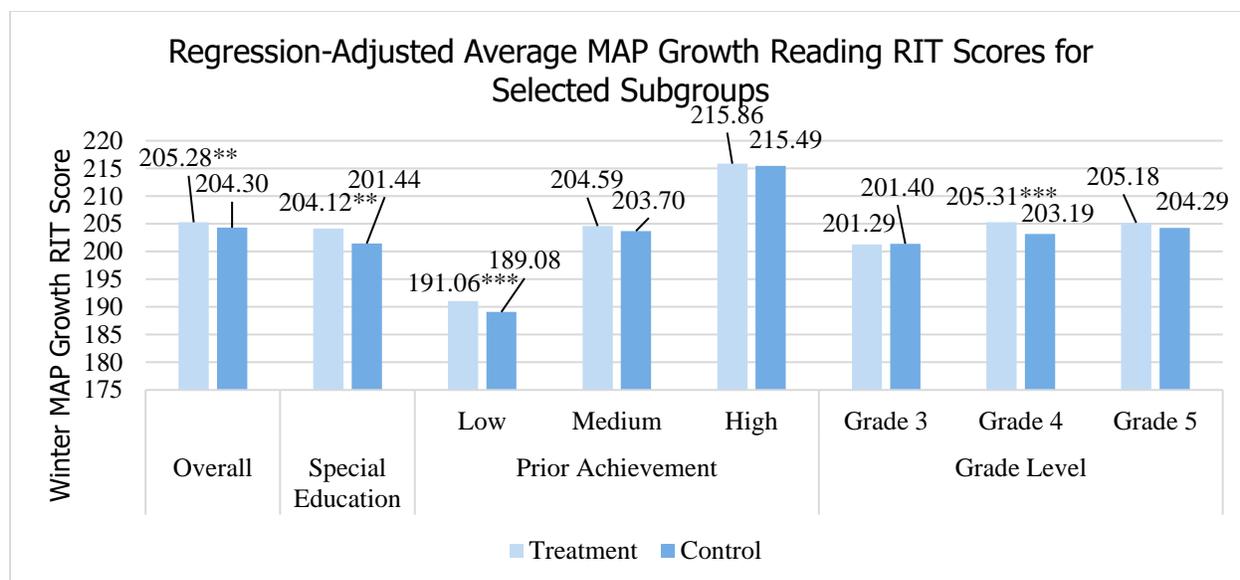


Figure 7. Average MAP Growth regression-adjusted reading RIT scores by subgroup
 Notes: 1. * p<.05, **p<.01, ***p<.001. 2. The statistical significance refers to the difference between the Pathblazer and control groups for each group, controlling for other variables.

Overall impact. Overall, impacts of Pathblazer showed a small but statistically significant and positive impact of Pathblazer on students’ reading performance (ES=+0.07, p = .008). Specifically, Pathblazer students scored an average of just under one point (0.977) higher on the winter 2020 MAP Growth reading assessment than did otherwise similar control students.

Table 6
 Overall impact of Pathblazer on winter 2020 MAP Growth reading RIT scores

Variable	Estimate	Standard Error	P-value	Effect Size
Pathblazer	0.977**	0.367	.008	0.068
Constant	204.299***	0.251	<.001	
Variance of constant	<.001			
Residual	45.533			
Student N	1524			
Class N	71			

Notes: 1. * p<.05, **p<.01, ***p<.001. 2. The model also controlled for gender, FARMS, and SPED status, as well as student grade and fixed teacher effects. 3. Variables were grand-mean centered to facilitate interpretation of the constant.

Differential impacts by student subgroup. We conducted a series of analyses to examine whether Pathblazer effects varied across different student subgroups. Descriptive tables of average MAP Growth reading RIT scores, by grade and for selected subgroups, are found in Appendix A, and complete regression tables related to subgroup analyses can be found in Appendix E.

We did not find differential impacts of Pathblazer for students of different gender, race, English learner (EL) status, or free and reduced meals (FARMS) status. We did find, however, a significant differential impact of Pathblazer for special education students. As shown in Table 7, special education students had gains of approximately two points greater ($p=.006$) from fall to winter on the MAP Growth tests, compared with special education control students, controlling for other demographic variables and teacher effects. It is important to note that special education students consistently scored considerably lower on the MAP Growth reading assessments at both time points than other students by a range 8 to 15 points across grades. This finding gives potential evidence of additional effectiveness of Pathblazer for special education students.

Table 7

Impact of Pathblazer on winter 2020 MAP Growth reading RIT scores for special education students

	Estimate	P-value
Special education	2.681**	.006

Notes: 1. ** $p<.01$. 2. The treatment effect for each subgroup was calculated by adding the overall treatment effect and the treatment interaction terms for the subgroup. The p-values reported in this table show whether Pathblazer had a positive effect for the subgroup relative to similar control students. 3. Full model information is available in Appendix E.

We examined differential impacts of Pathblazer for students with different levels of prior ELA achievement. We classified students as low, medium, or high prior achievement in the following manner: Students with fall MAP Growth RIT scores at the 25th percentile or lower were classified as "low"; students with fall MAP Growth RIT scores between the 25th and 75th percentiles as "mid"; and students with fall MAP Growth RIT scores at the 75th percentile or higher as "high." As Table 8 shows, Pathblazer students with low prior achievement had significantly higher winter MAP Growth RIT scores than did their control counterparts. Low-achieving Pathblazer students scored nearly three points higher than did low-achieving control students ($p < .001$). This result, along with the observed effects for special education students, gives evidence that Pathblazer was particularly effective for low-achieving students.

Table 8

Impact of Pathblazer on winter 2020 MAP Growth reading RIT scores by prior achievement

	Estimate	P-value
Achievement		
Low	2.882***	<.001
Mid	0.518	.235
High	0.495	.412

Notes: 1. *** $p < .001$. 2. The treatment effect for each subgroup was calculated by adding the overall treatment effect and the treatment interaction terms for the subgroup. The p-values reported in this table show whether Pathblazer had a positive effect for the subgroup relative to similar control students. 3. Full model information is available in Appendix E.

We also found statistically significant differences in Pathblazer impact by grade, as shown in Table 9. The most positive effects were found in grade 4, where Pathblazer students had fall to winter MAP Growth gains more than two points greater (2.120) than did control students, after controlling for other demographic variables and teacher effects ($p < .001$). By contrast, differences in MAP Growth achievement gains for Pathblazer and control students were much smaller in grades 3 and 5, and did not reach statistical significance. Baseline equivalence on fall 2019 MAP Growth was not met for students in grade 4, meaning that Pathblazer students had higher prior achievement than did similar control peers. However, attrition standards were met for the grade 4 sample, which indicates that the subgroup analyses met the research standards required for ESSA Tier 1 ([WWC, 2020](#)).

Table 9

Impact of Pathblazer on winter 2020 MAP Growth reading RIT scores by grade and school

	Estimate	P-value
Grade		
Grade 3	-0.106	.858
Grade 4	2.120***	<.001
Grade 5	0.894	.188
School		
School 1	-0.591	.572
School 2	-0.812	.596
School 3	1.249	.114
School 4	2.287*	.015
School 5	1.445	.141
School 6	0.890	.171

Notes: 1. * $p < .05$, *** $p < .001$. 2. The treatment effect for each subgroup was calculated by adding the overall treatment effect and the treatment interaction terms for the subgroup. The p-values reported in this table show whether Pathblazer had a positive effect for the subgroup relative to similar control students. 3. Full model information is available in Appendix E.

We also examined differences in program impact by school. One statistically significant difference was found in School 4 ($p = .015$), with Pathblazer students scoring more than two points higher on the winter MAP Growth assessment than their comparison counterparts. Therefore, this school may have benefitted from Pathblazer to a greater extent than other schools. However, this finding should be interpreted with caution, given that it represents only one data point.

Associations between Pathblazer usage and reading achievement. We now discuss analyses that examined the associations between Pathblazer usage variables and students' winter 2020 MAP Growth reading RIT scores, while controlling for prior achievement, other student covariates, and teacher effects. Pathblazer usage was generally related with improvement in students' reading achievement, and three of the four usage variables were found to statistically significantly predict students' winter MAP Growth reading RIT scores. Specifically, the number of activities a student completed, the proportion of assigned activities a student completed, and the average activity score were significant predictors, as shown in Table 10.

