Exploring the Impact of Question Engagement, Student Learning, Tutor Quality, and Grade Levels on Diagnostic Growth in Math and ELA

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Introduction

The Southeast Community Foundation (SCF) spearheaded a transformative initiative during the summer of 2022, offering free, high-dosage tutoring to 52 students in Huntington Park and South Gate. Over a 5-week duration, this program aimed to provide crucial educational support to enhance learning outcomes during the summer break. The primary objective of this initiative was to bridge educational gaps and provide valuable learning opportunities for students in Huntington Park and South Gate during the summer break. Through a strategic partnership with Woodcraft Rangers, the program aimed to create a positive and enriching environment for academic growth. This initiative not only delivered high-quality tutoring but also ensured accessibility by offering sessions on weekdays and at convenient times. The chosen host sites, Salt Lake Park and Madison Elementary School, served as nurturing environments for fostering learning and collaboration. The success of this summer tutoring pilot was not only measured in academic progress but also in the community-building aspect, bringing together students, educators, and community partners in a collective effort to support and uplift the educational experience for local youth. By providing targeted and comprehensive tutoring services, the 2022 Summer Tutoring Pilot in Huntington Park and South Gate showcased the potential for impactful community-driven educational initiatives. The collaborative efforts of the Southeast Community Foundation, Woodcraft Rangers, and the dedicated educators contributed to a successful program that made a positive difference in the lives of participating students.

Data Description

Dataset used: Tutoring Analysis HP & SG_Summer and Fall 2022_CSULA - Fall 22 Data

https://csula-my.sharepoint.com/:x:/r/personal/sbalan_calstatela_edu/_layouts/15/Doc.aspx?sourcedoc=%7B757E8474-BF46-48D2-A14D-482BE5371D2E%7D&file=Tutoring%20Analysis%20HP%20%26%20SG_Summer%20and%20Fall%202022_CSULA.xlsx&action=default&mobileredirect=true

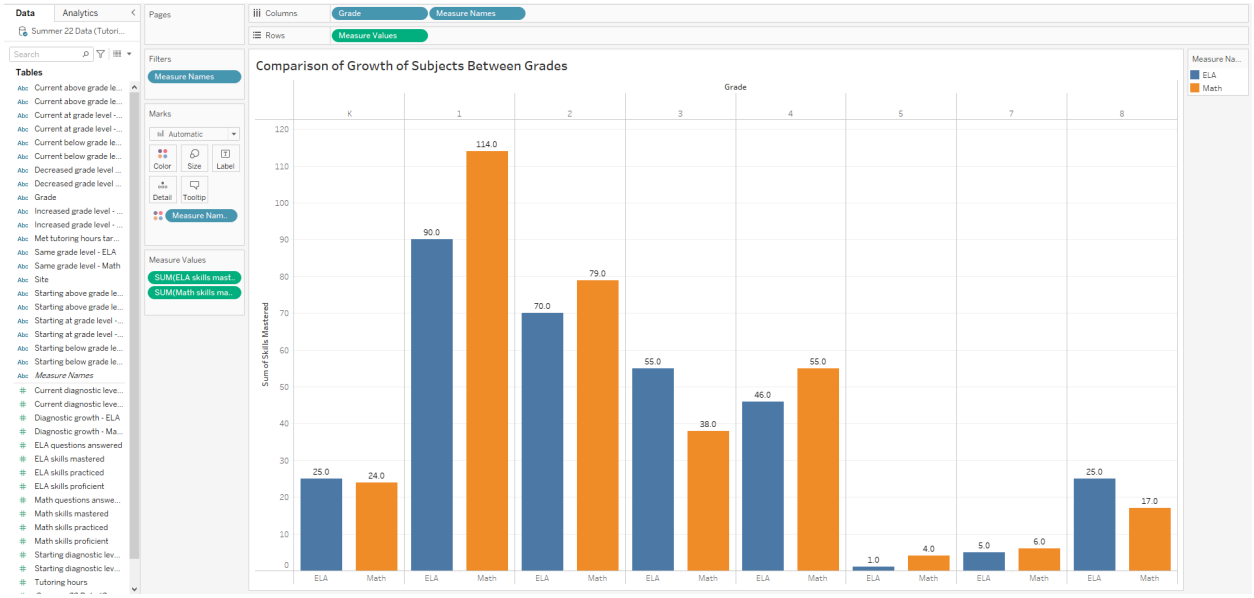
Data Field Name	Description	Example Value
Diagnostic Growth	How Much a Student Improved on a Subject	"110"
Average Diagnostic Growth	Student(s) Average Progress/Improvement Based on Diagnostic Assessments	"390"
Skills Mastered	Number of Skills a Student has Mastered	"25"
Tutor	Name of the Tutor	"Julia"
Grade	Grade Level of Student(s)	"Pre-K"
Pre-Average	Progress in Math/ELA Before Intervention	"23"
Post-Average	Progress in Math/ELA After Intervention	"67"

