Analytics Design Case 2: Effectiveness Analysis of CLC

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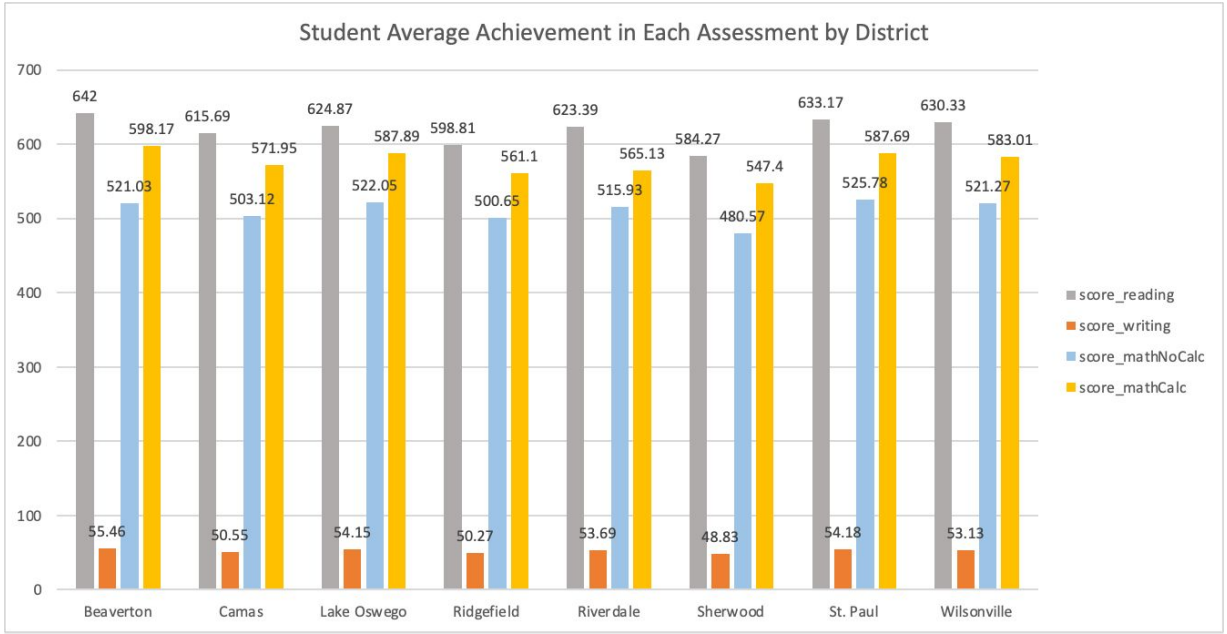
Project Mandate

- Analyzing the effectiveness of Cobblestone Learning Center (CLC) from 3 different aspects:
  - Student Achievement & Outcome
  - Program Utilization & Student Trajectory
  - Location (in center & on-line)
- Student Achievement & Outcome: Understanding the effectiveness of learning outcome in each district by using anonymized student assessments.
- Program Utilization & Student Trajectory: Understanding the effectiveness of taking different numbers of program and the order of program selection to create a personalized “path” for each student.
- Location (in center & on-line): Understanding the effectiveness of program delivery and considering SkillsAdvantage program to adapt on-line format.

Objective 1 Student Achievement



What's Student Achievement?

Student highest score in each assessment
(Reading, Writing, MathNoCalc, MathCalc)

Max & Min Score Of Districts

- **Score of Reading**
  - Max: Beaverton
  - Min: Sherwood
- **Score of Writing**
  - Max: Beaverton
  - Min: Sherwood
- **Score of "No Calculator Math"**
  - Max: St. Paul
  - Min: Sherwood
- **Score of "Calculator Math"**
  - Max: Beaverton
  - Min: Sherwood

