



SIMON
BUSINESS SCHOOL
UNIVERSITY *of* ROCHESTER

Cobblestone Learning Center Project



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Project Overview



Company Overview

Cobblestone Learning Center (CLC) offers tutoring services and test preparation courses to students in grades 7-12 across metropolitan areas.



Project Goal

Generate clear, relevant, and accurate insights from the survey and student data provided by CLC to help them better understand their students and improve their teaching services.



Methodology

- Descriptive analysis
- K-means clustering for segmentations
- A/B testing and regression



Project Overview



Key findings

- **Student segmentations:**

- Segment 1: The Independent Explorer (10%): Prefers solitary learning and positive affirmation.
- Segment 2: The Collaborative Connector (49%): Enjoys discussions, group reviews, and collaborative activities.
- Segment 3: The Strategic Organizer (41%): Prefers structured learning approaches with time management tools.

- **Cobblestone market share and program enrollment:**

- Overall market share in 2018: 2.4%.
- Program Engagement (2016-2019): 8,888 unique students; 13,540 total enrollments; 1.52 average enrollment per student

- **Student outcomes and trajectory:**

- Wilsonville excels with the greatest average improvement across all subjects, while Ridgefield shows the least progress.
- The 'Skills' program stands out as the students' top choice. The 'Tutoring' program excels with the highest scores.

- **Effectiveness of center-based vs. online delivery modality:**

- No obvious effectiveness of online modality on student improvement



Student Segmentations

K-means clustering was conducted based on a survey of prospective students for online course

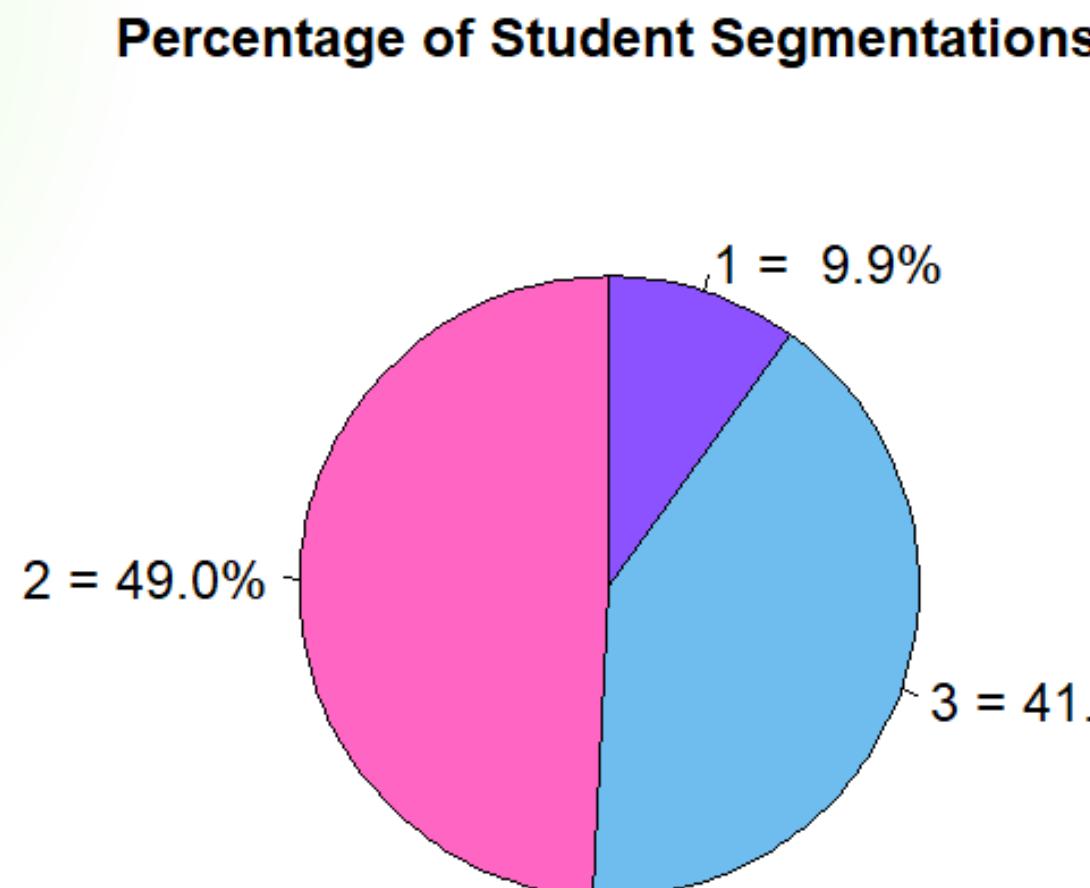
- **Objective:** To identify different sub-groups within the online student body with respect to how students like to engage with online course material
- **Respondents:** 1,200 prospective students who indicated they would be interested in taking an online course at Cobblestone
- **Questions:** Students responded to 11 questions about their preferences and motivating factors when studying in an online course.