Table 10
Association between Pathblazer usage variables and winter 2020 MAP Growth reading RIT scores

Usage Variable	Estimate	Standard Error	P-value
Activities Completed	0.020***	0.005	<.001
Percent Activities	0.017**	0.005	.001
Hours of Usage	0.049*	0.021	.018
Average Score	0.014**	0.005	.002

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Each activity completed was associated with an increase of 0.020 points in winter MAP Growth reading RIT scores ($p < .001$). Put another way, approximately 50 completed lessons was associated with a one-point MAP Growth RIT score increase. Each percent of completed activities was associated with a 0.017 point MAP Growth RIT gain ($p = .01$). This means 100 percent completion was associated with a 1.7 point MAP Growth RIT score increase. Similarly, an average score of 100 percent on all activities was associated with a 1.4 point MAP Growth RIT score increase ($p = .002$). Average activity scores were generally around 80 percent, which would be associated with a 1.12 point increase in MAP Growth RIT score. Total usage was also significantly associated with winter MAP Growth reading RIT scores, as each hour of Pathblazer usage was associated with a nearly half-point increase in MAP Growth reading RIT score ($p = .018$).

We also conducted regression analyses using quartiles of Pathblazer usage, in terms of minutes of total usage and their association with MAP Growth reading RIT scores. None of the usage quartiles was statistically significant relative to the control

group. However, findings indicated a generally positive trend between extent of Pathblazer usage and improved reading scores. Students with the second lowest quartile usage made the largest improvements in MAP Growth reading RIT scores, followed by students in the fourth, third, and then first quartiles of usage.

Teacher Survey Findings

Twenty-two teachers who implemented Pathblazer in at least one of their classrooms responded to the teacher survey. The survey covered topics including classroom learning environments, factors that helped or hindered Pathblazer implementation, educator perceptions of Pathblazer, and instructional practices. Appendix F is a copy of the survey instrument.

All but one teacher who responded to the survey was an experienced teacher (four or more years of teaching experience), and the vast majority (90.9 percent) had been working in their schools for more than one year. Teachers indicated that 24.5 percent of their students were below grade level, 45.5 percent were on grade level, and 30.0 percent were above grade level. Therefore, teachers had a mix of students with different achievement levels.

Teachers were generally comfortable integrating online learning programs such as Pathblazer in their classrooms, with 86 percent of teachers reporting they were “somewhat comfortable” or “very comfortable” in response to this Likert-type question. Thirty-eight percent of teachers reported using Pathblazer before the 2019–2020 school year, while 86 percent of teachers reported using other online programs with students. Sixty-eight percent of teachers reported previously using the online program Moby Max.

Program Support and Training

A set of Likert-scale survey items asked teachers to rate the usefulness of the initial Pathblazer training and ongoing support. The vast majority of teachers agreed that the initial training was of high quality (81.8 percent) and prepared them to implement Pathblazer in their classrooms (87.3 percent). The vast majority of teachers also indicated that the ongoing support from Pathblazer was helpful (72.8 percent). In addition, 77 percent of teachers reported that they would like to continue using Pathblazer and that they would recommend Pathblazer to other teachers. These findings are outlined in Figure 8.

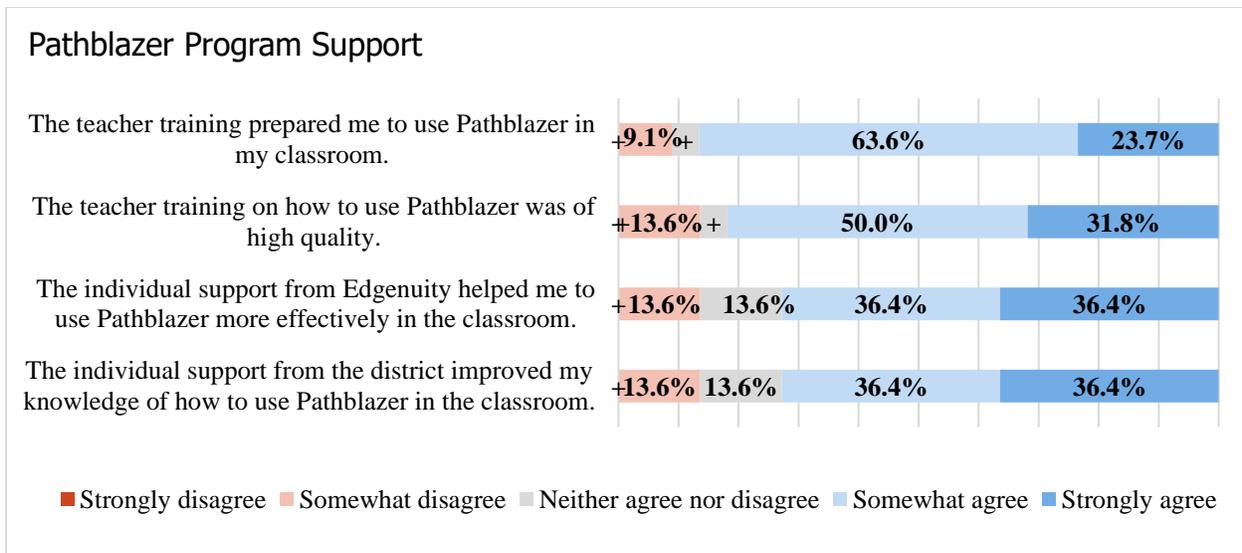


Figure 8. Teacher ratings of Pathblazer program support

Note: + < 5%

Changes in Teaching Strategies

Teachers were asked whether Pathblazer changed how they approached various teaching strategies. Figure 9 illustrates percentages of teachers who reported changes in specific teaching strategies as a result of Pathblazer use. In yes or no questions, the majority of teachers reported that Pathblazer changed how they grouped students on skill levels, assigned time for students to practice skills, and taught students skills such as goal-setting and self-reflection. About half of teachers reported that Pathblazer changed the way they taught reading comprehension, vocabulary, predictions while reading texts, and question generation. Lower percentages of teachers reported changes to time spent on independent student reading (40.9 percent) and analyzing errors during read-alouds (36.4 percent).

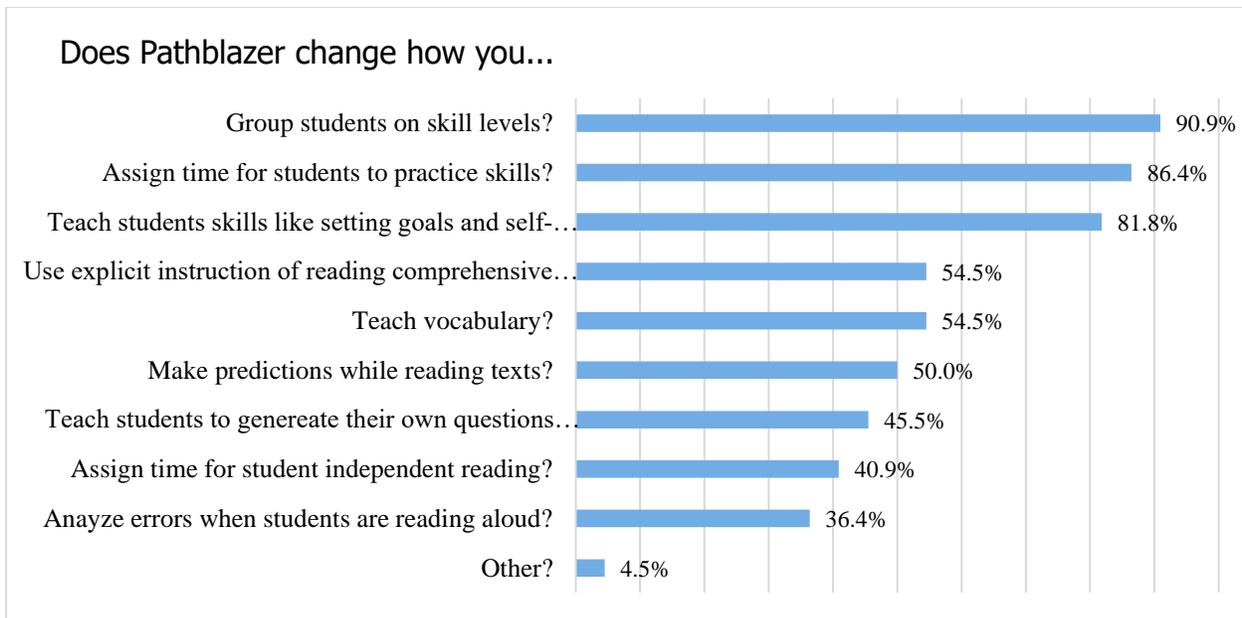


Figure 9. Changes in teacher-reported behaviors associated with Pathblazer use

Teachers also reported using Pathblazer data to enhance their instruction, as shown in Figure 10. Nearly all teachers (81.8 percent) reported using Pathblazer data in some capacity. Teachers used Pathblazer data to inform one-on-one student conferences (90.9 percent) and to group students according to their ability levels (81.8 percent). As a result of Pathblazer data, 81.9 percent of teachers indicated that they were better able to identify gaps in student skills.