Data Field Name	Description	Example Value
Starting Diagnostic Level	Initial Diagnostic Level of Student(s) in Math/ELA at the Beginning of the Period	"330"
Current Diagnostic Level	Student(s) Current Diagnostic Math/ ELA Level After a Certain Period	"370"
Average Diagnostic Level	Student(s) Numerical Average Calculated From Diagnostic Assessments	"230"
ELA Skills Mastered	The Amount of ELA Skills a Student has Mastered	"35"
Math Skills Mastered	The Amount of Math Skills a Student has Mastered for Math	"72"

Data Visualization

Bar Chart (Vertical Cluster Bar Chart)

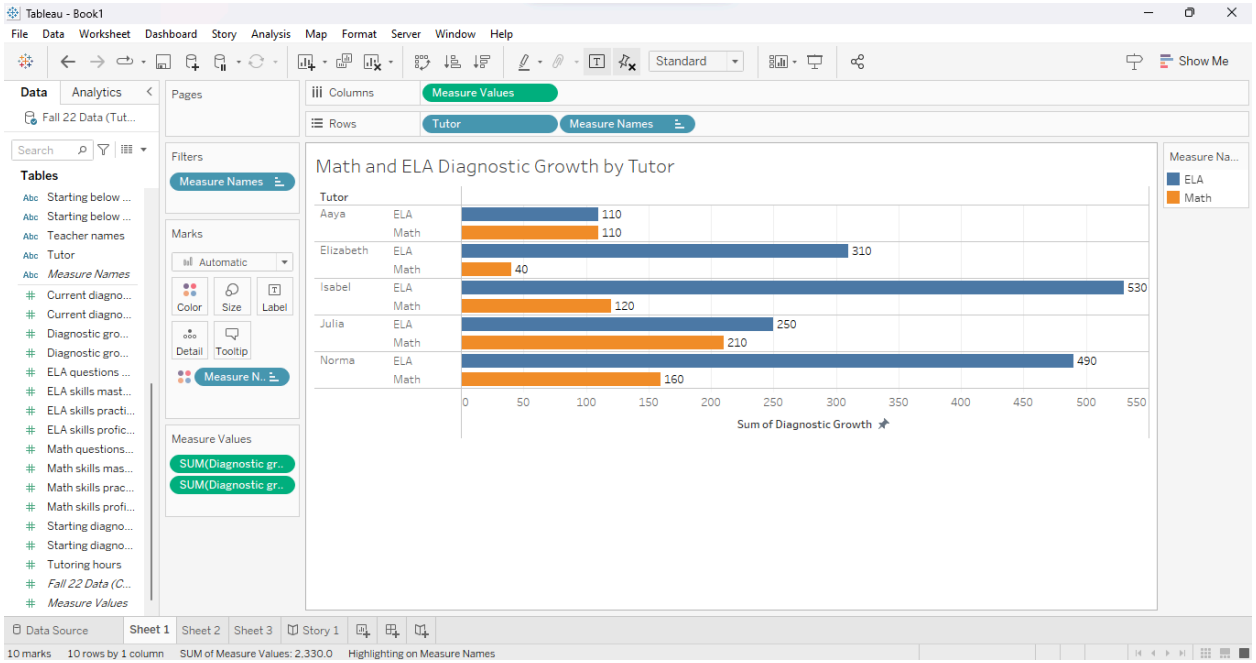
Are there grade levels where students consistently show more growth in one subject over the other?



The bar chart compares the growth of the subjects ELA and Mathematics between the grades Kindergarten through Eighth grade. The visualization displays Math having the most Skills Mastered when compared to ELA for the majority of the grades. Grades 1, 2, 4, 5, 6, and 7 have Math as the subject with the majority of Skills Mastered. Grades Kindergarten, 3, and 8 have ELA as the subject with the majority of Skills Mastered.This indicates that overall, Math shows that it has the overall most Skills Mastered between the grades.