ID	G1	G2	S1	S2	S3	A1	A2	A3	T1	T2	T3	
100059	6	7	6	6	2	3	3	3	1	3	1	
100245	1	1	6	7	1	3	4	4	2	4	2	
100416	6	5	2	1	7	6	7	7	3	4	2	
100518	3	3	7	6	2	4	4	4	2	2	3	
100673	2	2	7	7	1	6	4	2	2	3	1	
100674	4	7	1	2	7	7	7	6	4	1	4	
100926	7	7	6	7	2	3	3	3	2	3	3	
101103	5	5	1	1	7	7	7	7	3	2	3	
101121	1	1	2	2	6	1	3	2	7	5	7	
101175	1	1	4	2	7	2	3	2	6	7	6	
101238	2	1	2	4	4	2	2	2	5	6	5	
101282	5	5	2	1	7	7	7	7	1	4	3	
101651	1	1	4	4	4	2	3	1	7	7	6	
101748	1	1	7	6	1	5	5	5	2	1	1	
101797	2	3	7	7	1	5	7	4	3	1	4	
101875	1	2	7	7	1	6	5	7	5	1	2	
101936	6	5	6	7	1	2	5	2	4	2	3	
101944	7	5	7	6	2	3	4	2	1	1	2	
101958	1	1	3	4	5	2	3	1	5	7	7	
101968	1	5	6	6	2	7	3	6	1	2	1	
102024	5	6	3	1	7	6	6	7	3	4	1	
102215	2	2	7	7	1	5	5	5	3	3	2	
102305	1	1	2	4	5	3	3	2	6	7	5	
102552	2	2	6	7	1	5	6	5	2	1	3	

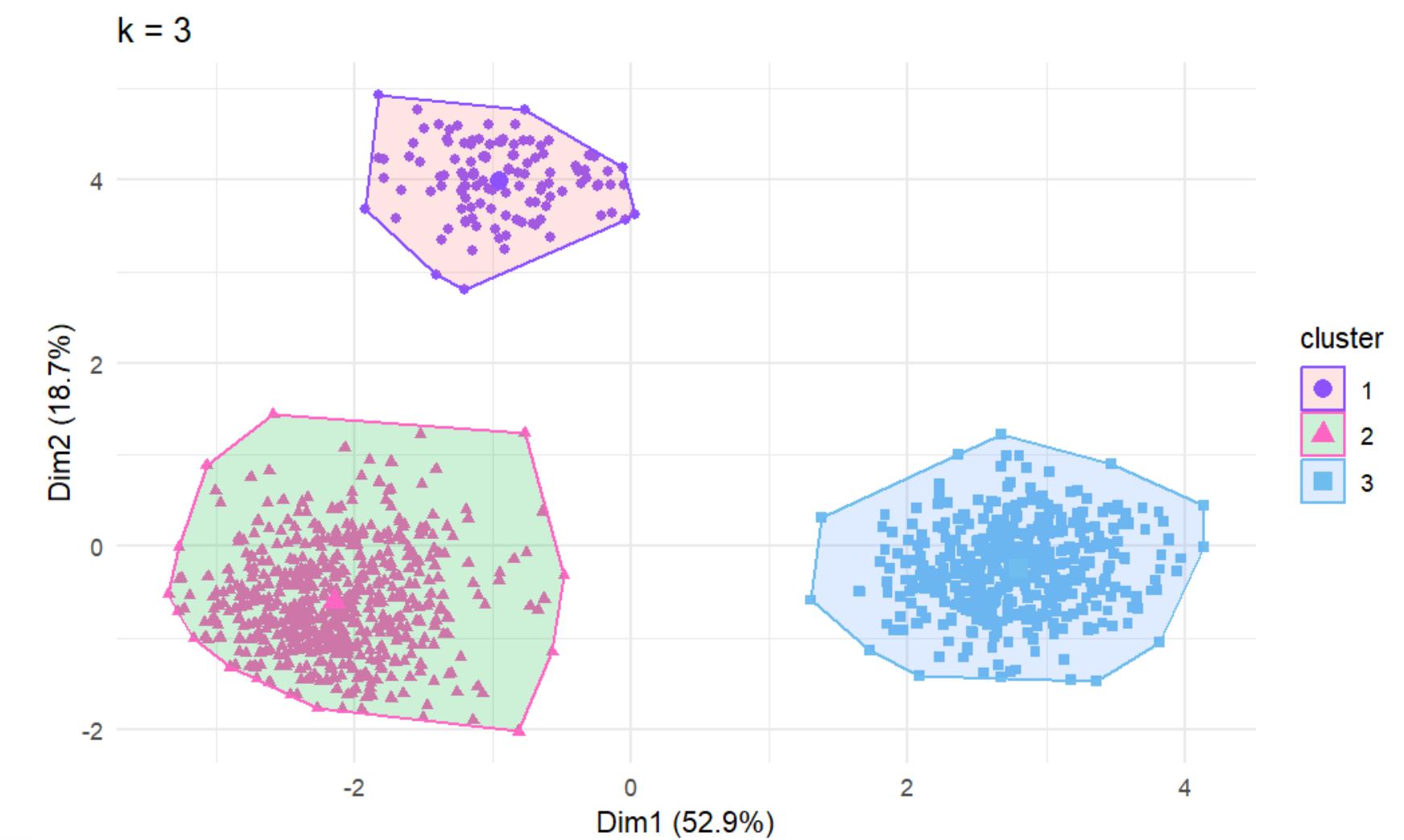
Question Label	Question Text
G1	How do you feel about earning digital rewards or badges for answering questions correctly?
G2	How do you feel about study activities designed as interactive challenges or games?
S1	How do you feel about the opportunity to engage with other students through discussion boards and group review sessions?
S2	How do you feel about sharing ideas and receiving feedback from your classmates?
S3	How do you feel about periods of uninterrupted solitary study where you can explore topics deeply on your own?
A1	How do you feel about getting positive recognition from teachers or classmates when you achieve something in your studies, like completing a challenging assignment or improving your performance?
A2	How do you feel about receiving supportive words of encouragement when tackling new learning challenges?
A3	How do you feel about being praised for your academic accomplishments?
T1	How do you feel about tools that assist you with planning and managing your learning schedule?
T2	How do you feel about receiving periodic time management tips while studying?
T3	How do you feel about having a study timeline included when learning new material?