Sherwood has the lowest average student achievement in all 4 assessments

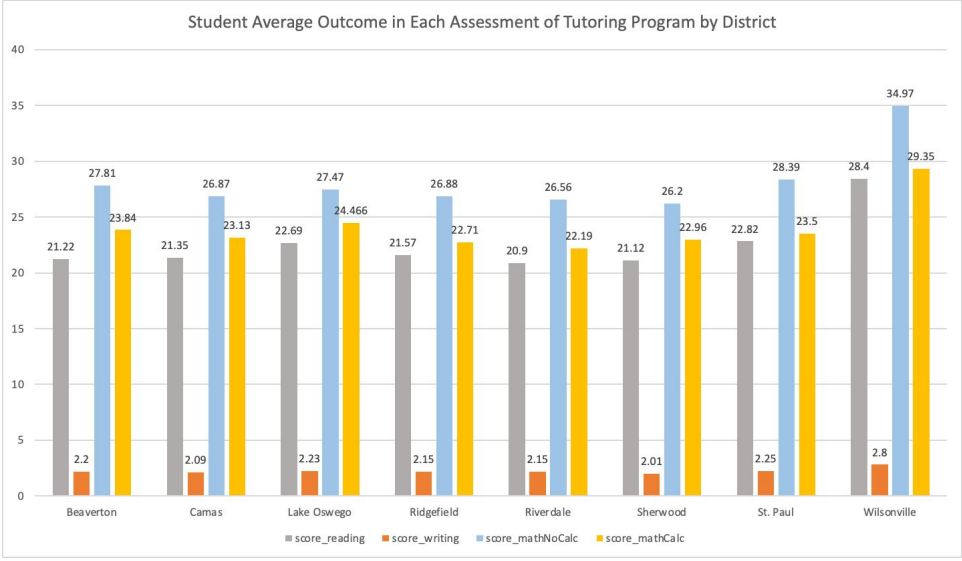
&

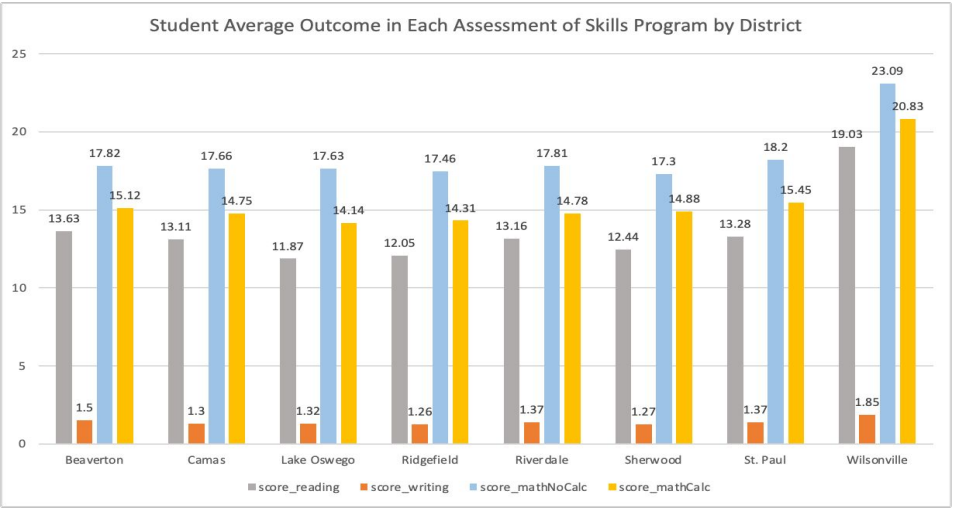
Beaverton and St.Paul has the highest average student achievement in 3 and 1 assessment(s) respectively.

