

## Streaming Increases Student Engagement and Achievement – For All

### Background on Streaming

Discovery Education Streaming is the definitive collection of digital resources for K-12 schools, and most recently, has become the safe space for students to collaborate and share learning experiences. Used by more than a third of all schools in the United States and by millions of students worldwide, Streaming offers students and teachers a one-stop location to find, create, and collaborate on vetted high quality digital content. From downloadable and editable videos, to audio, images, and digital interactives, Streaming engages all students, especially at-risk students, to better understand academic content and develop workforce-ready skills.

### Research Findings

1. Discovery Education Streaming inspires and engages students to learn. Daily school attendance increased for students with high-use of DE Streaming and was most notable for <sup>3</sup> —
  - **Hispanic students** in high-use social studies classes, who attended an average of 3 more days than those in low-use classes.
  - **Students impacted by poverty** in high-use social studies classes, who attended an average of 6 more days than those in low-use classes (more than an additional week of school).
  - **Special education students** in high-use social studies classes, who attended an average of 12 more days compared to low-use classes (more than two weeks of school).
2. Use of Discovery Education Streaming converts excitement and engagement about learning into substantial academic gains. In a different study, **73% of high-use students met or exceeded state benchmarks**, compared to only 30% of low-use students reaching those same benchmarks <sup>1</sup>. This difference was also found to be especially significant for –
  - African American students,
  - Hispanic students, and
  - students impacted by poverty.
3. Use of Discovery Education Streaming results in higher scores in both reading and math. In a third study, **66% of high-use students met or exceeded state benchmarks, for reading and 70% of high use students met or exceeded state benchmarks for math**, compared to only 50% of low-use students reaching those same benchmarks <sup>2</sup>. This difference was also found to have a profound impact for -
  - Hispanic Students, and
  - African American Students.
4. Use of Discovery Education Streaming results in greater interest and higher academic scores for some of the hardest to reach students <sup>3,4</sup>.
  - **Students impacted by poverty —** In Grade 8 high-use social studies classes, 53% of students impacted by poverty met state targets on the CAASPP ELA and 25% met state targets on the CAASPP Math, compared to 43% and 21%, respectively, for students impacted by poverty in low-use classes.
  - **Hispanic students —** In Grade 8 high-use social studies classes, 56% of Hispanic students met state targets on CAASPP ELA, compared to 43% of Hispanic students in low-use classes.
  - **Limited English Proficiency —** In Grade 8 high-use math classes, 18% of LEP students meet state targets on CAASPP ELA compared to 10% of LEP students in low-use classes. Both of these use-groups exceeded state and local results for LEP students.

The findings in this research bulletin are based on three separate studies, conducted in three different states, and are also supported by the independent findings of a published university study. The three internal studies compared two groups of students in the district: those that had high-use of Discovery Education Streaming and those that had low-use of Discovery Education Streaming. Use analysis includes both teacher and/or student usage of the service. When the use analysis is based on just teacher usage, high-use is defined as the top 25% of teacher users in the district. Low-use comprised the lower 75% of teacher users in the district. When use analysis is based on teacher and student usage, high-use is based on adding two normed z-values together, those values above zero are considered high exposure.

1. 2015-2016 study of a school district in northern Texas, with 3,300 students, the majority of students (90%) identifying as white and having no special needs. The assessment measure was the State of Texas Assessments of Academic Readiness (STAAR) in English I.
2. 2014-2017 study of an eastern Tennessee school district with 4,500 students, approximately 20% of whom were identified with special education status and 70% identified as white. The assessment measure was the Tennessee Comprehensive Assessment Program in Reading and Mathematics (Graph A).
3. 2015-2016 study of a California school district with 9,100 students, two-thirds of whom were identified as low income while almost half identified as Hispanic. The assessment measures were the California Assessment of Student Performance and Progress (CAASPP) in Reading and Mathematics (Graph B).
4. *Laptop Use, Interactive Science Software, and Science Learning Among At-risk Students* (Zheng, Warschauer, Hwang, & Collins, 2014) is published at <https://eric.ed.gov/?id=EJ1037105>

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Discovery Education has been a leader in the transformation of learning through the use of digital tools for over fifteen years. In that time Discovery Education has conducted a number of studies assessing impact on instruction, and has also been the subject of several independent research studies measuring the impact of DE products and services on instruction and learning. For further information contact DE Chief Academic Officer at [MCreel@discoveryed.com](mailto:MCreel@discoveryed.com)