Student Segmentations

Segment 1 The Independent Explorer



Segment 2 The Collaborative Connector



Segment 3 The Strategic Organizer



Sophia is a **studious** individual. She finds deep motivation in delving into topics on her own.

While she doesn't fancy competitive learning methods, she **values positive recognition** from teachers and peers when she achieves academic milestones.



She is not drawn to socialization through group discussions but **appreciates words of encouragement** when facing new challenges.

Time management tools don't excite her much. She **prefers setting her own study pace and timeline**.

Segment 1

The Independent Explorer



Alex is a **social learner**. He finds tremendous motivation in discussions and sharing ideas with classmates, valuing the feedback received in these collaborative settings.

Unlike solitary study, Alex **enjoys the dynamic environment of teamwork and social learning**.



Segment 2

The Collaborative Connector

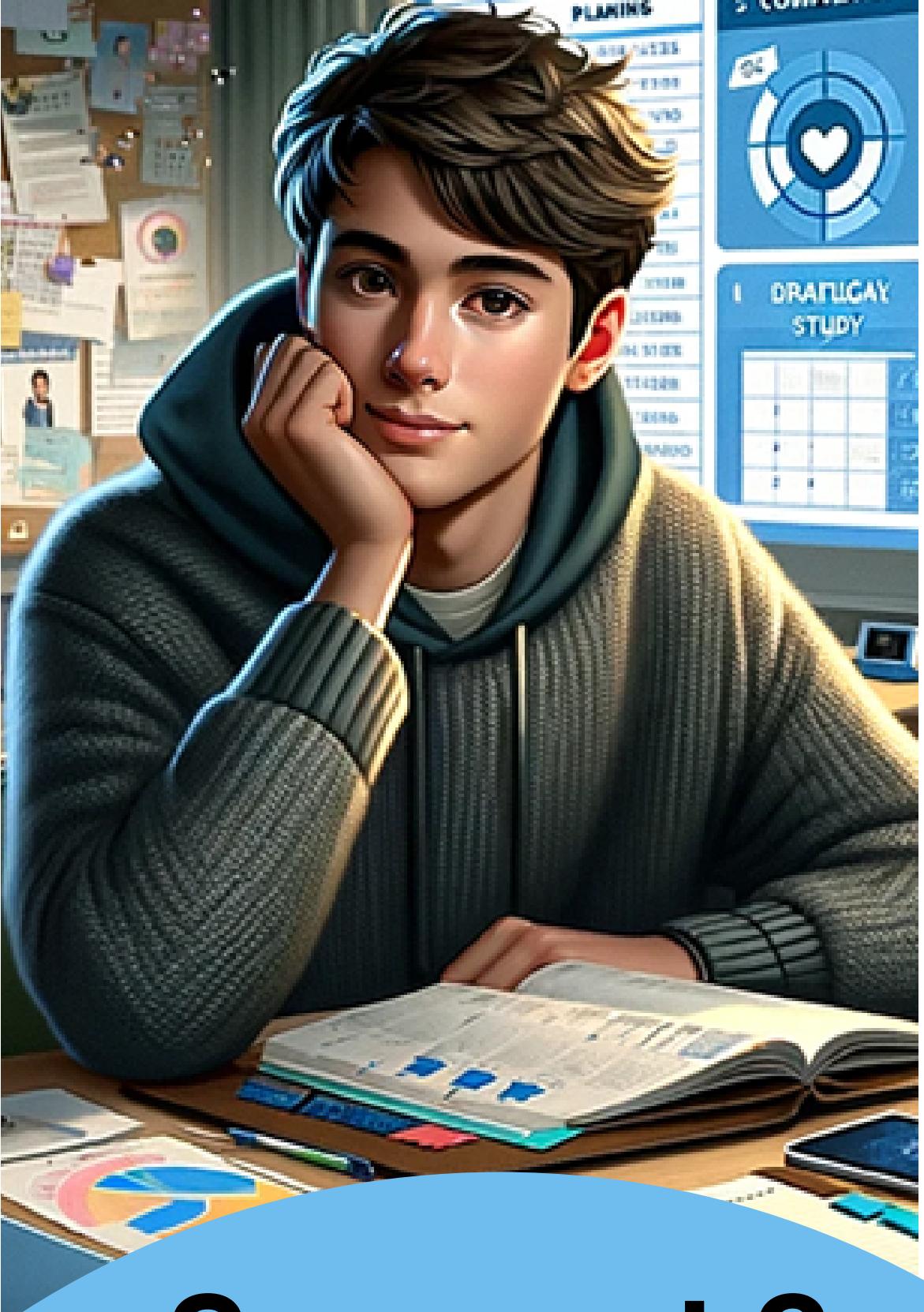
While not particularly drawn to competitive learning methods, Alex finds some interest in **positive recognition** from teachers or peers for his academic achievements.