Bar Chart (Horizontal Cluster Bar Chart)

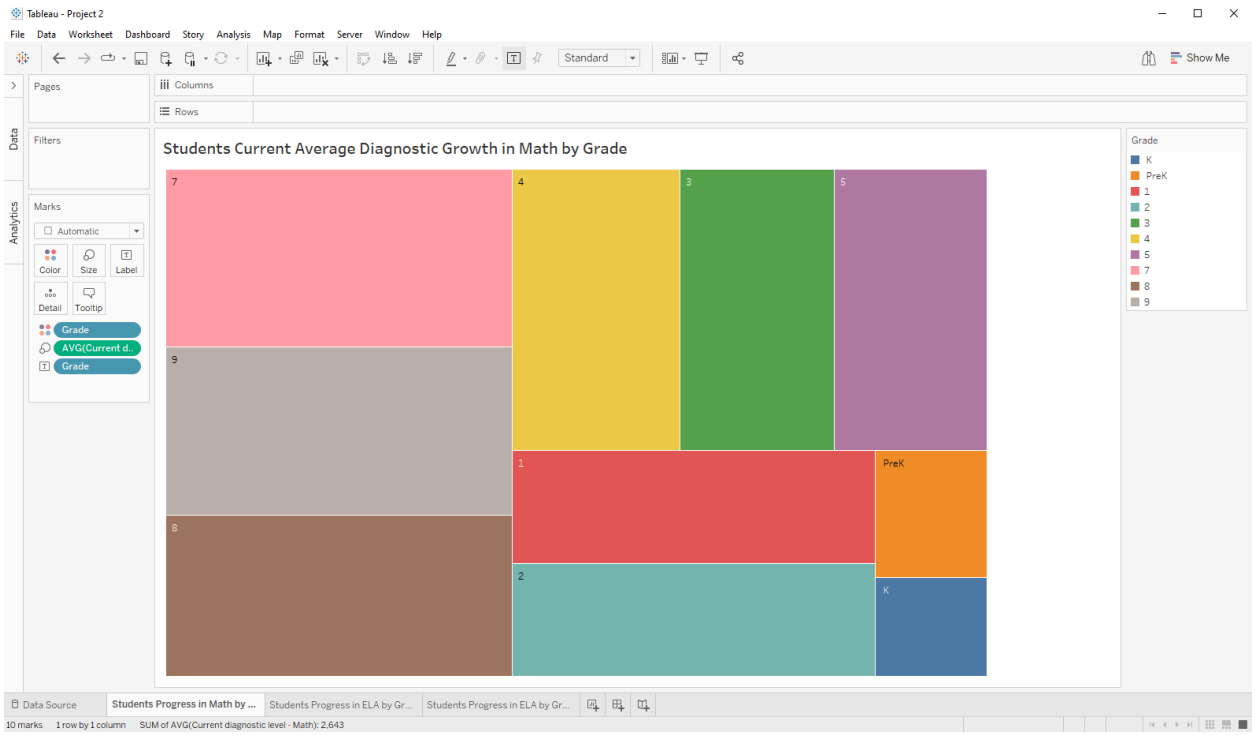
What are the notable differences between Student ELA and Math Diagnostic Growth by each tutor?



The bar chart above shows us the effectiveness of each tutor in fostering student growth in Math and ELA. On the Y axis we have all 5 tutors listed from the Huntington Park tutoring site which include Aaya, Elizabeth, Isabel, Julia, and Norma. The X-axis is labeled Sum of Diagnostic Growth, which starts from 0 and ends at 550. Individual tutor insights include that Aaya has an overall lower, but even growth in both ELA (110) and Math (110). Elizabeth has the second strongest impact on ELA (310), but the lowest growth in Math (40). Isabel has the highest growth in ELA (530), but ranks third in Math (120). Julia ranks fourth in ELA (250) and has the strongest impact on Math (210). Lastly, Norma ranks second in being most effective in ELA (490), but slightly lower than Julia in Math (160). To sum up the overall tutor comparison, the most effective in ELA is Isabel (530), the least effective in ELA is Aaya (110), the most effective in Math is Julia (210), and the least effective in Math is Elizabeth (40). Essentially, this tells us that tutors have more of a stronger impact in ELA than in Math and that there needs to be more concentration to improve students' Math growth.