### Discovery Education Streaming Use Analysis

Chart A: School district in eastern Tennessee, High-use of DE Streaming compared to low-use, state, and district averages, 2016 Tennessee Comprehensive Assessment Program in Reading and Math <sup>2</sup>

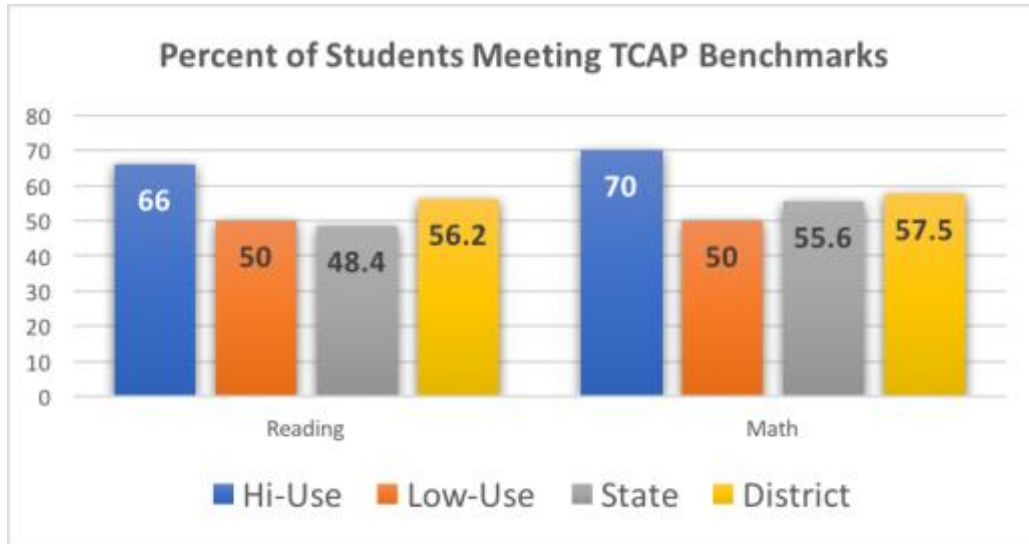
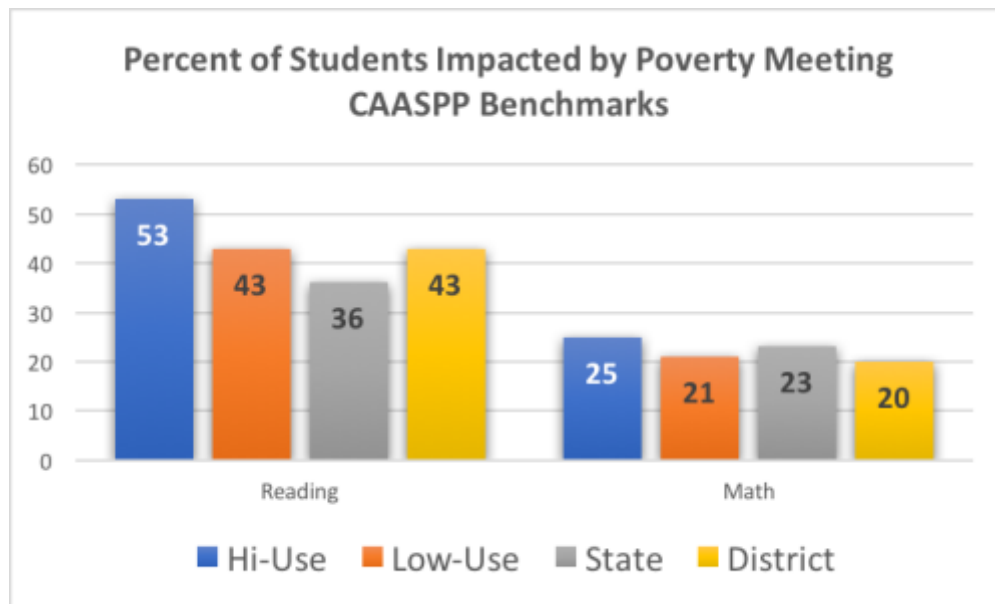


Chart B: School district in California, For students impacted by poverty, High-use of DE Streaming compared to low-use, state, and district averages, 2016 California Assessment of Student Performance and Progress (CAASPP) in Reading and Mathematics <sup>3</sup>



## Active Streaming Users and Test Scores in Kentucky- A Case Study

### Background on Streaming

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### Kentucky as a Case Study

For the past several years, Kentucky Educational Television (KET) has offered Discovery Education Streaming services to all public schools in the state of Kentucky. Therefore, a large proportion of schools in Kentucky have access to and use Streaming. The state of Kentucky also publishes annual test score (K-PREP) data at the school level for all students and students within certain demographic characteristics. By combining school-level test score data with internal Streaming usage data, Kentucky can serve as a case study to determine if there is a relationship between Streaming usage and test scores.