Time management tools don't resonate with Alex, who **prefers the organic flow of collaborative learning over structured schedules and timelines**.



Ryan values **structured learning** and appreciates **time management tools**.

Ryan doesn't resonate much with gamification or competitive elements in learning. Positive recognition or encouragement for achievements also doesn't particularly motivate Ryan.



Segment 3 The Strategic Organizer

However, what stands out for Ryan is the interest in **tools and tips that assist in planning and managing his learning schedule**.

He finds somewhat interesting the idea of incorporating study timelines and receiving periodic time management tips while studying.



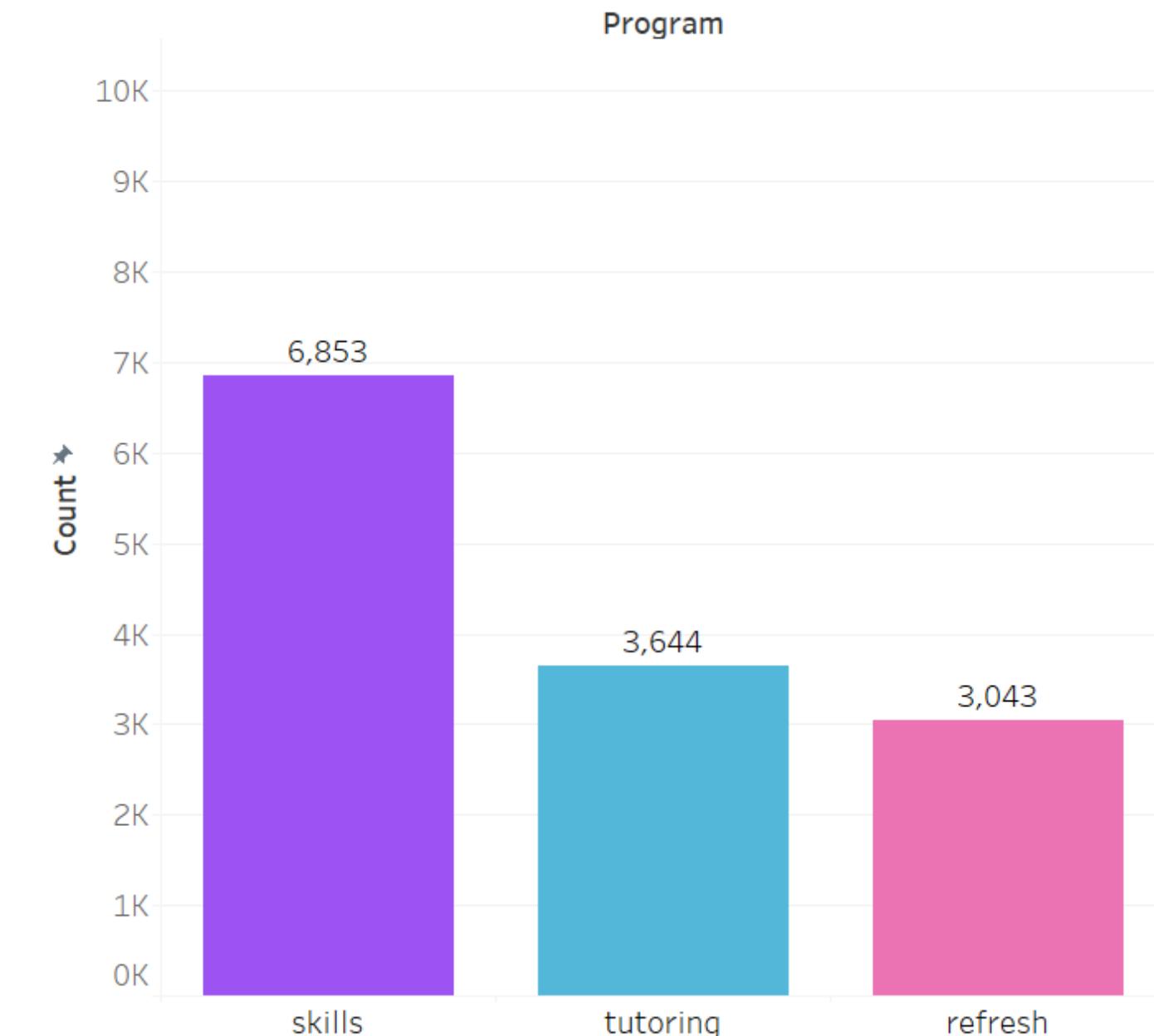
Descriptive Analysis



MARKET SHARE OF COBBLESTONE LEARNING CENTER IN 2018

Student Population	Number of Students in CLC	Market Share