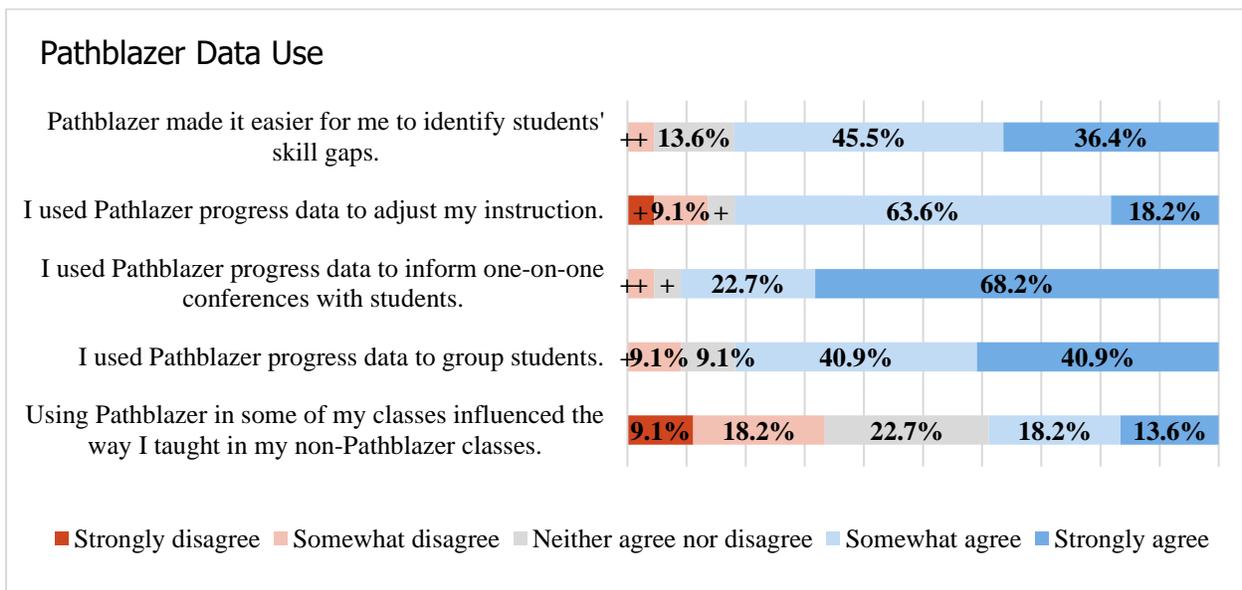


Figure 10. Teacher perceptions of Pathblazer data use

Note: + < 5%

In open-ended survey responses, teachers cited the student progress reports as the most popular data resource. One respondent noted that her favorite resource was, “the weekly reports that are emailed directly to me on the day and time of my choice. I choose to get them during the weekend. ... This helped me start the week off by addressing any issues as far as student progress that may have arisen the week before.” That said, reading, generating, and using reports other than the weekly self-generated student progress report were topics in which teachers said they needed more support. Teachers described creating reports, assigning lessons, and making changes themselves within the program as being “cumbersome” activities. Teachers would like the reports to be easier to read, and they want the skills to use the dashboard and information from the reports to better aid their students.

Many teachers also commented that they would like the dashboard to be more user-friendly. Teachers indicated that the dashboard was hard to use, both due to its complexity and the time it took to perform various tasks. One teacher suggested, “Lessen the amount of steps for the teacher portal. It's all too much and too many buttons to click. It needs to be narrowed down.” Another teacher requested an “updated” dashboard that “didn’t feel like it was designed for a computer programmer.”

In terms of instructional time spent on various activities, there were some small differences between Pathblazer and non-Pathblazer classrooms. As shown in Figure 11, teachers reported a slightly higher percentage of instructional time spent on one-on-one student conferencing (by 3.4 percentage points) and student independent work (by 4.6 percentage points) in their Pathblazer classrooms than in their non-Pathblazer classrooms. Teachers also reported a slightly lower percentage of instructional time spent on whole-group instruction (by 4.0 percentage points) in their Pathblazer classrooms than in their non-Pathblazer classrooms.

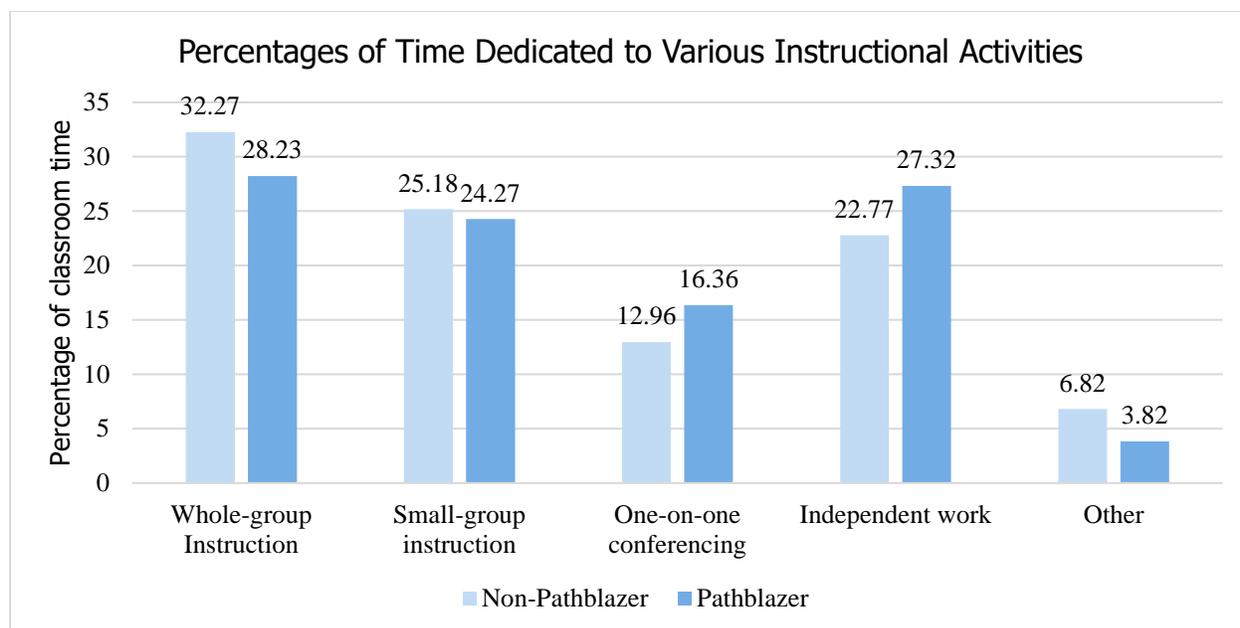


Figure 11. Teacher-reported percentages of time dedicated to various instructional activities

Teachers also reported initial challenges with finding enough time to implement Pathblazer, and this was cited as the greatest challenge teachers faced in using the program. Open-ended survey responses showed that teachers struggled to meet the required 60 minutes per week of program usage, although for some teachers this improved over the course of the school year. One teacher wrote, "At first, I struggled with when to give students time to get on daily, but after a few weeks I found a time that worked for me."

Teachers were also asked how frequently they met with students one-on-one to discuss their progress in Pathblazer. Nearly three quarters (73 percent) of teachers reported conducting one-on-one student conferences "often" or "very often" on a Likert scale, indicating that some teachers in Pathblazer classrooms were generally conducting one-on-one student conferences regularly. In open-ended responses, teachers reported initial challenges with finding the time to conduct the one-on-one student conferences, but they were better able to integrate them into the schedule over time. As one teacher stated, it took time to learn "to balance one-on-one conferencing in the beginning."

Overall, these findings indicate that as a result of Pathblazer, most teachers adjusted the way they grouped students on skill levels and focused more on student independent work, goal-setting, and self-reflection than they had in the past. Most teachers also reported using Pathblazer data to enhance instruction and identify gaps in student skills.