### Research Findings

The use of Discovery Education Streaming had an impact on test scores in the Commonwealth of Kentucky.

1. Use of Discovery Education Streaming in schools leads to higher test scores than schools that did not use the service for **All Students in Language, Mathematics, Reading, Social Studies and Writing**. The percent of students **proficient and distinguished was 3.3-14.3% greater** for schools that used Discovery Education than those that did not use the service.
2. Subgroups impacts were found for:
  - **Students Impacted by Poverty:** 1.2-7.2% more students proficient and distinguished in Mathematics, Reading, Social Studies and Writing for schools that used Discovery Education Streamings than those that did not.
  - **Hispanic Students:** 13.2-21.5% more students proficient and distinguished in Mathematics and Reading for schools that used Discovery Education Streaming than those that did not use the service.
  - **African American Students:** 5.8-22.7% more students proficient and distinguished in Mathematics and Reading for schools that used Discovery Education Streaming than those that did not use the service.
3. The amount of usage impacts scores as well. A higher amount of monthly active teachers of Discovery Education Streaming in schools led to higher test scores than those schools that had lower amounts of monthly active teachers for **All Students in Language, Mathematics, Reading, Social Studies and Writing**. The percent of students **proficient and distinguished was 2.5-4.5% greater** for schools that had more monthly active teachers than those that had fewer.
4. These results are consistent at the subgroup level for all subjects for:
  - **Students with Disabilities:** 3.3-5.5% more students proficient and distinguished for schools that had more monthly active teachers than those that had fewer.
  - **English Language Learners:** 2.9-4.9% more students proficient and distinguished for schools that had more monthly active teachers than those that had fewer.
  - **Asian Students:** 9.6-15.7% more students proficient and distinguished for school that had more monthly active teachers than those that had fewer.

### Methodology

Test score data was obtained from publically available datasets available on the Kentucky Department of Education website. There are 1,253 public schools in Kentucky, and 981 (78%) of those schools were successfully paired with Discovery Education Streaming usage data. This final dataset had test score data for 121,175 - 222,624 students depending on test, and at least one school was represented from each county in Kentucky.

The testing and usage data are from the 2015-2016 school year and cover the follow K-PREP content areas: Language Mechanics, Mathematics, Reading, Social Studies, and Writing. Science test scores were not available for the 2015-2016 school year. K-PREP scores fall into four categories of achievement: Novice, Apprentice, Proficient, and Distinguished. The latter two categories (Proficient and Distinguished) indicate a student passed the assessment, and this was the metric used to assess the impact of Streaming usage on test scores.

All data analysis were conducted using R version 3.4.0 and the ggmap package was used for creating maps. The initial analysis (Research Findings 1 and 2) compared pass rates at schools who used Streaming compared to schools who did not use Streaming. This was followed up by comparing schools with a high amount of monthly active teacher users to schools with a low amount (Research Findings 3 and 4). The active teachers group was created by taking the schools in the top quartile of monthly active teachers (at or above 5.9 monthly active teachers), while the low group consisted of schools in the bottom 3 quartiles of monthly active teachers (below 5.9 monthly active teachers). T-tests were used to assess if group differences were statistically significant, and the Welch-Satterthwaite equation was used to calculate degrees of freedom. Comparisons were made for all students and all possible disaggregated groups (some disaggregated groups did not have a large enough sample).

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**Discovery Education Streaming Use and K-PREP Test Score Analysis**

Figure 1: Map of Kentucky showing comparing schools that have average Monthly Streaming Users to schools that have no Monthly Streaming Users.