135,000	3,200	2.4%

NUMBER OF PROGRAM ENROLLMENTS 2016-2019



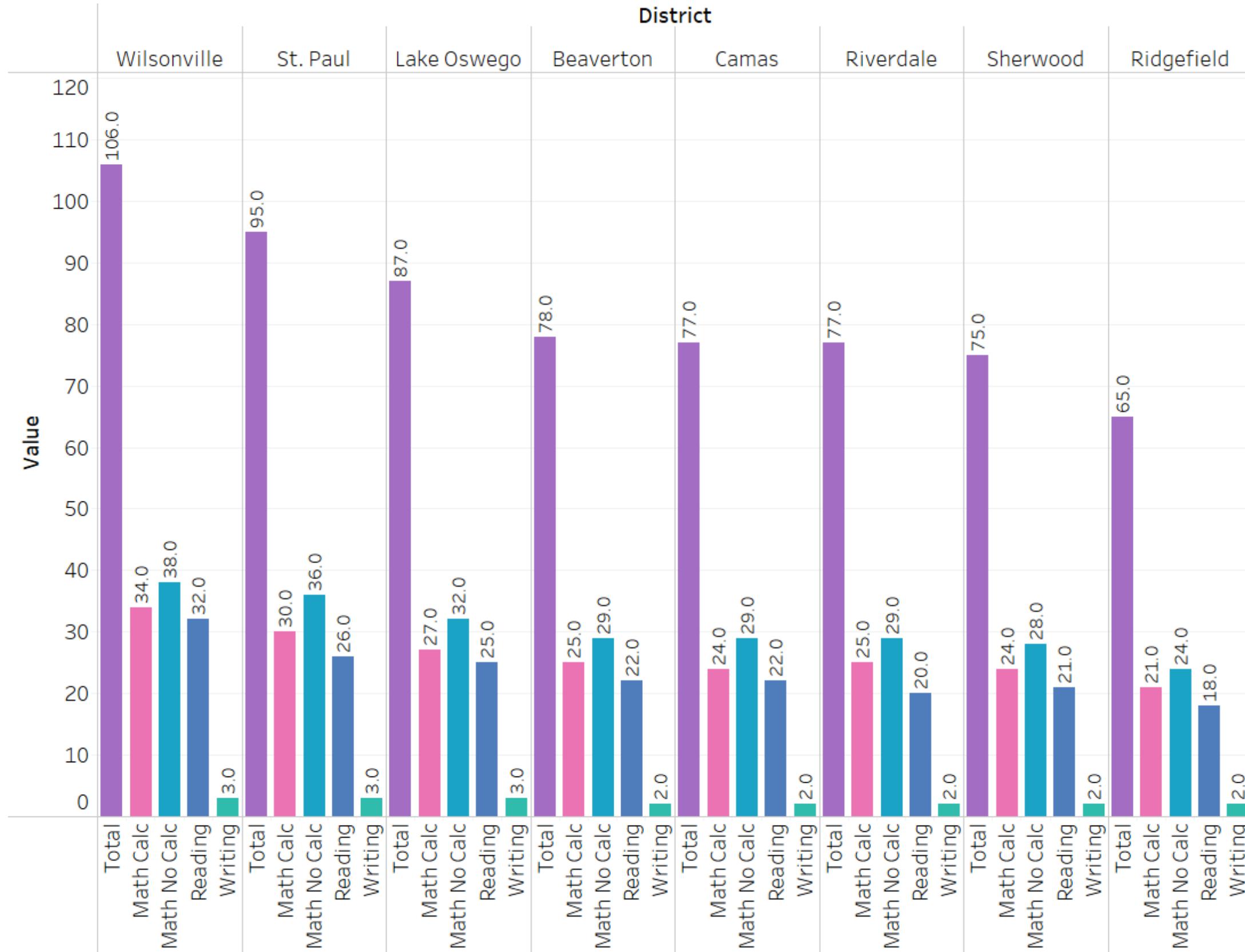
- Total unique students: 8,888 (evals_data); Total program enrollments: 13,540; Average enrollment per student: 1.52
- Largest market share in Sherwood: 17.6%; Smallest market share in Riverdale: 7.32%



Average Score Improvement by District

Student Performance

Student outcomes across the student population reflect the program quality, indicating that the impact of programs varies in different districts



- Score improvement = test score after each program is completed - intake score
- The greatest average improvements across all subjects are observed in Wilsonville.
- Meanwhile, Ridgefield shows the least average improvement in scores.

The 'Skills' program stands out as the top choice for student enrollment, with the 'Skills & Tutoring' combination following closely in popularity.