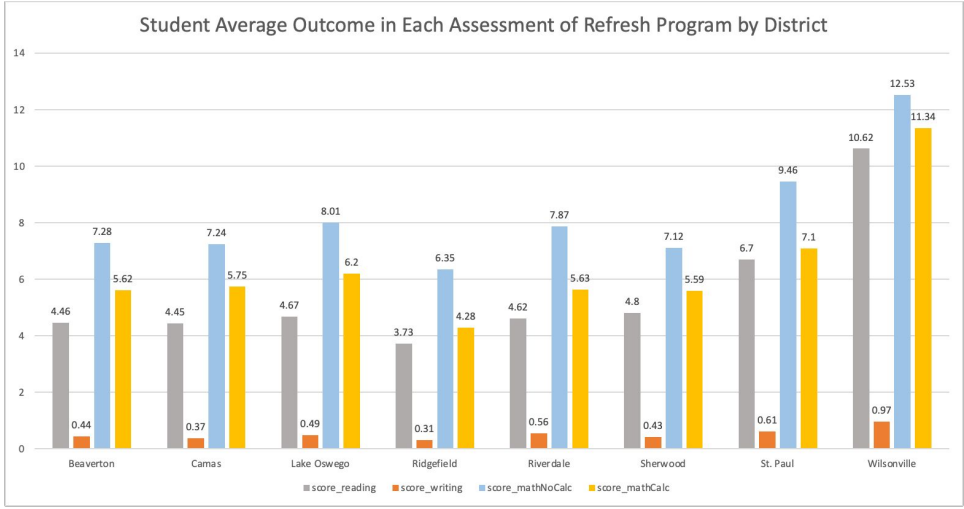
Objective 1 Student Outcome

What's Student Outcome?

Student improved score from previous program in each assessment
(Reading, Writing, MathNoCalc, MathCalc)







Objective 1 Student Outcome

Skills Advantage

- **Score of Reading**
  - Max: Wilsonville
  - Min: Lake Oswego
- **Score of Writing**
  - Max: Wilsonville
  - Min: Ridgefield
- **Score of "No Calculator Math"**
  - Max: Wilsonville
  - Min: Sherwood
- **Score of "Calculator Math"**
  - Max: Wilsonville
  - Min: Lake Oswego

Cobblestone Refresh

- **Score of Reading**
  - Max: Wilsonville
  - Min: Riverdale
- **Score of Writing**
  - Max: Wilsonville
  - Min: Ridgefield
- **Score of "No Calculator Math"**
  - Max: Wilsonville
  - Min: Ridgefield
- **Score of "Calculator Math"**
  - Max: Wilsonville
  - Min: Ridgefield

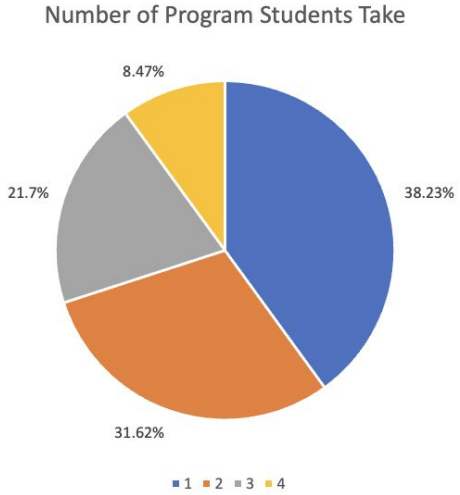
One-on-One Tutoring

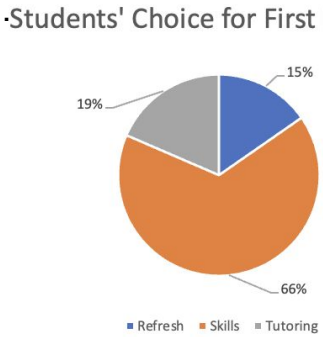
- **Score of Reading**
  - Max: Wilsonville
  - Min: Riverdale
- **Score of Writing**
  - Max: Wilsonville
  - Min: Sherwood
- **Score of "No Calculator Math"**
  - Max: Wilsonville
  - Min: Sherwood
- **Score of "Calculator Math"**
  - Max: Wilsonville
  - Min: Riverdale