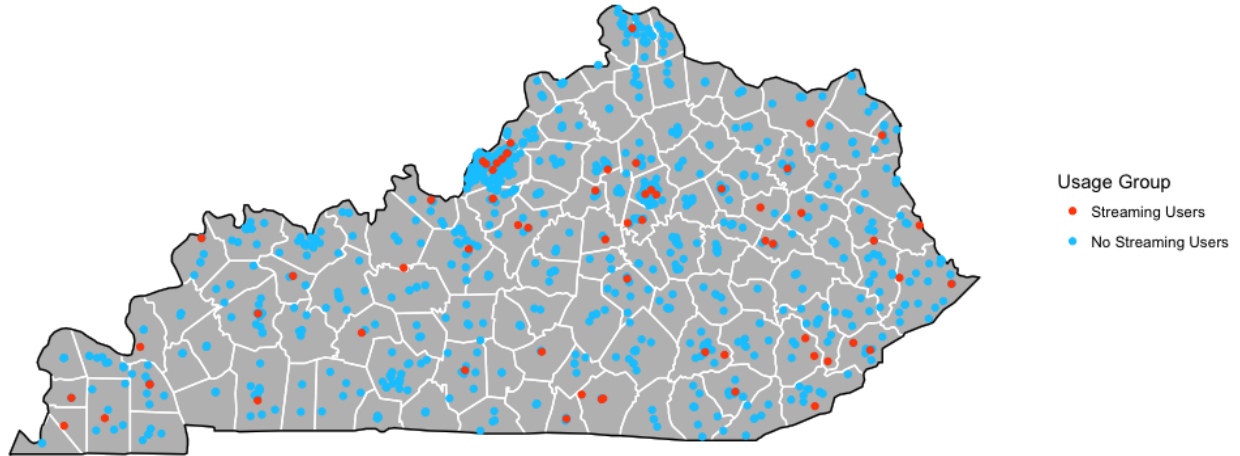


Figure 2: Map of Kentucky showing comparing schools that have Low average Monthly Streaming Users to schools that have High Monthly Streaming Users.

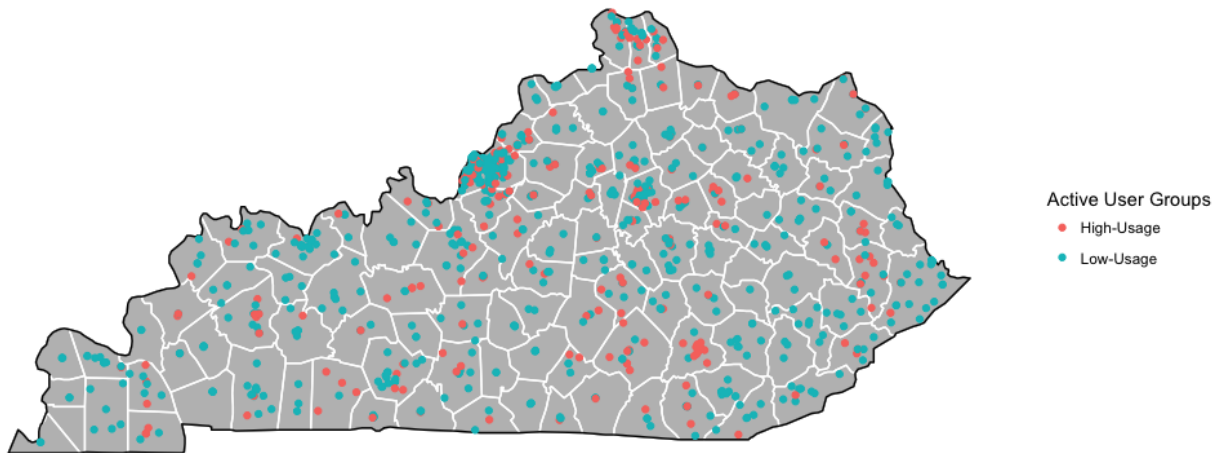


Figure 3: The colors represent *t*-test results comparing schools with no Active Monthly Streaming Users to schools with Active Monthly Streaming users on the percent of students who passed the K-PREP. The number in the cells shows how many more students passed the K-PREP in schools with Active Streaming users compared to schools with no Active Streaming users (Active-No Active).

	Language Mechanics	Mathematics	Reading	Social Studies	Writing
All Students	9.54	10.42	8.16	3.25	14.30
Female	3.28	0.82	-0.10	3.26	3.72
Male	6.04	7.94	4.27	0.98	7.82
African American	-13.39	22.70	5.82		-10.38
American Indian or Alaska Native					
Asian					
Hispanic		13.23	21.48		-15.89
Native Hawaiian or Other Pacific Islander					
Two or more races		11.02	21.87		
White (Non-Hispanic)	7.69	8.55	4.27	5.14	15.96
Disability-Alternate Only		15.42	27.02		20.24
Disability-With Accommodation (not including Alternate)	-12.23	-13.58	-14.81		-8.87
Disability-With IEP (not including Alternate)	-4.04	-5.07	-6.24	11.02	-5.12
Disability-With IEP (Total)	2.50	-4.46	-2.37	7.36	2.25
English Learners					
Free-Reduced-Price Meals	-1.53	1.28	2.39	3.05	7.15
Gap Group (non-duplicated)	3.27	4.36	4.58	3.07	9.18
Gifted-Talented	-1.64	0.50	-1.95		10.43
Migrant					

	Use>No Use
	Use<No Use
	Not Significant
	Not Enough Data

Figure 4: The colors represent *t*-test results comparing schools with low Active Monthly Streaming Users to schools with high Active Monthly Streaming users on the percent of students who passed the K-PREP. The number in the cells shows how many more students passed the K-PREP in schools with High Active Streaming users compared to schools with Low Active Streaming users (High Active-Low Active).