Tree Map

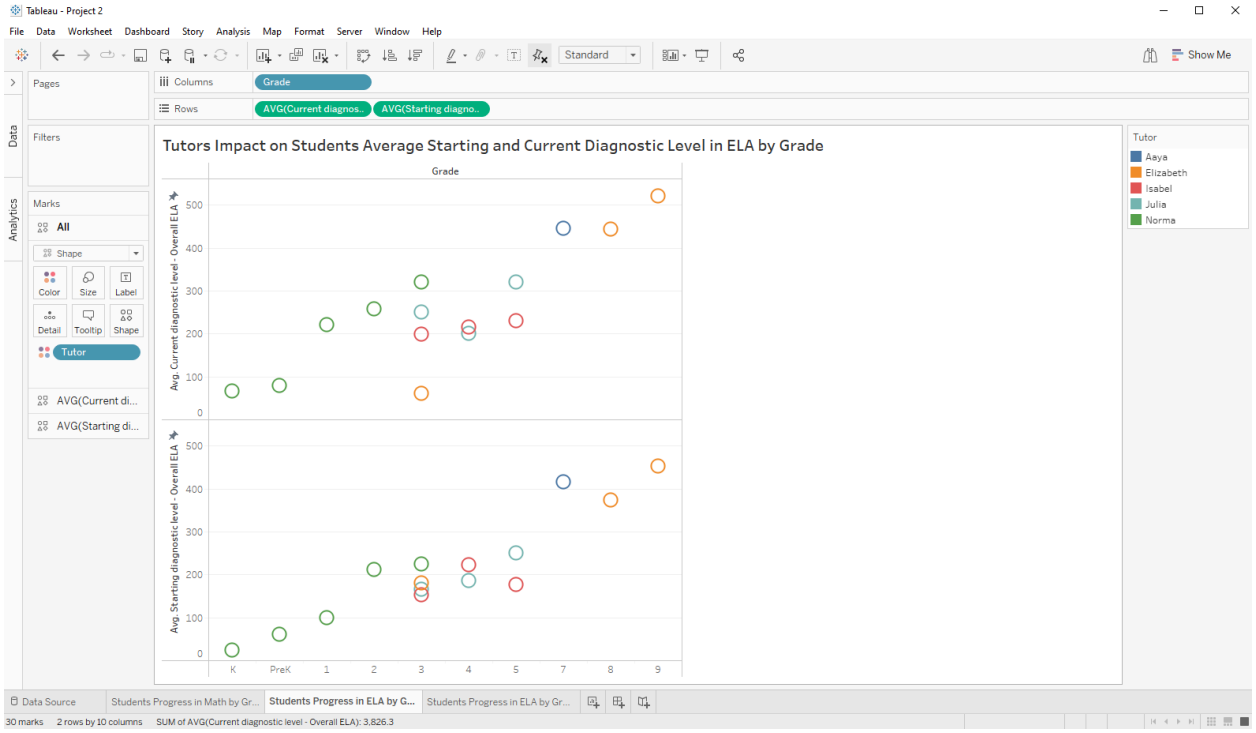
How does the distribution of current average diagnostic growth in Math vary across different grade levels?



The treemap visualization above shows that Grades 7 and kindergarten stand out. Each block corresponds to a specific grade, and the size is due to the average diagnostic growth in Math in Huntington Park. Grade 7 has the highest average current diagnostic level at 390, making it stand out among the other grades. Kindergarten (K) has a lower average current diagnostic level of 70, and Pre-K follows closely with 90. Looking across the treemap, grades 8 and 9 showcase solid growth with an average current diagnostic level of 355 and 370, respectively. This treemap is a visual, showcasing the spectrum of current diagnostic levels across different grades. It allows us to see the success of Grade 7 while recognizing other grades' starting points and growth. Understanding this data is essential for shaping tutoring and educational strategies. Helping us identify where students excel and areas where additional support may be beneficial.