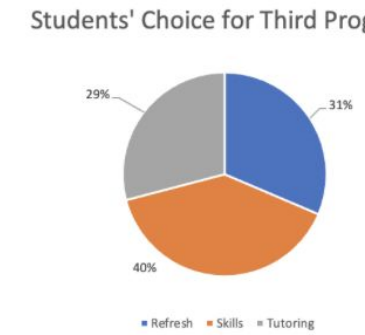
- Wilsonville has the most improvement in all of assessments and under all 3 programs.
- Lake Oswego, Ridgefield, Sherwood, Riverdale have relatively least improvement under 3 programs

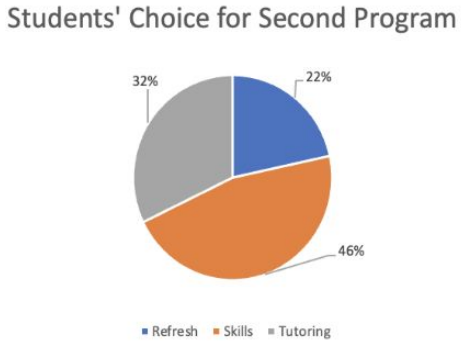
Objective 2 Program Utilization & Students Trajectory

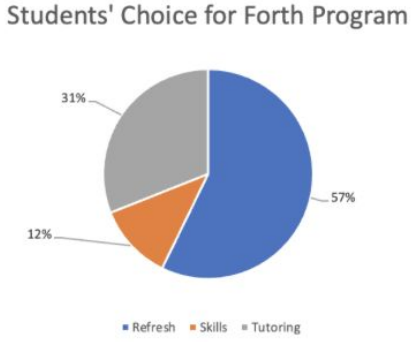
- Most student (38.23%) choose to attend 1 program
  (31.62% attend 2 programs, 21.7% for 3, 8.47% for 4)
- Students are more likely to choose Skills Advantage Program in first 3 program, more students choose Cobblestone Refresh Program in fourth program.











Objective 2 Effect of Program Participation

Most Effective Program

1st Program's Choice: One-on-One Tutoring

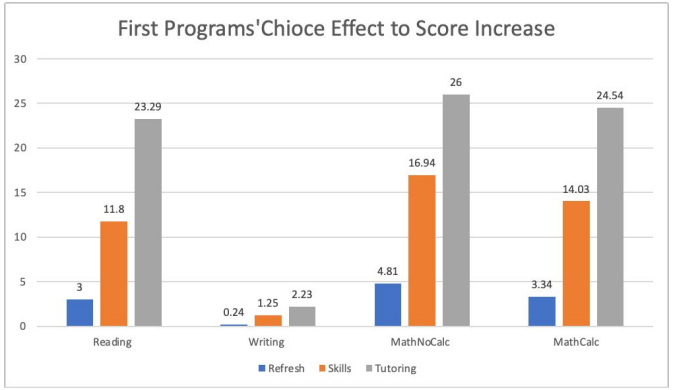
2nd Program's Choice: One-on-One Tutoring

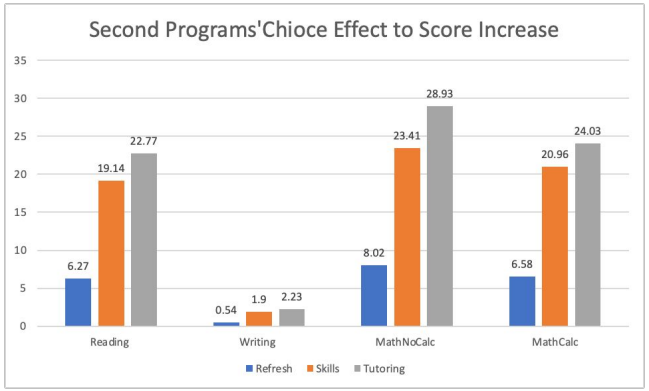
3rd Program's Choice: One-on-One Tutoring