	Language Mechanics	Mathematics	Reading	Social Studies	Writing
All Students	4.53	4.46	3.35	3.11	2.49
Female	3.68	2.87	2.68	3.00	3.38
Male	6.28	3.28	3.10	2.61	2.51
African American	-1.93	3.32	2.95	3.67	1.26
American Indian or Alaska Native					
Asian	9.55	13.12	13.04	9.94	15.73
Hispanic	-1.45	-0.22	-0.36	-1.64	-0.67
Native Hawaiian or Other Pacific Islander					
Two or more races	-1.52	1.72	0.37	-11.52	-3.00
White (Non-Hispanic)	0.89	3.53	2.86	0.44	0.47
Disability-Alternate Only		-0.63	-3.91		-7.90
Disability-With Accommodation (not including Alternate)		5.82	5.63	7.81	1.95
Disability-With IEP (not including Alternate)	6.36	6.00	5.52	7.61	3.55
Disability-With IEP (Total)	5.22	3.33	4.25	4.77	3.76
English Learners	4.87	2.88	4.51	4.02	3.76
Free-Reduced-Price Meals	3.73	0.92	0.91	1.43	1.62
Gap Group (non-duplicated)	4.09	1.55	1.27	1.38	1.70
Gifted-Talented	-3.12	-0.37	-1.31		
Migrant		18.57	13.80		23.86

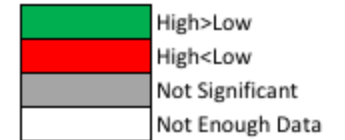




Figure 5: The percent of all students who obtained a “Proficient” or “Distinguished” score on the K-PREP grouped by Monthly Active User group.