Perceived Program Impacts on Students

Teachers reported positive program effects on student engagement and learning. About three-quarters (77.3 percent) of teachers agreed that their students were engaged in Pathblazer. Over 90 percent of teachers agreed that Pathblazer helped their students learn, with over 80 percent agreeing that Pathblazer had resulted in increased student learning above and beyond regular practices. The vast majority (86.4 percent) of teachers believed that Pathblazer was the right difficulty level for their students. Finally, the majority of teachers reported that Pathblazer had positive effects on student perseverance in learning new material and self-confidence (86.3 percent and 68.2 percent, respectively). These results are outlined in Figure 12 below.

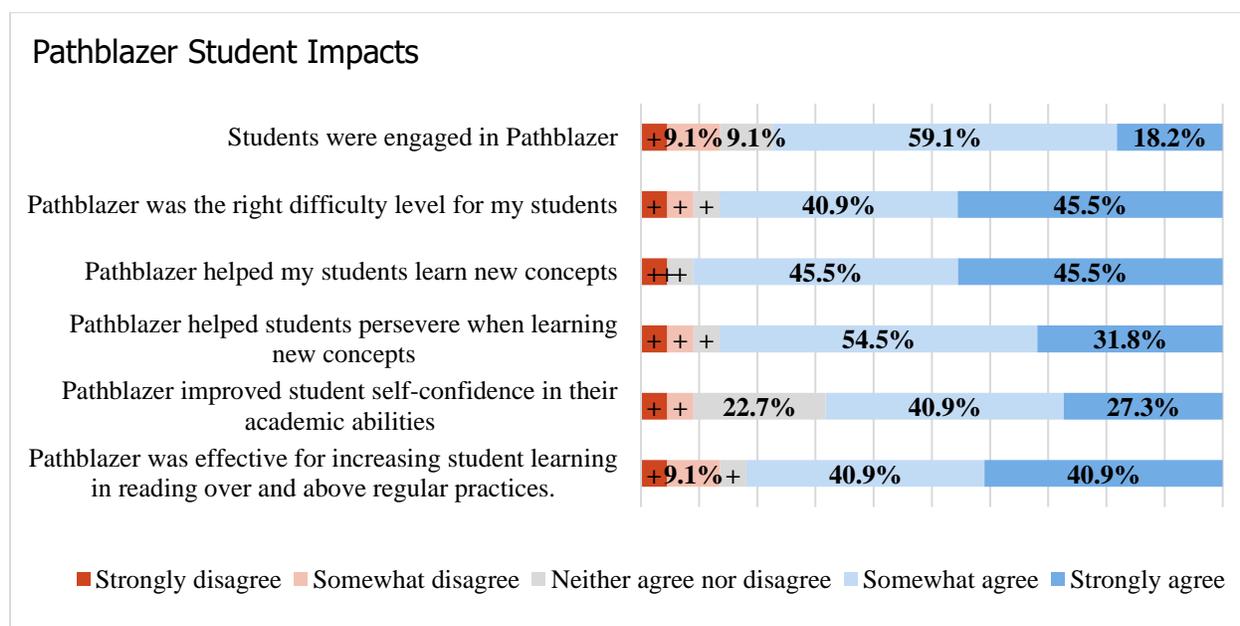


Figure 12. Teacher perceptions of effects of Pathblazer on students
 Note: + < 5%

In open-ended survey responses, teachers most appreciated the individualized lesson plans that Pathblazer generated for students based on their MAP Growth RIT scores. One respondent noted that they liked that Pathblazer allowed students “to work on their individualized learning pathway.” Another teacher wrote that Pathblazer “is adaptive, individualized, and challenging. The graphics are modern and engaging too.”

Site Visit Findings

As previously described, the research team conducted in-person visits to two elementary schools in the district to better understand Pathblazer implementation and participant reactions to the program. Educators and students were asked a number of questions about the following topics:

- Implementation of Pathblazer
- Perceived impact on teacher practice
- Perceived impact on student achievement and engagement
- Suggestions for program improvement

The next sections outline the key findings obtained from analyzing the interview, focus group, and observational data.

Program Implementation

Program adoption. The first site visit school was one of two district elementary schools that served as pilot schools for Pathblazer beginning in October 2019. Both site visit schools began full implementation of the program at the start of the 2019–2020 school year. One principal said that Pathblazer had been selected for use by the district superintendent largely because of its capacity to directly integrate individual students' MAP Growth RIT scores with online instruction, which would save teachers time in lesson planning. The other principal added that recommendations from teachers at the two pilot schools were the main reason Pathblazer was implemented district-wide in 2019–2020. Teachers at the second site visit school echoed this sentiment by stating that they had heard many good things about Pathblazer from colleagues at the first school.

Both principals noted that prior to Pathblazer implementation, several different online intervention programs had been used, to the point where too many programs might have been in use for teachers to successfully implement them all. Pathblazer has become one of the programs used most frequently in both schools, but other online programs are still in use in both schools.

Training and preparation. While teachers generally felt positive about preparedness to implement Pathblazer, there was also a consistent sentiment that more training was needed. Teachers received one day of in-person training from Edgenuity at the beginning of the school year, as well as a half day of training off-site at the county school district office during an in-service day at the beginning of October. During this half day, teachers were trained on how to use the various features of Pathblazer. Teachers were generally happy with the training, but three of the six teachers in one focus group specifically stated that they thought too much content was covered in the half-day training. Teachers would have preferred training sessions with smaller groups of people and smaller amounts of content. Teachers also indicated that additional support was needed, stating that they knew there were probably more features available than they were currently using in Pathblazer, but they didn't know what they were or how to access them.

Time spent implementing the program. In general, the 60-minute-per-week program usage requirement was met in classrooms at both schools, but there was variation in how teachers reported it was met. At one school, teachers reported using Pathblazer for 10 to 20 minutes each day. A teacher at the school acknowledged that she did not use Pathblazer every day, although she was reaching the 60 minutes per week guideline. Another teacher stated that longer time periods for Pathblazer were not necessarily helpful, as students would just take a longer amount of time to log on when they knew they had more time to complete Pathblazer activities during class. Teachers at this school agreed that 60 minutes of Pathblazer usage each week was too much. At the other school, teachers indicated that they used Pathblazer for 20 minutes every day, usually during What I Need (WIN) time at the beginning of class, “to get it done quickly and efficiently.”

The research team observed seven English language arts (ELA) blocks in six different classrooms in the two schools. In all observed classrooms, the Pathblazer program was used for approximately 20 minutes of the standard ELA block. In two of the seven classrooms, Pathblazer was used for approximately 12 to 20 minutes during one out of five to six rotation stations. The rotation schedule was posted on the white board for one of the two classrooms.

Students were also asked to reflect on the amount of time they spent using Pathblazer on a typical day. The majority of students (58 percent) thought they used the program for just the right amount of time, while smaller percentages of students believed they used the program either too much (24 percent) or too little/not enough (18 percent). One student said, “We do it for 20 minutes, and I think it’s just about right.”

Classroom environment and routines. All observed classrooms provided a classroom environment that was conducive to learning while using Pathblazer. A one-to-one ratio of Chromebooks to students was seen in both schools. Class sizes ranged from 14 to 22 students, with students seated at tables of six or fewer or at individual desks that were clustered or in rows. During time allocated to Pathblazer use, workspaces were largely clear and neat save for student devices and occasionally a notebook or notepaper.

Information on individual student progress in Pathblazer was observed in only one classroom, where it was depicted in “Portfolio Progress” signage on which student success was indicated by stickers. None of the observed classrooms had program-specific information posted on academic goals, lessons completed, or scores and grades.

Students in all observed classrooms appeared to follow clear and well-understood routines. At the beginning of each classroom observation, students entered the room and quickly logged into and operated Pathblazer independently and with ease.

Students appeared to be very familiar with program features and use. This familiarity with procedure was clearly demonstrated in two rooms where the teachers, having watched their students take their seats and take out their Chromebooks, simply needed to say, "You know what to do." Students were typically observed working quietly and without instruction. The majority wore headphones during program use; a teacher commented that some students preferred to read lesson material to themselves rather than listen to it.

Students remained on-task and did not converse with one another or turn their attention to other students' computers during Pathblazer time. Teachers in all seven classrooms alerted students to the time they had to spend on Pathblazer and provided a method for tracking time, either by posting a countdown clock on the whiteboard or by providing verbal updates throughout the period.

One recommendation of Pathblazer is for students to take notes while using the program. In one school, this was evidenced by composition books that all students were instructed to have out while they were working on Pathblazer. By contrast, neither the principal nor teachers seemed to focus on note-taking during instruction. Little evidence of note-taking by students was obtained from either classroom observations or teacher focus groups at either school. Note-taking was observed only in one 3rd grade classroom where the teacher was overheard saying "Do you have your Pathblazer notebooks? Make sure you take those notes." Teachers at this school acknowledged that students were given notebooks and encouraged to take notes while using Pathblazer, but one commented that she was not sure whether students knew how to take notes, and instead might only be "going through the motions." Teachers at the other school voiced similar opinions, stating that students at this age did not really know how to take effective notes and would either write everything down or just doodle. They also indicated that they thought taking notes in addition to completing Pathblazer activities was simply too much to ask of students.