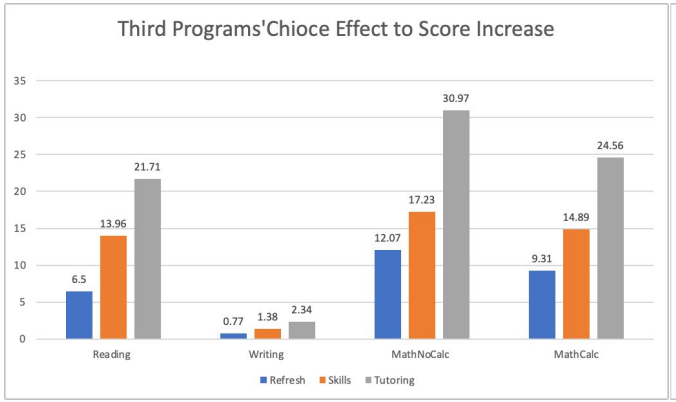
4th Program's Choice: One-on-One Tutoring

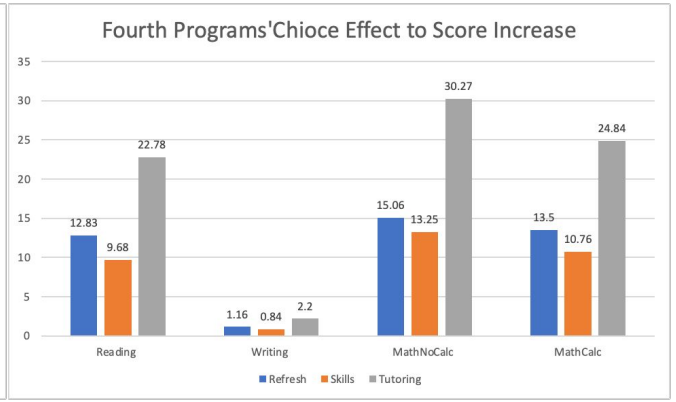
Most Effective Combination

4 One-on-One Tutoring

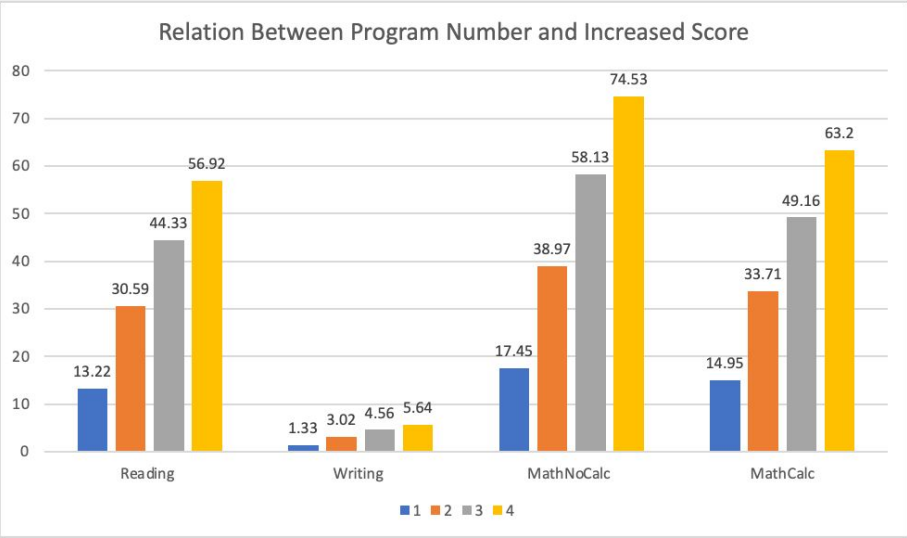








Objective 2 Effect of Program Participation



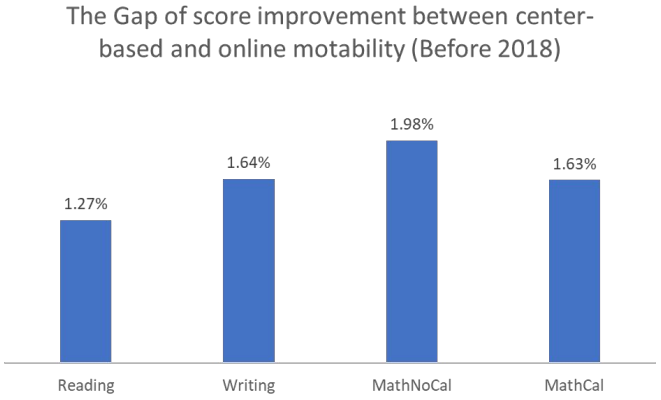
Findings

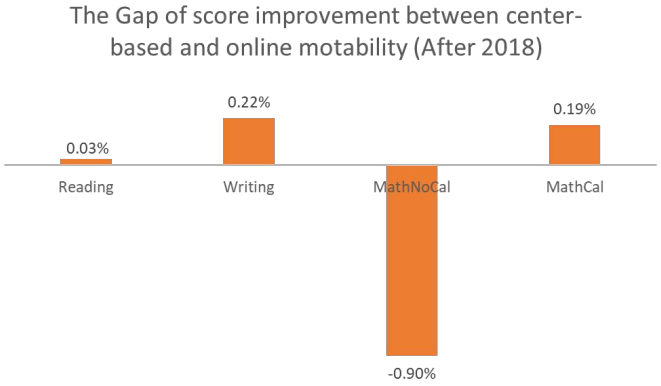
- **Score of "No Calculator Math"** has the **most significant improvement** after taking 4 numbers of programs.
- Score improve **proportional** to number of programs.
- The **greatest improve** usually happen between **first program** and **second program.**

District & Program & Improvement

- Wilsonville students would more likely **attend 1 program** (**37%**), and the proportion of choosing One-on-One Tutoring (**11.6%**) in Wilsonville is **below** average level in 8 districts**.**
- We can't conclude that the improvement in Wilsonville is because of taking One-on-One Tutoring Program.
- This **difference of improvement** between districts may also caused by **different students' conditions**.
- We may have **further conclusion** if we have more detail information of student (eg. education background).