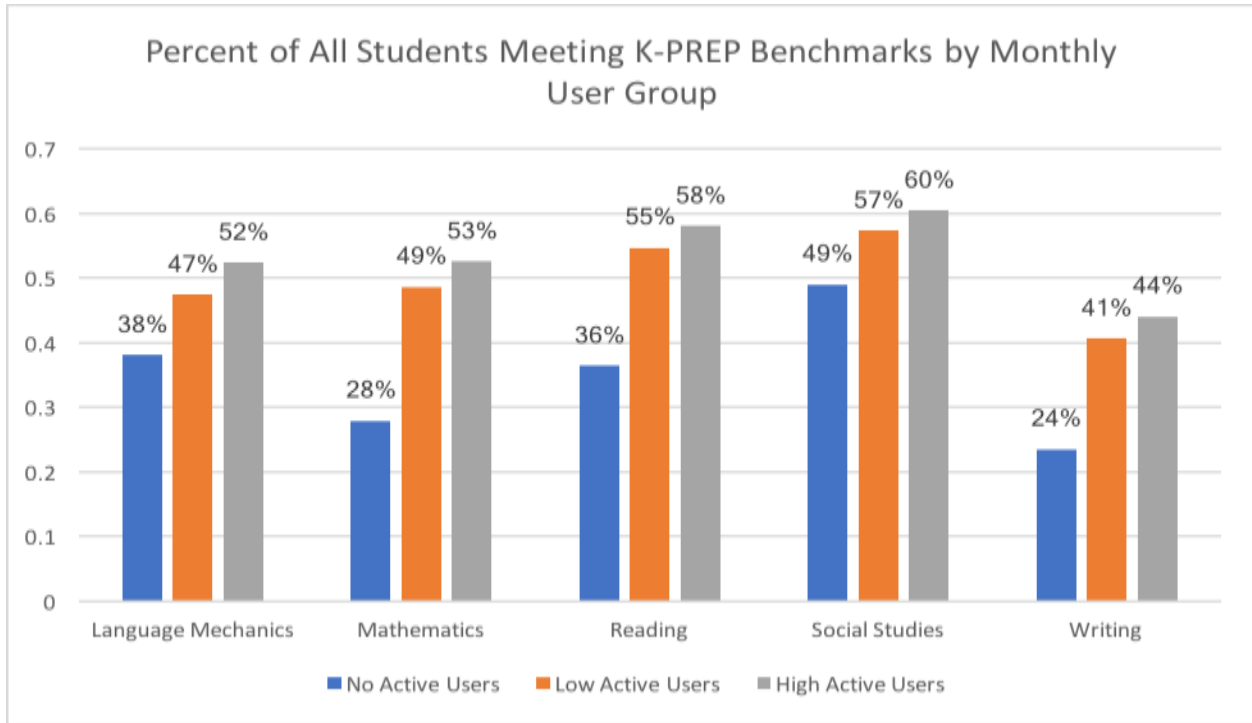


Figure 6: The percent of African American students who obtained a “Proficient” or “Distinguished” score on the K-PREP grouped by Monthly Active User group.

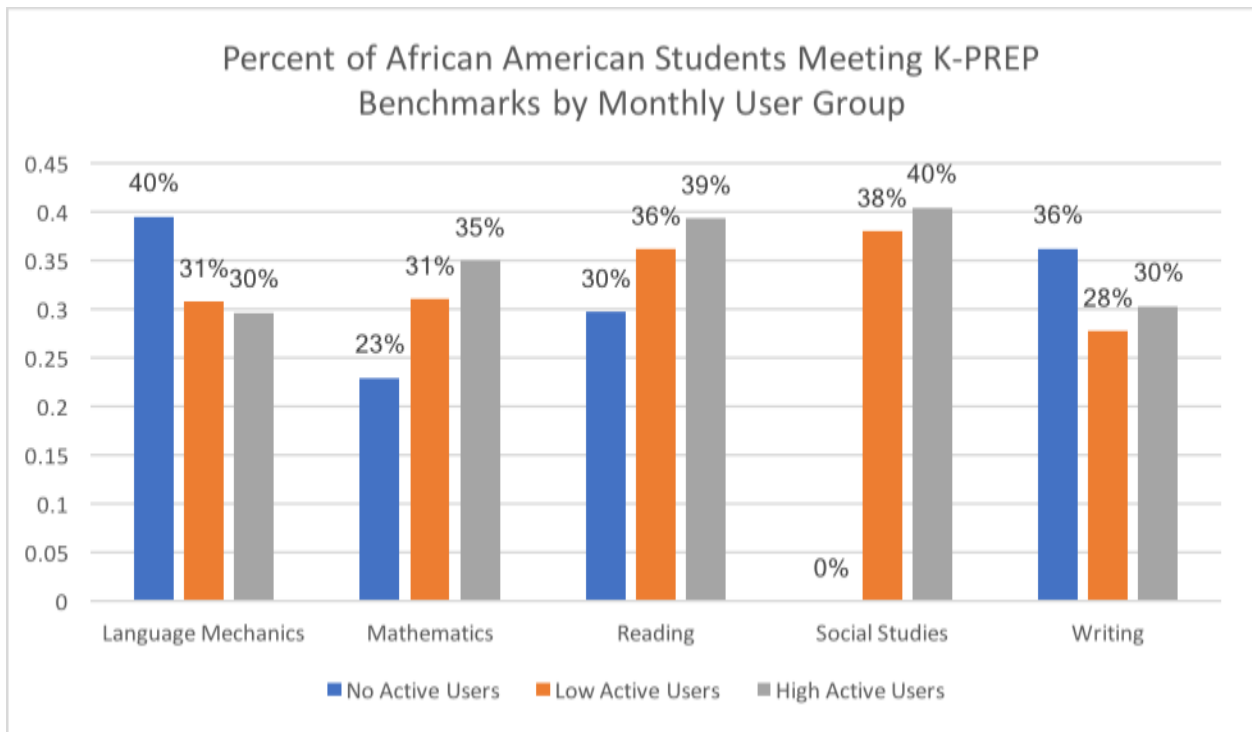


Figure 7: The percent of Hispanic students who obtained a “Proficient” or “Distinguished” score on the K-PREP grouped by Monthly Active User group.