Student Trajectory

Student trajectory refers to path of students taking certain orders of subjects



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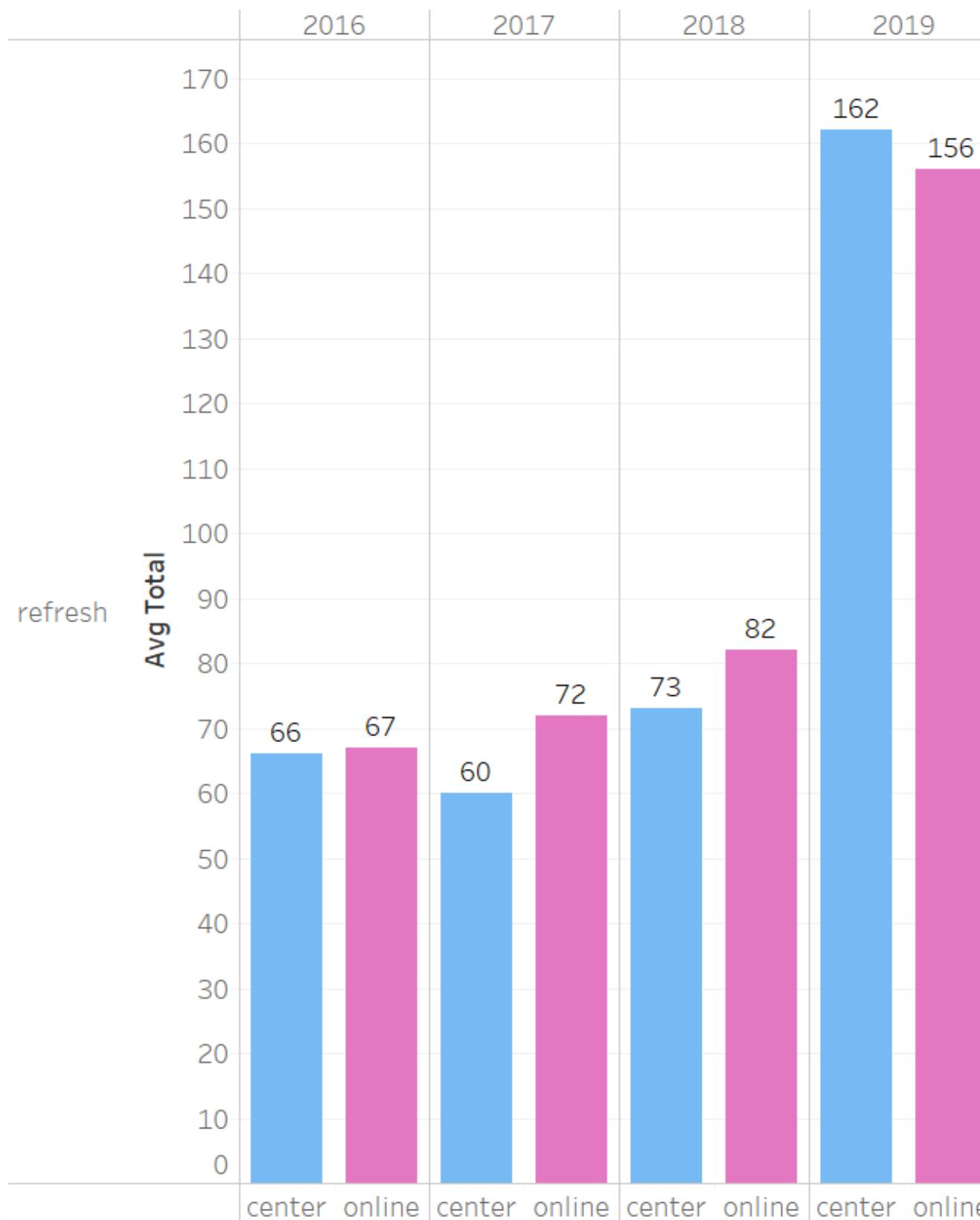
Trajectory	Avg Reading	Avg Writing	avg mathCalc	avg mathNoCalc	Avg Total
tutoring	617	52	576	503	1,748
refresh, skills	611	52	572	502	1,737
refresh, tutoring	615	52	568	498	1,733
skills, tutoring	612	52	568	499	1,731
skills	611	51	569	500	1,731
refresh, skills, tutoring	619	53	558	500	1,730
refresh	599	50	560	471	1,680

The 'Tutoring' program excels with the highest scores, attributed to its unique 1:1 blend of offline and online learning experiences.