Pathblazer time concluded in the same manner across all classes, with teachers stating that time was up and reminding students to close out of the program and put away their devices. Some teachers provided their students with additional instruction, such as, "Check your portfolio. Look at today and then the week. Look and see if there are any skills to finish," and, "Exit out correctly, save your information!"

Data and reports. Teachers provided mixed feedback on their use of the data and reports provided by Pathblazer. All teachers in both schools reported using the automatically generated reports regularly, and much more often than any reports they needed to manually pull themselves. One teacher commented, "I like the reports that they send, so I can go to a certain student and see what they are struggling with, and reassign, if needed." Another teacher noted that she used information from the reports to identify material that multiple students were struggling to learn. She would then create mini-lessons on those topics to reinforce learning and help her students toward

mastery. However, the majority of teachers in both schools also reported that they generally used MAP Growth RIT scores instead of Pathblazer assessment scores to track student progress. This may have been due to difficulties they encountered while using the dashboard and the time required to pull even basic reports from Pathblazer. In comparison, teachers were able to pull reports on students' MAP Growth RIT scores in about 20 minutes.

Perceived Program Impacts

Teacher practice. Since both schools were already using online interventions, teacher practices generally did not dramatically change. In a principal's words, the program required teachers to act more as "facilitators." Teachers described their role as one of being a "monitor" during Pathblazer time. The overwhelming majority felt that they needed to monitor students using Pathblazer to ensure they remained on task. One teacher stated that she was on the lookout for students who were jumping around within the program and not sticking with one skill or folder until they could pass a quiz, and another noted, "I have to constantly walk the room to check." During observations, the majority (five of seven) of teachers used the time to walk the room, seemingly to ensure students were on task and to answer any questions that arose.

Educators noted that students were aware they had growth goals to hit, and that Pathblazer was connected to their growth goals. This knowledge had allowed for more conferencing between students and teachers. The assistant principal remarked, "We've never in the past had a tool for students to know 'I'm doing this because of ...'" Later, he added regarding interactions between students and teachers, "I think the level of meaningful (and intentional) interaction has increased the rigor a great deal."

One-on-one conferences between teachers and students happened with varying frequency across classrooms. The teacher survey results indicate that more teachers used conferencing, although not necessarily every day. Teachers at one school generally reported conferencing one-on-one with students weekly, and typically with those needing the most support. Some teachers from the other school stated they very rarely had one-on-one student conferences. Several reasons were provided for why this was the case. One reason was that teachers had "too much stuff to do," such as monitoring their classrooms to ensure that students were engaged. Another reason was that individual teachers held conferences only for very specific purposes, such as if a student had all red codes or if a student was unable to pass a quiz.

During the classroom observations, teacher-student conferencing was observed in one out of the six classrooms. The teacher used the first part of the Pathblazer time to call six students individually to her desk to conduct brief one-on-one conferences about their Pathblazer reports. A small number of these students received rewards for their progress. This was also the only time a teacher was observed celebrating student success in Pathblazer. Other teachers mentioned that they used things like candy and

stickers to reward students who had obtained good scores on quizzes or those who had made good progress.

Student achievement and engagement. Students were asked to describe their initial impressions of using Pathblazer for reading. In general, students stated that they liked the program and thought it helped them with their reading. Comments included, “It helps me with my reading. ... I work on the things that I score low on and I can get better at those subjects,” “It helps you grow in a skill, it helped me a lot,” and, “I think it’s cool.” Another student stated, “I love Pathblazer reading, it’s the best thing ever.” When asked if they thought using Pathblazer made reading easier, a strong majority of 14 out of 17 students (82.3 percent) replied yes, while three students (17.6 percent) said they were undecided. Students stated that the program helped them to learn new words, showed them new ways to do things, and took them “step by step through the process” so that they could understand their lessons. One student noted, “It helps you with your own individual work—the teacher can’t do that.”

Students were somewhat less enthusiastic when asked if using Pathblazer made reading more fun. Out of the 17 participants, 12 (70.6 percent) said yes and five (29.4 percent) were undecided. “It’s widened my vision of different things I can read,” remarked one student, while another added, “It makes it easier so that makes it more fun.” Students indicated that parts in the program could sometimes be too long and sometimes “a little boring.” Some students acknowledged that they had enjoyed using the program more at the beginning of implementation, while others indicated that it had gotten better with time. One student summed up the group’s opinion in saying, “It’s not my favorite but it helps me.”

There were also differences in student responses across low- and high-achieving groups. When students were asked if they thought Pathblazer made reading more fun, lower achieving students were less likely to say the program was fun (33.3 percent vs. 83.3 percent for higher achieving students). Student responses across low- and high-achieving groups were otherwise similar.

Teacher focus group participants stated that Pathblazer had no effect on student engagement, either positively or negatively. One teacher believed students stayed engaged because of the potential reward of candy, while another teacher said about half of her students were engaged, while the other half had a sort of “Ugh, I have to do this again” attitude toward Pathblazer. Principals stated that students generally liked using Pathblazer, although they acknowledged there were variations in motivation by achievement level and grade—specifically, that Pathblazer had helped higher achievers the most, but had also helped lower achievers to a certain degree and that younger students tended to be more motivated than older students; 5th graders in particular tended to be less motivated while using Pathblazer.

Some teachers found that allowing students some flexibility in the order in which they completed activities, as opposed to forcing students to complete folders before moving on, tended to increase student motivation. Teachers related that Pathblazer lesson content was appropriate for individual students at both ends of the achievement spectrum, and allowed for greater flexibility from teachers in terms of assigning work to students. This did cause some initial “growing pains,” as one teacher put it, for some students, especially gifted students. Gifted students were not as used to encountering challenging material, so initially when Pathblazer pushed out content more challenging than they were used to, these students became frustrated. This abated over time, however, and one teacher commented that her gifted student was “very enthusiastic” in completing Pathblazer activities. Another teacher said, “I like that [Pathblazer] plugs in those holes that I can’t get to and that it pushes the upper achievers. Upper achievers didn’t make growth last year, but this year they did.”

Several teachers in both schools raised a point about the difficulty for high-achieving students to move through folders, relative to low-achieving learners. Specifically, as high-achieving students progressed through a folder, the content became more and more complex, to the point where content was at a level that was much too difficult to understand, even for high-achieving students. Teachers in one school elaborated on this, saying that Pathblazer was very useful for gifted students, but that the context and vocabulary used in the lessons was well beyond what a student in that grade, even a gifted student, could be expected to understand. Thus, it was more difficult for high-achieving students to show progress than it was for low-achieving students, which all of the teachers highlighted as an important concern.

A majority of focus group teachers (66.6 percent) agreed that Pathblazer had a positive effect on student reading progress. Some teachers also reported that low-achieving students made the greatest MAP Growth RIT gains after using Pathblazer. However, another teacher reported that some of her low-achieving students were at levels far below other students in the class, and that they became embarrassed when they saw where they were in comparison to other students. Teachers also felt that Pathblazer was not helping test grades as much as they would have hoped. This was, at least in part, attributed to the fact that the program had only been implemented for a relatively short period of time at both schools.

Program Reception and Recommendations for Improvement

Program reception. Principals, teachers, and students would recommend the program to others. Both principals reported that overall perceptions were typically more positive than negative. One principal highlighted the fact that she really appreciated how Pathblazer “meets students where they are.” The other principal reported that her teachers viewed Pathblazer “as a bit of a safety net” in the sense that it allowed them to teach content that they might not otherwise get to. This idea was repeated during focus groups, when a teacher repeatedly commented on how Pathblazer helped her to

“fill the gaps in instruction” for her students that she could not otherwise do. According to the principal, other teachers at the same school “had nothing but good things to say about Pathblazer.”

All of the focus group teachers at one school reported that they would recommend Pathblazer to other teachers. One teacher stated that although she didn't see a noticeable difference in MAP Growth RIT scores for Pathblazer students from fall to winter, the fact that Pathblazer connects to MAP Growth and automatically assigns lessons saves her so much planning time that she would definitely recommend Pathblazer. The savings in planning time was the main motivation for teachers recommending Pathblazer implementation. Pathblazer also saves teachers time by automatically grouping students by ability, so teachers do not have to individually look up student test scores. Teacher comments included, “That's a bonus for me ... knowing that it's linked to MAP. I depend on and rely on that.”