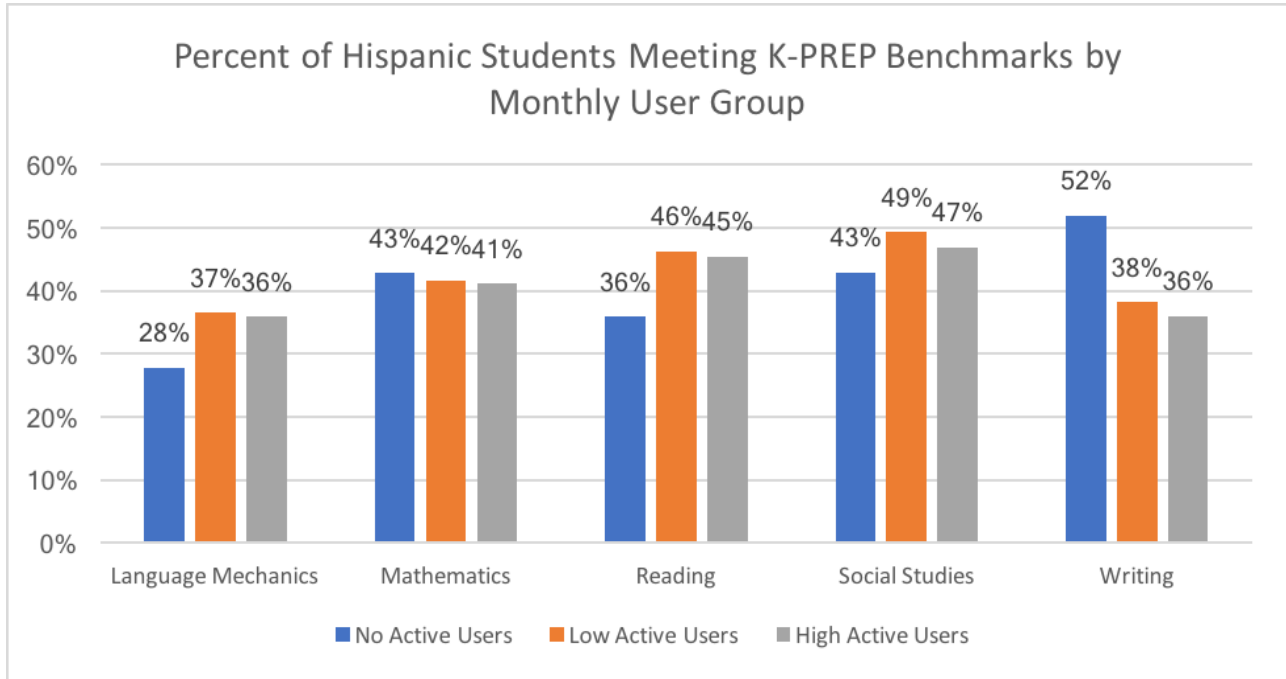


Figure 8: The percent of Disabled Students with Individual Education Plans who obtained a “Proficient” or “Distinguished” score on the K-PREP grouped by Monthly Active User group.