Scatter Plot

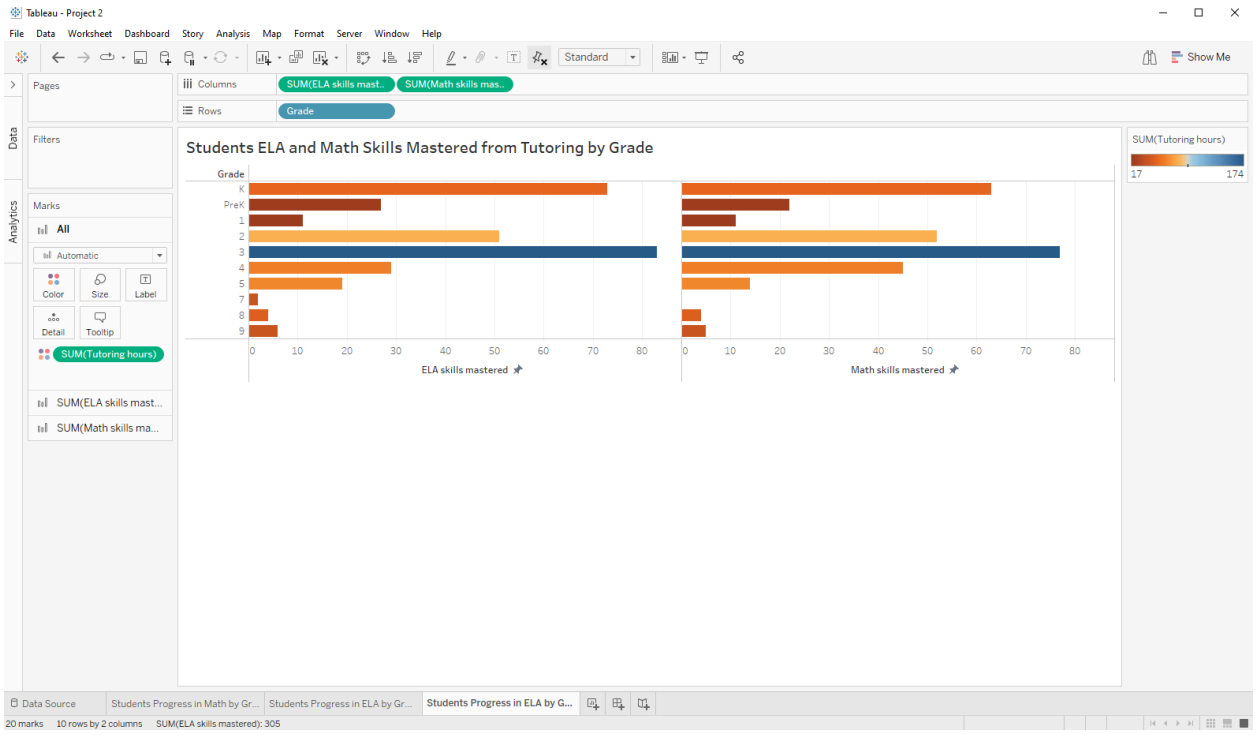
How does tutoring influence the trajectory of students' average starting and current diagnostic levels in ELA for each Grade?



The scatter plot above showcases each tutor's impact on students' average starting and current diagnostic levels in ELA. We see that Tutor Norma is notable across various grades. For instance, in Grade K, Norma contributes substantially from a pre-avg of 23.33 to a post-avg of 66.67. This trend continues across different grades, showcasing her impact. In Grade 3, multiple Tutors - Elizabeth, Isabel, and Julia - collectively shape the ELA diagnostic levels. These varied impacts across grades emphasize the unique strengths that each tutor brings to students learning journeys. Understanding the impact of each tutor on starting and current diagnostic levels is crucial in reigning tutoring strategies. These insights can help us recognize practical and effective approaches and ensure the tutoring efforts align with the unique needs of each level.