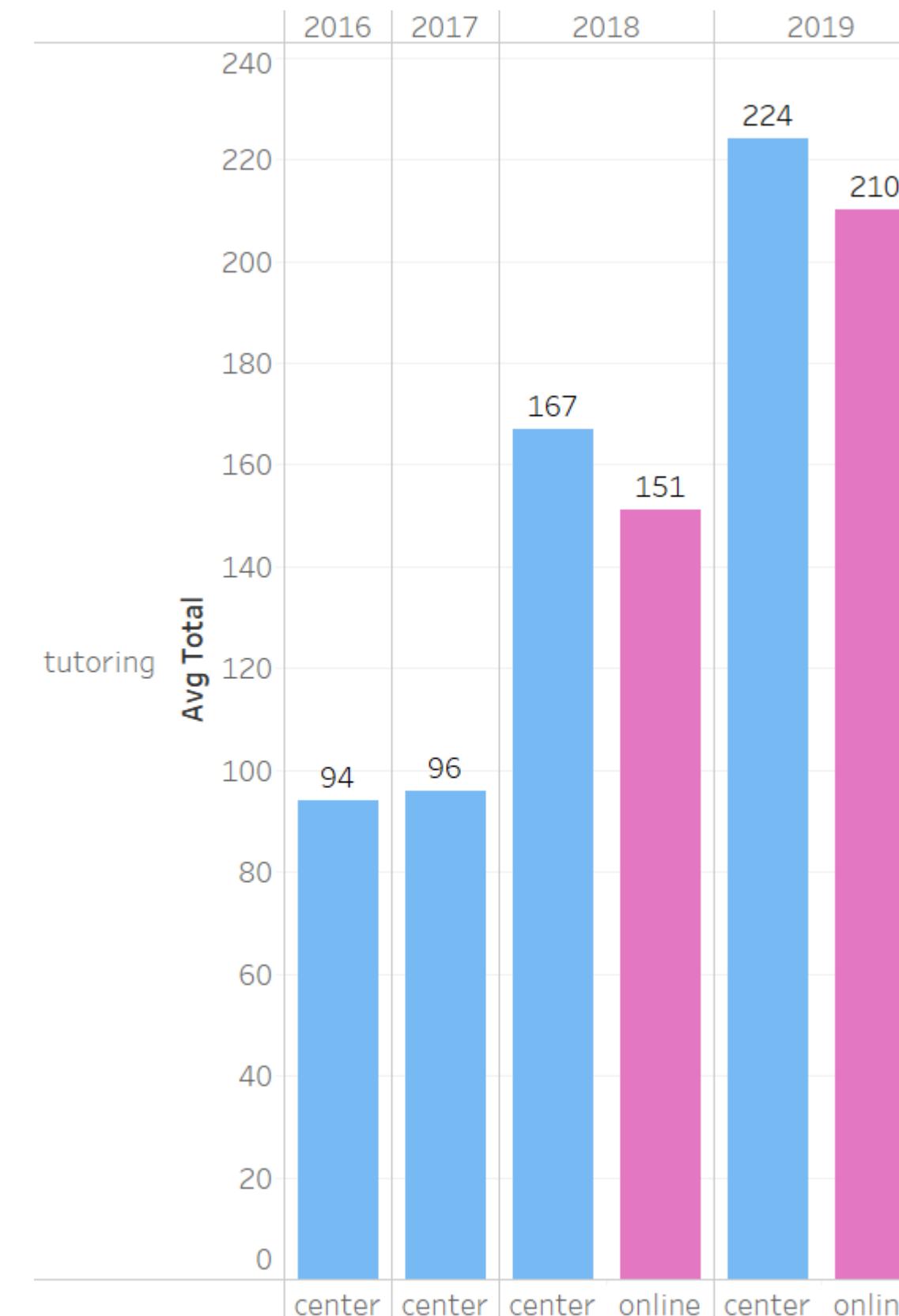


No obvious effectiveness of online modality on student improvement

REFRESH PROGRAM



TUTORING PROGRAM



No obvious effectiveness of online modality on student improvement

```
lm(improvement_total~is.Online, data = sampled_data)
```

Call:

```
lm(formula = improvement_total ~ is.online, data = sampled_data)
```

Residuals:

Min	1Q	Median	3Q	Max
-108.68	-47.68	-15.66	37.32	274.35

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	169.679	2.396	70.813	< 2e-16 ***
is.online	-15.029	3.389	-4.435	9.94e-06 ***

Signif. codes:	0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1			

Residual standard error: 62.62 on 1364 degrees of freedom

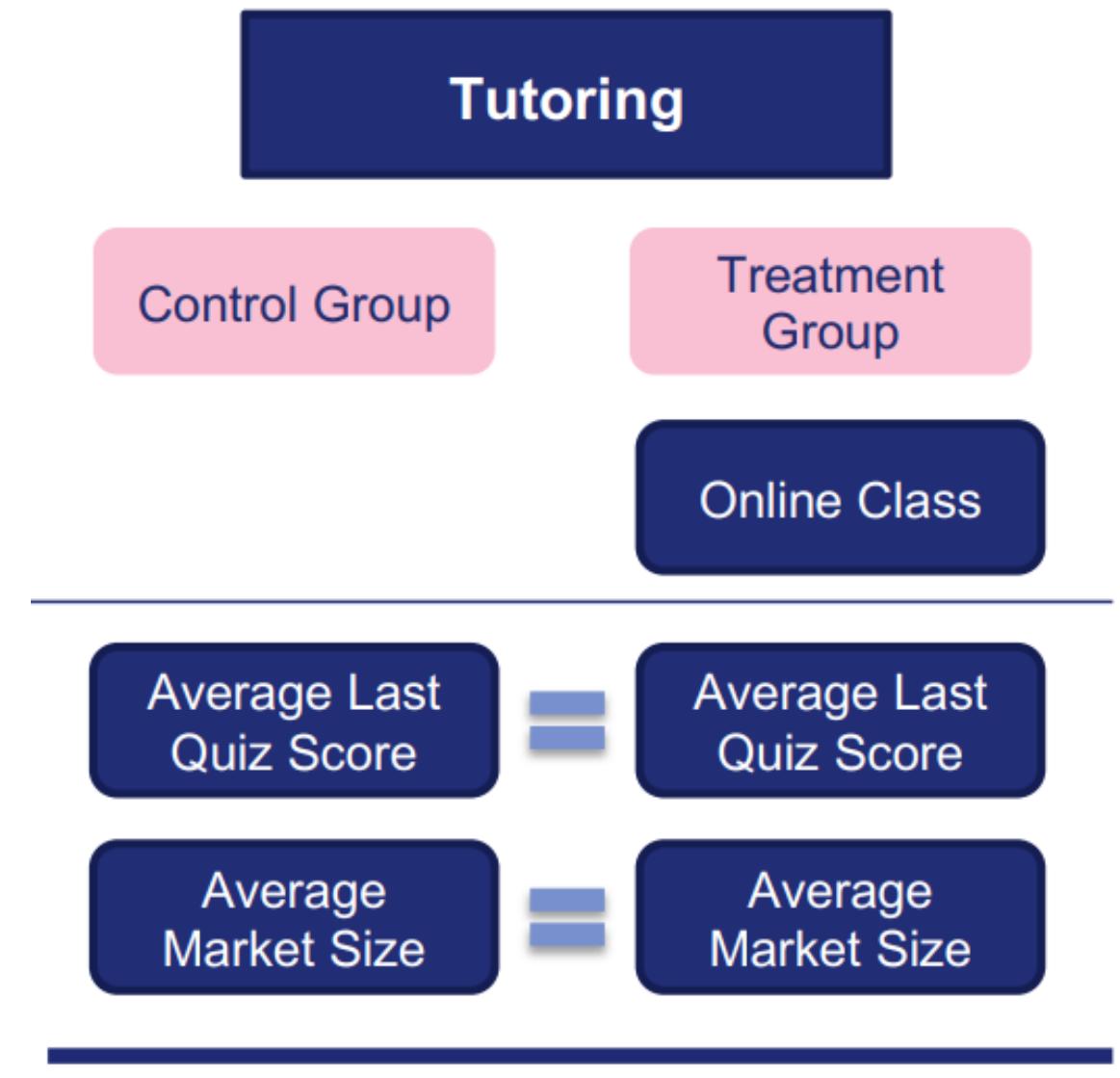
Multiple R-squared: 0.01422, Adjusted R-squared: 0.01349