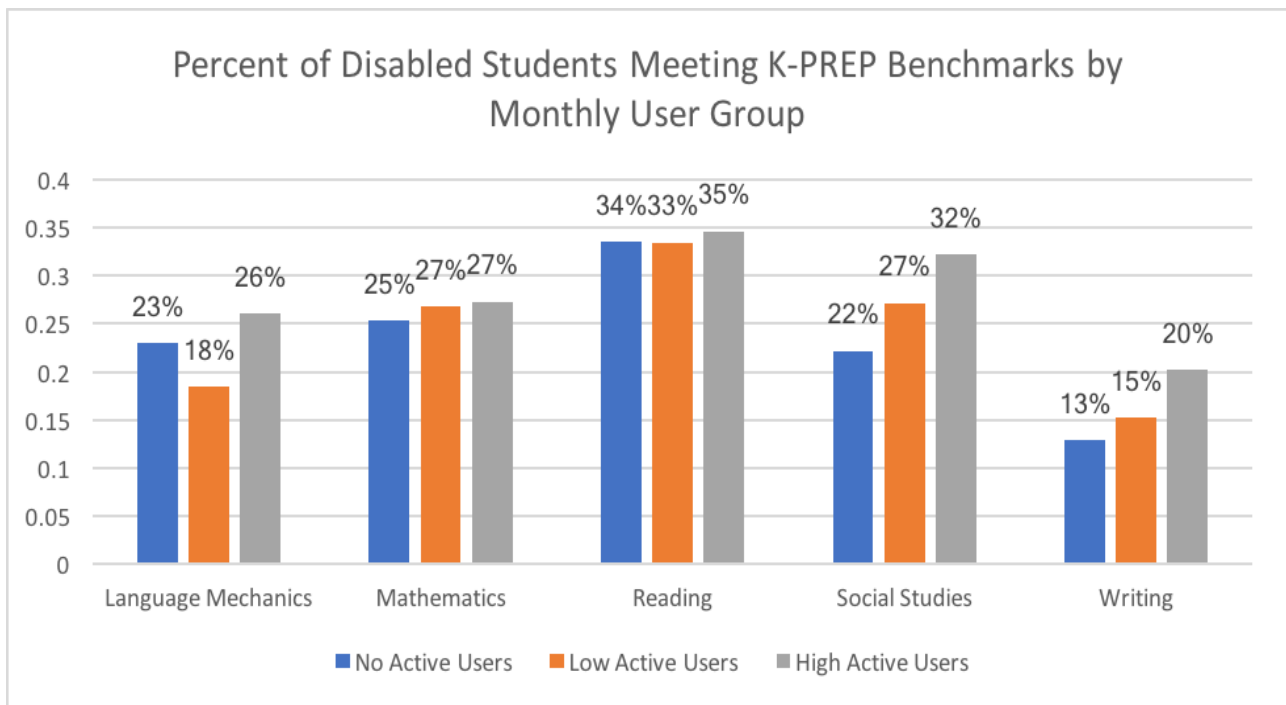


Figure 9: The percent of students Impacted by Poverty who obtained a “Proficient” or “Distinguished” score on the K-PREP grouped by Monthly Active User group.

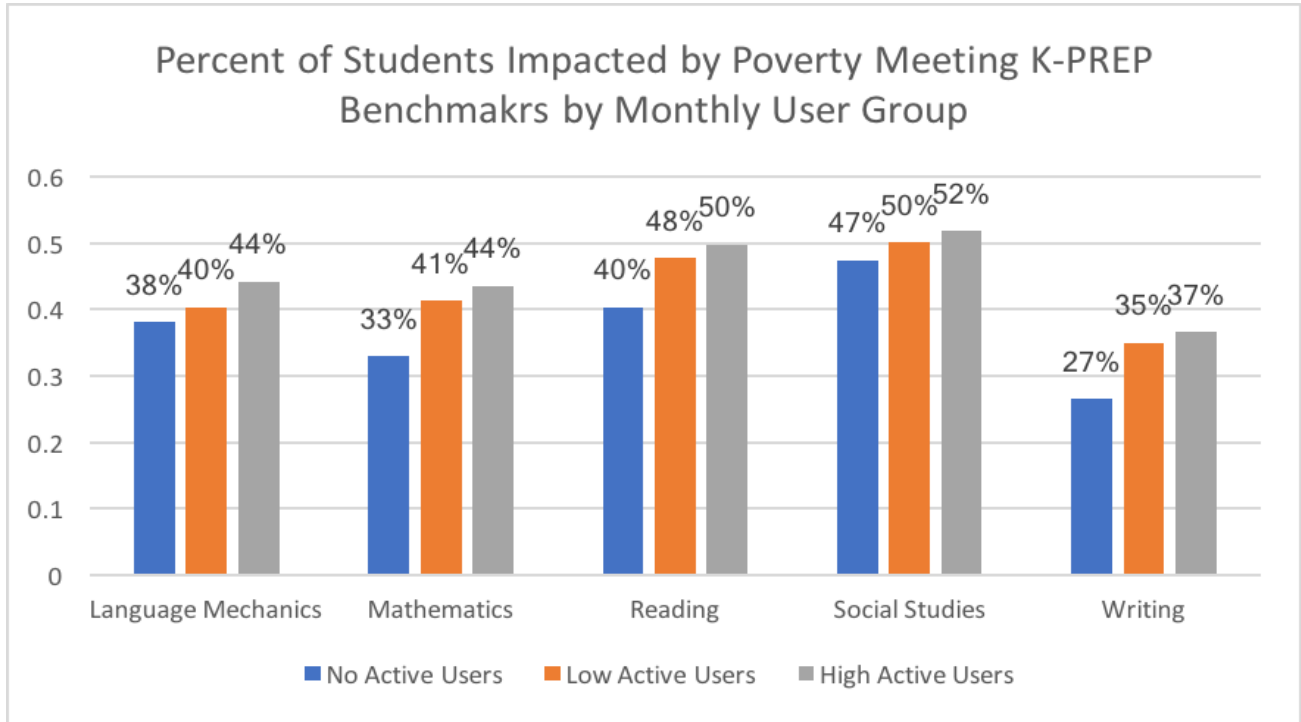


Figure 10: The percent of Gap Group students who obtained a “Proficient” or “Distinguished” score on the K-PREP grouped by Monthly Active User group.