Horizontal Bar Chart

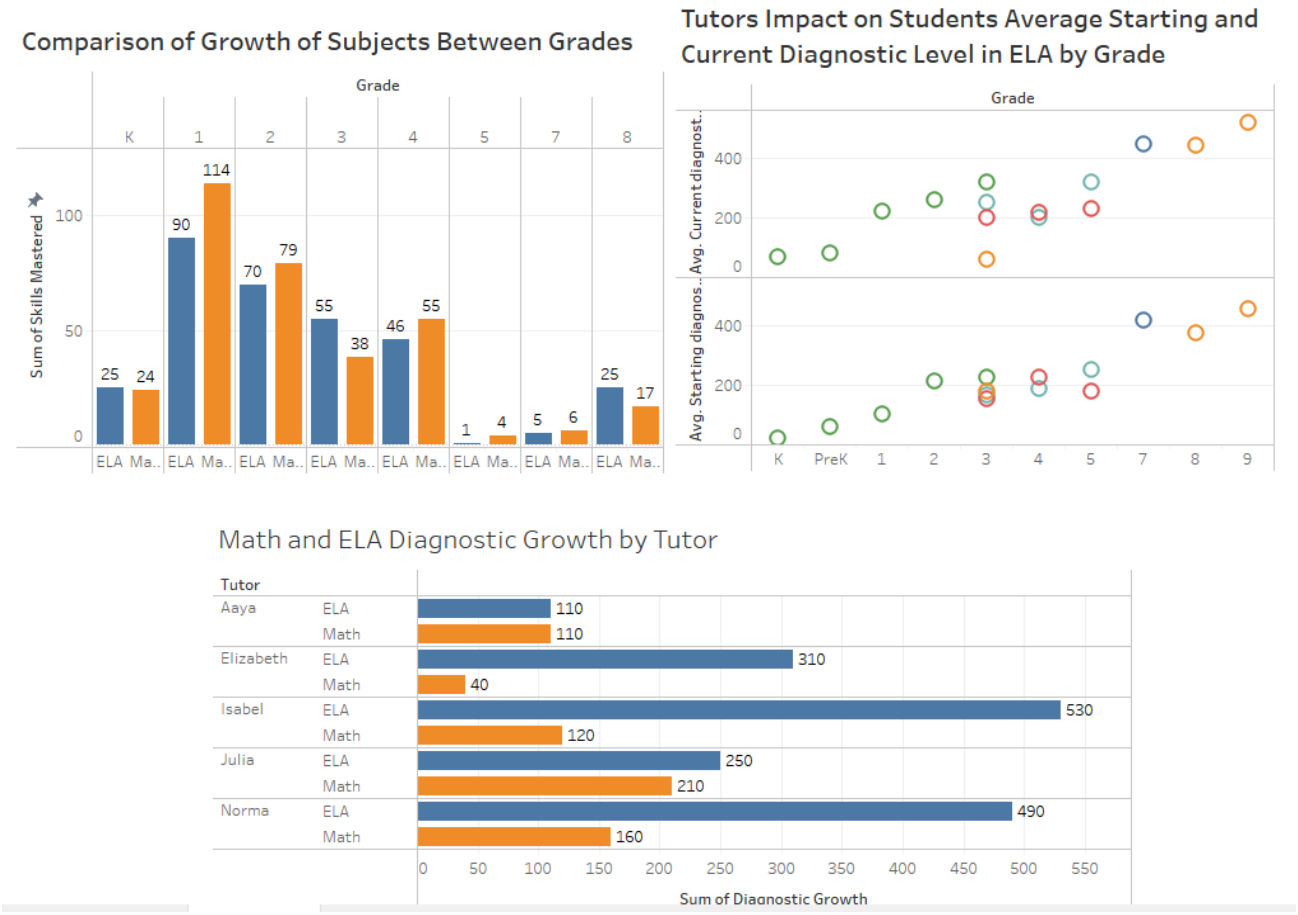
How does the total number of tutoring hours correlate with the level of ELA and MAth skills mastered in each grade?



The horizontal bar visualization sheds light on the relationship between the total number of tutoring hours and the mastery achieved in ELA and Math across various grades. The color gradient, ranging from orange to blue, offers the sum of tutoring hours associated with each grade. Bars with a deeper blue represent a higher sum of tutoring hours, while those in orange indicate lower tutoring hours. Notably, Grades K and PreK show strong skills mastery with a moderate sum of tutoring hours, suggesting efficient use of instructional time. Grade 3 is a high-achieving grade, with a substantial positive correlation between tutoring intensity and skills mastery. However, Grade 3 might appear high due to a larger student population and the higher focus on them, contributing to the high ELA and Math mastery scores. This allows us to see the correlation between tutoring hours and mastering ELA and Math skills across different grade levels. Understanding how tutoring intensity aligns with skill mastery is important in evaluating

the effectiveness and altering any approaches that can improve skill mastery and encourage tutoring.

Interactive Dashboard



In the interactive dashboard, we can see all grades growth comparisons across skills mastered, diagnostic growth, and diagnostic level. From all charts collectively, tutors have been making a positive impact on student progress. In the first chart, we can see that the first grade has made the biggest improvement from all grades. The next chart, we can see that all grades have improved their diagnostic level significantly. The last chart, we can see that students made the most overall improvement on English for diagnostic growth. While all growth varies, we can tell where all grades stand in terms of their improvements and where they need to continue working

on. By utilizing this interactive dashboard, the tutoring center can center on which grades and areas need more attention.