Students shared some of their favorite things about using the Pathblazer program. Several commented on how the program helped them with learning new things and with achieving higher scores and doing better on tests. Other students indicated that various features of the program were what they liked best. One student said they like “having someone in my ear, telling me how to do everything.” Other students gave their approval for the animation, characters, and videos like The Old Time Word Show. One student said what they liked best was that the program helped them to understand what they got wrong.

Recommendations for improvement. Educators and students cited a number of issues that could be improved in Pathblazer.

Usability of interface. Usability of the Pathblazer interface was consistently cited by educators as one trouble spot with using the program. Both principals reported that teachers felt the Pathblazer teacher interface was not very user-friendly, especially in terms of functionality and efficiency. The assistant principal at one school went as far as calling the interface of Pathblazer “antiquated.” Teachers at both schools also indicated that they were not familiar with how to access and utilize all of the reports available to them through the interface. Teacher comments included, “I'm still not real comfortable with all of the reports. I'm still not sure where to get the reports I need, because I don't do it enough,” and, “I feel like there's a lot more that can be done than what I am doing.” Teachers noted that if using the interface was easier or more intuitive, it would also take less time to use, which is a critical factor for many teachers. Teachers recommended that ongoing support consist of brief two-to-three-minute instructional videos developed by Edgenuity for teachers on focused topics. Ideally, these videos would be accessible and searchable through an online video library.

On the flip side, teachers were unanimous in stating that the student dashboard was user-friendly and that students had an easy time navigating within the program.

This was supported during classroom observations, when members of the research team watched students log into the program and navigate within it independently and with ease.

Technical difficulties. Educators and students alike reported several technical problems associated with their use of Pathblazer. Students said the voice in quizzes and tests sometimes cut out before finishing a question. Teachers said they had experienced login difficulties, activity malfunctions, and quizzes that did not always save—the last of which was a problem for both student morale and loss of instructional time. These issues, combined with the difficulties faced in enrolling students without current MAP Growth RIT scores, while not particularly common, did create headaches for teachers, especially in terms of planning instruction. A principal noted that the computer lab instructor from her school would have liked to have had some sort of mechanism to report these types of issues to Pathblazer directly.

Students also said they had experienced times when they selected the right answer to a question but were scored “wrong.” Some added that the program could be slow to load and that they did not like it when lessons expired and they had to spend time logging back in, sometimes losing completed work.

Student engagement. Principals, teachers, and students all recommended that Pathblazer provide some means to enhance engagement among students. Teachers were unanimous in stating that program use required regular monitoring to prevent distraction and maintain student progress so students could achieve maximum benefit. While the majority of students remained attentive to program content, a small number of “dawdlers” were observed in all classrooms. These students were slow to log into the program, slow to begin work, and slow to progress through their lessons. The classroom assistant in one room commented to a member of the research team, “The motivated students, as with everything, move through [Pathblazer] better and enjoy it more.” She added that she and the lead teacher made a specific point of walking the room both to answer questions and to motivate. During teacher focus groups, the majority of teachers agreed that if the program was made to be a little more engaging for students, with badges, rewards, and games, teachers might not need to supervise its use as closely.

Students from all three focus groups, and particularly older students, agreed that the program videos were either too long or too childish, a concern that was echoed by teachers. One student commented, “I don’t like the long videos; I don’t feel like I’m progressing.” Several students also indicated that they found the lesson material repetitive. Finally, students stated that the program offered little incentive other than the satisfaction of finishing, or getting a higher MAP Growth RIT score.

Students provided several suggestions for making Pathblazer better. Many focused on making the program more fun or game-like. They would like to have a

reward system and some opportunity to compete with one another or themselves within the program. They would also like the program lessons to be more varied and less repetitive. Finally, students from one school remarked that Pathblazer has taken over all of their computer lab time, but they would like to have some time for other things, since they already use Pathblazer in class.

Conclusion

This study provides ESSA “strong” or Tier 1 evidence of the efficacy of Pathblazer in improving student achievement in reading for students in grades 3–5. Students who participated in Pathblazer scored about one point higher on the winter 2020 administration of MAP Growth in reading than did similar, control peers. Pathblazer appeared to be particularly beneficial for students with low prior achievement (+2.88 points) and special education students (+2.68 points) relative to similar control peers.

Teachers were asked to assign Pathblazer to students for at least 60 minutes a week over the course of approximately 20 weeks. For the most part, teachers indicated that this threshold had largely been met, although students often used Pathblazer in 15- to 20-minute chunks of time. The average time students spent using Pathblazer during the study period ranged from 9 to 23 hours, and varied by school and grade.

Increased use of Pathblazer was also associated with improved reading performance. Each Pathblazer activity completed was associated with an increase of 0.020 points in winter MAP Growth reading RIT scores. Put another way, approximately 50 completed lessons was associated with a one-point MAP Growth RIT score increase. Total hours of Pathblazer usage was also significantly associated with winter MAP Growth reading RIT scores, as each hour of Pathblazer use was associated with a nearly half-point increase in MAP Growth reading RIT score. These findings indicate improved reading performance for students who used Pathblazer to a greater extent.

Findings from qualitative data supported these findings, and educators believed that Pathblazer was most beneficial for low- and high-achieving students. For low-achieving students, Pathblazer helped fill in gaps in students’ knowledge and skills. For high-achieving students, teachers believed that Pathblazer provided access to more advanced content that gifted students would not otherwise have had.

Students generally indicated that they liked Pathblazer and felt it helped them with their reading. For example, students reported that using Pathblazer made reading easier. However, students recommended that the program be augmented with more incentives and rewards, such as games, badges, and contests, to potentially increase student motivation to use the program. Teachers agreed that students found Pathblazer engaging but indicated that Pathblazer had not changed student engagement one way or another. Classroom observations corroborated the current level of student

engagement, as students were generally seen to be on task while working with Pathblazer.

Teachers reported that incorporating Pathblazer did not require them to change their instructional practices, and they were grateful for the time Pathblazer saved them by being integrated with students' MAP Growth RIT scores. Teachers reported some changes to specific instructional strategies, such as adjustments to how they grouped students on skill levels and a greater focus on student independent work, goal-setting, and self-reflection. Most teachers also reported using Pathblazer data to enhance instruction and identify gaps in student skills.

Teachers would like to continue using Pathblazer but outlined a few technical issues that could be improved within the program. Teachers also reported that the initial training was very useful but requested short and on-demand refresher videos because a lot of material had been covered in the initial training. Teachers felt that there was benefit to them in learning how to better navigate the teacher dashboard.

Principals, teachers, and students would recommend the Pathblazer program to others. Both teachers and students had suggestions for program improvement, but both were eager to continue using the program in the future. Teachers particularly appreciated the time savings due to the Pathblazer feature that automatically integrates with students' MAP Growth RIT scores. Educators feel more training would be needed to take advantage of all of Pathblazer's features.

Appendix A: Descriptive Statistics for MAP Growth Reading RIT Scores

In this appendix, we present a series of descriptive analyses of student MAP Growth reading RIT scores. Descriptive statistics are broken down by grade and school. Specifically, we present tables related to the following descriptive analyses:

- MAP Growth reading Overall RIT scores by grade
- MAP Growth reading Overall RIT scores by school
- MAP Growth reading Overall RIT scores by grade and school
- MAP Growth reading Overall RIT scores by school for SPED and non-SPED students
- MAP Growth reading Overall RIT scores by school for FARMS and non-FARMS students

Table 11
Mean MAP Growth reading RIT scores by grade

	Fall 2019	Winter 2020	Mean Change
Grade 3			
Pathblazer (n = 247)	190.45	198.08	7.63
Comparison (n = 258)	187.93	196.24	8.31
Grade 4			
Pathblazer (n = 266)	202.18	208.16	5.98
Comparison (n = 265)	198.05	203.18	5.13
Grade 5			
Pathblazer (n = 243)	207.51	212.45	4.94
Comparison (n = 245)	206.19	211.02	4.83

We also examined MAP Growth reading achievement trends by school. Pathblazer students at Schools 1 and 2 started at a much higher level in terms of baseline reading achievement, as measured by fall 2019 MAP Growth reading RIT scores, than did control students. We include further breakdowns of MAP Growth reading RIT scores by grade and school in Tables 12–15.