Objective 3 Center-based VS On-line





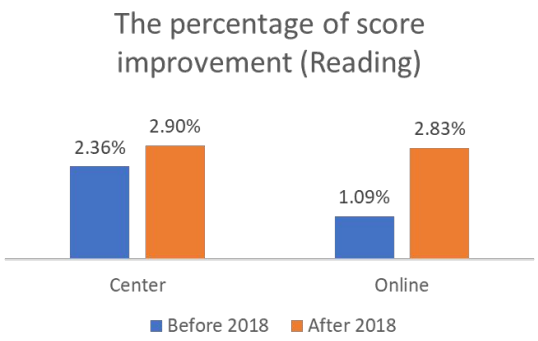
\+ Center-based > Online

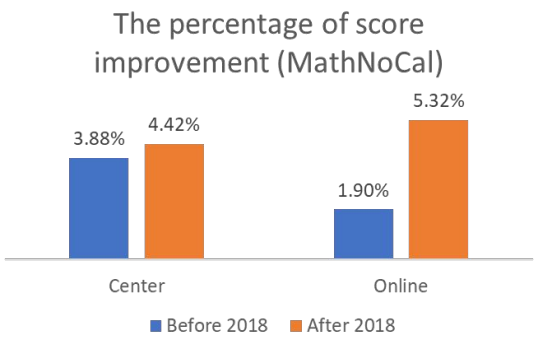
\- Online > Center-based

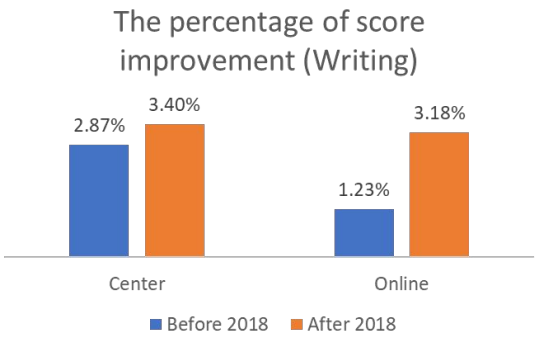
Before 2018, since only Cobblestone Refresh program was offered online and **lacking of experienced tutors** and **rigorous tutor training program**, there is a gap between the center-based modality and online modality. The improvement of scores under **center-based** modality is **more significant**, with an average gap of **1.63%**.

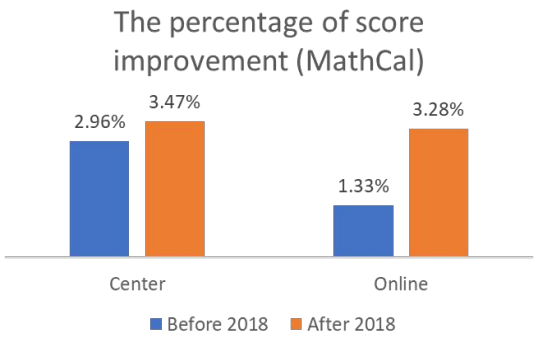
After 2018, due to the One-on-One tutoring program undergoing **a huge overhaul** and **the launch of the online tutoring program**, the gap between center-based and online modality is **significantly narrowing**. What notable most is that the improvement of online **"No Calculator" Math** overridden that of center-base mode and has an increasement of **0.90%** compared with the center-based mode after 2018.

Objective 3 Center-based VS On-line









- **MathNoCalc (online):** improved **most**
  - Possible reasons: easier to demonstrate (especially graphical questions) and practise, more effective
- **Reading (online):** improved **least**
  - Possible reasons: use the Internet to look up words while doing reading questions, lack the scenario of the real exam and face-to-face help
- In just four years, almost all online modes have grown about **3 times** more than they were before 2018, which is much higher than the center-based mode.
- Since the **only change** is the launch of **online tutoring program**, we can attribute such a **huge improvement** of online modality to it.
- With such a rapid improvement, the online mode is **promising** and we may expect it becomes **more effective** in the more assessments future.

Conclusion

- There are some differences in achievement and improvement between 8 districts under standardized programs. The district Beaverton has the highest average achievement, and Wilsonville has the highest improvement in all program and assessments.
- Created a personalised path for each student based on the program taken. Most students attend one program and choose Skills program. The most effective combination is 4 One-on-One Tutoring programs.
- On-line mode is more effective in some assessments, and there are still some of the assessment performed better in center-base mode. After adding online format to One-on-One Tutoring, the gap of score improvement between two format are reduced in all assessments. Since the improvement of “No Calculator” Math in on-line format overtook in center-base, there is large possibility on-line mode has better performance in future.

Appendix

- Objective 1:
  - Created different data aggregations based on different factors such as highest scores in each assessment, district, and program.
  - Aggregated the highest scores based on each district and program to understand the differences between them.
- Objective 2:
  - Aggregated and understood the relationship between increased score and the number of programs taken by student. Based on this result, recommended the number and order of programs.
  - Finding: students in Wilsonville has the most improvement, but they mainly choose to attend one program and more likely to choose Skills program, which is different from overall conclusion. Therefore, we think there might be other factors like students' study ability or parents' education level will also exert impact on increased score, so maybe need more information.
- Objective 3 :
  - Gap = The percentage of score improvement (center) - The percentage of score improvement (online)
  - The data used for comparison does not include program of Skill Advantage since it does not offer on-line mode
  - Finding: The improvement of scores in on-line mode increased after One-on-One tutoring offered on-line mode, it may caused by that One-on-One tutoring is more effective in on-line mode and One-on-One tutoring is more effective in improving scores, which corroborate conclusions in Objective 2.