Story Telling

The vertical bar chart offers a comprehensive analysis of the developmental trajectory of two key subjects, namely English Language Arts (ELA) and Mathematics, across the academic journey from Kindergarten through Eighth grade. The visualization serves as a valuable tool for understanding the acquisition of skills in these subjects over the course of the educational continuum. Upon closer examination, it becomes evident that Mathematics consistently emerges as the dominant subject with the highest number of Skills Mastered across the majority of grades. Specifically, in Grades 1, 2, 4, 5, 6, and 7, the bar chart reveals that Math surpasses ELA in terms of the number of Skills Mastered. This consistent pattern underscores the prevalence of mathematical proficiency throughout these specific grade levels. Conversely, Grades Kindergarten, 3, and 8 exhibit a different trend, wherein ELA emerges as the subject with the majority of Skills Mastered. This variation highlights the nuanced nature of academic development across different stages of the educational journey. Kindergarten, in particular, demonstrates an early emphasis on language arts skills, while Grade 3 and Grade 8 further emphasize ELA mastery, indicating potential shifts in the academic focus at these junctures. (Sylvia, 2015) The overarching trend discernible from the bar chart is that Math consistently maintains a stronghold as the subject with the overall highest number of Skills Mastered across the analyzed grades. This observation not only sheds light on the comparative performance of ELA and Mathematics but also underscores the significance of numeracy and mathematical proficiency throughout the primary and middle school years.

The horizontal bar chart depicting student diagnostic growth in ELA and Math among different tutors shows us insights into their teaching effectiveness. After analyzing the data, it is evident that there are variations in tutor performance, highlighting that some tutors may be more effective in one subject over the other. As mentioned, Elizabeth demonstrates the most proficiency in fostering ELA growth, while Julia excels in promoting Math proficiency. Tutor subject strength could also be a factor in overall variation in diagnostic growth. It is also important to cater to students learning needs, as tutoring is not a 'one-size-fits-all' approach. If tutors use the same teaching strategy across all students, some students may not grasp the material as well as their peers, resulting in lower growth. So, the implementation of personalized tutoring is recommended. "Personalized tutoring is a tailored educational approach designed to meet the unique learning needs of individual students… recognizes that each student has distinct strengths, weaknesses, and learning styles." (Tan, 2023). If tutors adjust to their students learning style, then student diagnostic growth may improve significantly. Personalized tutoring has been shown to result in better learning outcomes, higher retention rates, and better assessment performance (Evanick, 2023). Some recommendations I would include would be to explore the teaching methods and strategies used by Isabel and Julia and tailor these techniques to each student, investigate the factors contributing to lower growth for Aaya and Elizabeth, and to provide additional support and/or resources to tutors with lower growth rates to improve students academic progress and outcomes. Tutors must also concentrate more in areas where diagnostic growth falls short.

The scatter plot analysis highlights the significant impact of individual tutors on students' average starting and current diagnostic levels in English Language Arts (ELA). Grade 3 presents a scenario where the efforts of multiple tutors, including Elizabeth, Isabel, and Julia, shape the course for ELA diagnostic levels. This showcases the strengths each tutor brings to the learning journeys of students. Recognizing and understanding the unique contributions of each tutor to starting and current diagnostic levels is essential for refining tutoring strategies. Insights gained from this analysis can guide in recognizing practical and effective approaches to the needs of each grade level. According to "High-Dosage Tutoring: Supporting Students and Keeping Teachers" by Michele Israel, their tutoring initiative generated positive results -"pre-identified students were multiple grade levels below their typically developing peers. Tutoring enabled the district to exit many of them from interventions because they reached grade-level readiness." With this, it is clear that their tutoring program has effectively addressed the student's learning gaps, enabling them to meet or surpass grade-level expectations. The efforts of the Southeast Community Foundation in tutoring students were shown in the analysis, and the improvement of each grade level from their starting and current diagnostic levels in both ELA and math was seen. A way to further increase the average of each grade level's growth could be recognizing each tutor's strengths and weaknesses and considering them when tutoring students. Not only can this improve the overall average diagnostic growth, but it also shows what each tutor's teaching style contributes.

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