Table 12
Mean MAP Growth reading RIT scores by school

	Fall 2019	Winter 2020	Mean Change
School 1			
Pathblazer (n = 83)	198.11	202.67	4.56
Control (n = 107)	192.86	199.84	6.98
School 2			
Pathblazer (n = 62)	202.85	206.94	4.09

Control (n = 36)	189.31	197.78	8.47
School 3			
Pathblazer (n = 154)	199.89	207.34	7.45
Control (n = 148)	196.09	203.50	7.41
School 4			
Pathblazer (n = 107)	204.15	210.27	6.12
Control (n = 131)	206.63	210.69	4.06
School 5			
Pathblazer (n = 93)	201.37	207.30	5.93
Control (n = 121)	199.85	205.27	5.42
School 6			
Pathblazer (n = 257)	197.94	204.52	6.58
Control (n = 225)	194.52	200.50	5.98

Table 13
Mean MAP Growth reading RIT scores by school and grade

	Fall 2019	Winter 2020	Mean Change
School 1			
Grade 3			
Pathblazer (n = 22)	187.64	191.86	4.22
Control (n = 46)	187.57	195.76	8.21
Grade 4			
Pathblazer (n = 39)	196.18	201.23	5.05
Control (n = 18)	192.61	197.00	4.39
Grade 5			
Pathblazer (n = 22)	212.00	216.05	4.05
Control (n = 43)	198.60	205.40	6.80
School 2			
Grade 3			
Pathblazer (n = 17)	187.59	194.65	7.06
Control (n = 17)	180.06	192.65	12.59
Grade 4			
Pathblazer (n = 19)	202.89	207.11	4.22
Control (n = 19)	197.58	202.37	4.79
Grade 5			
Pathblazer (n = 26)	212.81	214.85	2.04
Control (n = 0)	n/a	n/a	n/a
School 3			
Grade 3			
Pathblazer (n = 47)	188.79	199.51	10.72
Control (n = 57)	188.65	197.32	8.67
Grade 4			
Pathblazer (n = 52)	203.60	210.63	7.03
Control (n = 55)	195.82	203.16	7.34

Grade 5			
Pathblazer (n = 55)	205.87	210.91	5.04
Control (n = 36)	208.31	213.81	5.50
School 4			
Grade 3			
Pathblazer (n = 36)	194.11	201.64	7.53
Control (n = 38)	196.63	202.34	5.71
Grade 4			
Pathblazer (n = 47)	205.47	212.00	6.53
Control (n = 44)	206.59	210.59	4.00
Grade 5			
Pathblazer (n = 24)	216.63	219.83	3.20
Control (n = 49)	214.41	217.24	2.83
School 5			
Grade 3			
Pathblazer (n = 45)	195.80	202.02	6.22
Control (n = 24)	180.71	190.58	9.87
Grade 4			
Pathblazer (n = 27)	210.19	214.74	4.55
Control (n = 46)	198.00	201.48	3.48
Grade 5			
Pathblazer (n = 21)	202.00	209.05	7.05
Control (n = 51)	210.53	215.61	5.08
School 6			
Grade 3			
Pathblazer (n = 80)	188.16	195.85	8.69
Control (n = 76)	187.32	195.25	7.93
Grade 4			
Pathblazer (n = 82)	199.44	205.77	6.33
Control (n = 83)	196.33	201.72	5.39
Grade 5			
Pathblazer (n = 95)	204.88	210.75	5.87
Control (n = 66)	200.53	205.00	4.47

Table 14

Mean MAP Growth reading RIT scores by grade and special education status

	Fall 2019	Winter 2020	Mean Change
Grade 3 (SPED)			
Pathblazer (n = 30)	183.13	192.80	9.67
Control (n = 42)	177.93	184.67	6.74
Grade 3 (non-SPED)			
Pathblazer (n = 217)	191.47	198.81	7.34
Control (n = 216)	189.88	198.49	8.61
Grade 4 (SPED)			

Pathblazer (n = 37)	192.00	199.24	7.24
Control (n = 30)	182.93	190.43	7.50
Grade 4 (non-SPED)			
Pathblazer (n = 229)	203.82	209.60	5.78
Control (n = 235)	199.98	204.80	4.82
Grade 5 (SPED)			
Pathblazer (n = 29)	193.83	200.59	6.76
Control (n = 37)	194.57	200.62	6.05
Grade 5 (non-SPED)			
Pathblazer (n = 214)	209.36	214.06	4.70
Control (n = 208)	208.26	212.87	4.51

Table 15

Mean MAP Growth reading RIT scores by grade and FARMS status

	Fall 2019	Winter 2020	Mean Change
Grade 3 (FARMS)			
Pathblazer (n = 162)	187.69	195.09	7.40
Control (n = 167)	185.07	193.89	8.82
Grade 3 (non-FARMS)			
Pathblazer (n = 85)	195.73	203.78	8.05
Control (n = 91)	193.20	200.54	7.34
Grade 4 (FARMS)			
Pathblazer (n = 149)	198.23	203.95	5.72
Control (n = 165)	194.54	199.52	4.98
Grade 4 (non-FARMS)			
Pathblazer (n = 117)	207.20	213.52	6.32
Control (n = 100)	203.85	209.21	5.36
Grade 5 (FARMS)			
Pathblazer (n = 159)	205.03	209.92	4.89
Control (n = 148)	201.30	206.79	5.49
Grade 5 (non-FARMS)			
Pathblazer (n = 84)	212.21	217.24	5.03
Control (n = 97)	213.66	217.47	3.81

Appendix B: Descriptive Statistics for Pathblazer Usage

The following table contains a descriptive breakdown of Pathblazer usage statistics by grade for each elementary school in the study.

Table 16
Average Pathblazer usage by school and grade

	Number of Completed Activities	Percent Activities Completed	Average Score	Average Hours Usage
School 1				
3rd (n = 22)	37.41	53.78	79.49	9.41
4th (n = 39)	37.28	51.29	79.55	9.09
5th (n = 22)	48.45	50.88	81.77	11.85
School 2				
3rd (n = 17)	72.00	66.07	80.78	14.66
4th (n = 19)	63.63	59.05	77.92	13.25
5th (n = 26)	65.27	70.93	83.82	13.69
School 3				
3rd (n = 47)	100.51	73.80	87.71	20.99
4th (n = 52)	87.17	77.74	83.94	19.22
5th (n = 55)	80.22	76.61	82.02	23.11
School 4				
3rd (n = 36)	89.72	76.23	85.77	18.79
4th (n = 47)	54.87	65.52	82.08	12.65
5th (n = 24)	93.88	90.35	85.62	17.68
School 5				
3rd (n = 45)	60.78	52.70	85.73	13.46
4th (n = 27)	72.85	64.32	85.49	18.33
5th (n = 21)	60.76	47.80	76.36	20.68
School 6				
3rd (n = 80)	66.63	61.75	86.05	13.71
4th (n = 82)	68.22	55.52	82.04	16.13
5th (n = 95)	54.32	53.75	80.73	12.51

Appendix C: Tables to Meet ESSA Tier 1 Standards

In this appendix, we present tables related to cluster and student attrition, baseline equivalence, and program impacts. We also briefly discuss the implications of these tables, specifically as they relate to meeting standards for ESSA's "[strong](#)" or [Tier 1](#) evidence.

This study had acceptable levels of cluster (e.g., classroom) and student attrition, per the ([What Works Clearinghouse \(WWC\)](#) (2020) attrition guidelines. Cluster attrition is shown in Table 17, and student attrition is shown in Table 18.

Although baseline equivalence was not necessary because this study was a cluster randomized controlled trial with low attrition, Pathblazer and control students were similar in terms of prior reading achievement. Using Fall 2019 MAP Growth reading RIT scores as the baseline measure, baseline equivalence was met because the standardized mean difference between Pathblazer and control students was 0.204, which was less than 0.25 ([WWC](#), 2020). Baseline equivalence was also met when considering the 3rd and 5th grade subsamples separately (standardized mean differences of 0.182 and 0.092, respectively). Conversely, baseline equivalence was not met when considering the 4th grade subsample separately, with Pathblazer students showing higher baseline achievement in reading than control students in the 4th grade (standardized mean difference of 0.324). However, attrition standards were met for grade 4 sample, which indicates that the subgroup analyses met the research standards required for ESSA Tier 1 ([WWC](#), 2020).⁶

Table 19 shows the baseline equivalence for the entire sample, as well as by grade. Table 20 shows additional information regarding program impacts.

Table 17

Summary of cluster attrition

C Class N	T Class N	N Randomized to C	N Randomized to T	Attrited C Classes	Attrited T Classes	Overall Class Attrition Rate (%)	Differential Class Attrition Rate (%)
36	35	36	35	0	0	0.00	0.00

Table 18

Summary of student attrition

C Student N	T Student N	N Randomized to C	N Randomized to T	Attrited C Students	Attrited T Students	Overall Student Attrition Rate (%)	Differential Student Attrition Rate (%)

⁶ There was no teacher attrition, and the overall attrition rate for the 4th grade sample was 5.35% and the differential attrition rate was 1.37%.

						Rate (%)	
756	768	797	833	41	65	6.50	2.66

Table 19
Baseline equivalence

	Overall Mean	Pathblazer Mean (SD)	Control Mean (SD)	Adjusted T v C Difference	Pooled Unadjusted SD	Stan. Mean Diff.
3rd grade	189.17	190.45 (14.01)	187.93 (14.62)	2.60	14.33	0.182
4th grade	200.12	202.18 (13.97)	198.05 (14.32)	4.58	14.14	0.324
5th grade	206.85	207.51 (13.80)	206.19 (14.35)	1.29	14.08	0.092
All students	198.64	200.06 (15.59)	197.25 (16.21)	3.24	15.90	0.204

NOTE: SD=standard deviation

Table 20
Program impacts

	Control Mean	Pathblazer Standard Deviation	Control Standard Deviation	Adjusted T v C Difference	Pooled Unadjusted SD	Stan. Mean Diff.
All students	198.64	13.72	14.99	0.98	14.37	0.0680

Appendix D: Correlations Among Student Variables

Table 21

Relationships among MAP Growth reading RIT scores and student demographic variables

	Winter MAP	Fall MAP	Female	Black	Latino	Other Race	SPED	EL	FARMS
Winter MAP	1								
Fall MAP	.88***	1							
Female	.06*	.05*	1						
Black	-.11***	-.07**	-.02	1					
Latino	-.09***	-.12***	.03	-.11***	1				
Other race	-.04	-.02	.04	-.06**	-.08**	1			
SPED	-.28***	-.29***	-.15***	.01	-.03	-.02	1		
EL	-.20***	-.22***	.03	-.08**	.68***	-.05*	.03	1	
FARMS	-.29***	-.28***	-.01	.07**	.20***	.07**	.10***	.18***	1

Note: * p < .05, ** p < .01, *** p < .001.

Appendix E: Regression Results for Subgroup Analyses

All regression models controlled for prior achievement, grade, gender, FARMS, and SPED status, as well as fixed classroom and teacher effects. In addition, all variables were grand-mean centered to facilitate interpretation of the intercept. Student and classroom sample sizes were identical to those outlined in previous regression tables.

Table 22

MAP Growth reading regression results with SPED interaction

	Estimate	Standard Error	P-value
Pathblazer	0.718	0.392	.067
Pathblazer*SPED	1.966	1.050	.061
SPED	-2.860***	0.743	<.001
Constant	204.303***	0.250	<.001

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 23

MAP Growth reading regression results with FARMS interaction

	Estimate	Standard Error	P-value
Pathblazer	1.740**	0.590	.003
Pathblazer*FARMS	-1.212	0.736	.099
FARMS	-0.997	0.546	.068
Constant	204.295***	0.251	<.001

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 24

MAP Growth reading regression results with grade level interactions

	Estimate	Standard Error	P-value
Pathblazer (Grade 5)	0.894	0.679	.188
Pathblazer*Grade 3	-1.000	0.913	.271
Pathblazer*Grade 4	1.226	0.898	.172
Grade 3	-2.894	1.800	.108
Grade 4	-1.097	1.416	.438
Grade 5	204.289***	.251	<.001

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 25

MAP Growth reading regression results with school interactions

	Estimate	Standard Error	P-value
Pathblazer (School 6)	0.890	0.650	.171
Pathblazer*School 1	-1.481	1.231	.229
Pathblazer*School 2	-1.702	1.670	.308

Pathblazer*School 3	0.359	1.028	.727
Pathblazer*School 4	1.397	1.143	.222
Pathblazer*School 5	0.555	1.176	.637
Constant	204.325***	0.252	<.001

Note: * p<.05, **p<.01, ***p<.001.

Table 26

MAP Growth reading regression results with prior achievement interactions

	Estimate	Standard Error	P-value
Pathblazer (Medium)	0.889	0.590	.132
Pathblazer*Low	1.979	1.129	.080
Pathblazer*High	0.366	1.020	.719
Low	-14.621***	0.780	<.001
High	11.786***	0.766	<.001
Constant (Medium)	203.698***	0.251	<.001

Notes: 1. * p<.05, **p<.01, ***p<.001. 2. This model did not include the pretest.

Appendix F: Teacher Survey Instrument

Background Information:

1. How many years have you worked as a lead teacher, not including student teaching? (1 year, 2-3 years, 4-5 years, 6-9 years, 10+ years, 20+ years)
2. How many years have you been working as a teacher at your current school? (1 year, 2-3 years, 4-5 years, 6-9 years, 10+ years, 20+ years)
3. About what percentage of students in your classrooms are ...? (Values must add up to 100%.)
 - Below-grade level learners
 - On-grade level learners
 - Above-grade level learners

Use of Online Learning:

4. Have you used Pathblazer before the 2019-2020 school year? (Yes/No)
5. Have you used other online programs with students before? (Yes/No, If yes, please list)
6. How comfortable are you at integrating online learning into your instruction? (Very uncomfortable, somewhat uncomfortable, somewhat comfortable, very comfortable)

Teacher Implementation:

7. How many of your classrooms used Pathblazer?
8. FOR YOUR PATHBLAZER CLASSROOMS, about what percent of instructional time in a given week do you allocate to the following activities? (Values must add up to 100%.)
 - Whole-group instruction
 - Small-group instruction
 - Teacher one-on-one/teacher conferencing
 - Student independent work
 - Other
9. FOR YOUR NON-PATHBLAZER CLASSROOMS, about what percent of instructional time in a given week do you allocate to the following activities? (Values must add up to 100%.)
 - Whole-group instruction

- Small-group instruction
- Teacher one-on-one/teacher conferencing
- Student independent work
- Other

10. Does using Pathblazer change how you ...? (Yes/No)

- Teach students to generate their own questions while reading texts
- Teach students to make predictions while reading texts
- Teach students skills like setting goals and self-reflection
- Use of explicit instruction of reading comprehensive skills
- Analyze errors when students are reading aloud
- Teach vocabulary
- Group students on skill levels
- Assign time for students to practice skills
- Assign time for student independent reading
- Other (open-ended)

11. How frequently do you meet one-on-one with students to discuss their learning goals/progress in Pathblazer? (Never, rarely, often, very often)

Student Impact:

12. Indicate the degree to which you agree or disagree with the following statements. (Strongly disagree, somewhat disagree, neither disagree nor agree, somewhat agree, strongly agree)

- Students were engaged in Pathblazer.
- Pathblazer was the right difficulty level for my students.
- Pathblazer helped my students learn new concepts.
- Pathblazer helped students persevere when learning new concepts.
- Pathblazer improved student self-confidence in their academic abilities.
- Pathblazer was effective for increasing student learning in reading over and above regular practices.

Teacher Impact:

13. Indicate the degree to which you agree or disagree with the following statements. (Strongly disagree, somewhat disagree, neither disagree nor agree, somewhat agree, strongly agree)

- Pathblazer make it easier for me to identify students' skill gaps.
- I used Pathblazer progress data to adjust my instruction.
- I used Pathblazer progress data to inform one-on-one conferences with students.
- I used Pathblazer progress data to group students.

- Using Pathblazer in some of my classes influenced the way I taught in my non-Pathblazer classes. If so, how? (Open-ended)

14. I would like to continue to use Pathblazer. (Yes, maybe, no)

15. I would recommend Pathblazer to other teachers. (Yes, maybe, no)

Program Support:

16. Indicate the degree to which you agree or disagree with the following statements. (Strongly disagree, somewhat disagree, neither disagree nor agree, somewhat agree, strongly agree)

- The teacher training prepared me to use Pathblazer in my classroom.
- The teacher training on how to use Pathblazer was of high quality.
- The individual support from Edgenuity helped me to use Pathblazer more effectively in the classroom.
- The individual support from the district improved my knowledge of how to use Pathblazer in the classroom.

Open-Ended:

17. What do you like best about Pathblazer?

18. What have been the most helpful resources?

19. What did you find challenging about implementing Pathblazer?

20. Where do you need more support?

21. Do you have recommendations for how to improve Pathblazer? If so, what are they?