F-statistic: 19.67 on 1 and 1364 DF, p-value: 9.94e-06

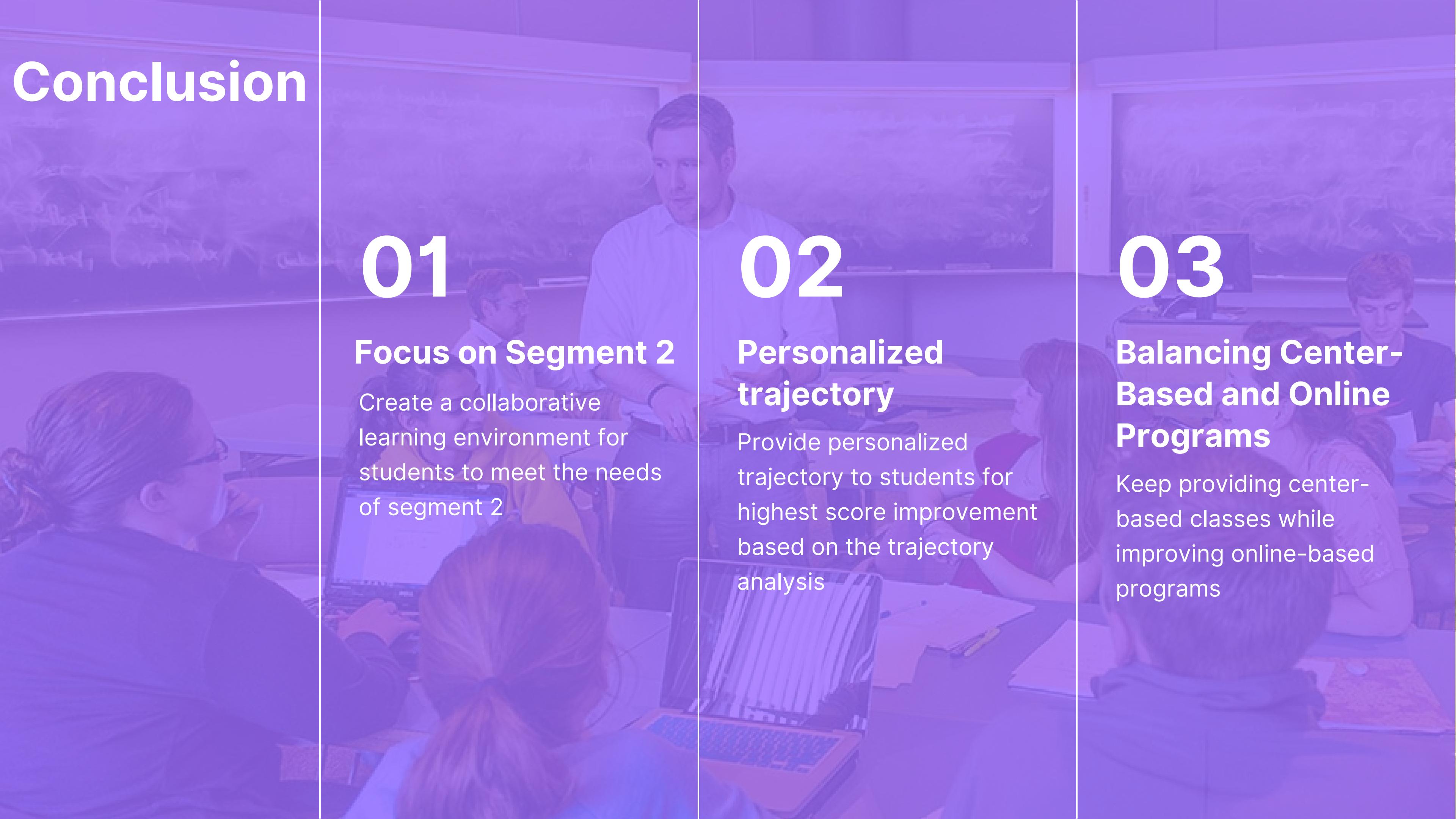
The coefficient -15.029 shows that students will have more significant score improvement if they study at the center.

Assume students in Tutoring Program are randomly selected in both control group and treatment group after 2018.

- Amount of online class: 720; Amount of center class: 683
- Dummy variable “is.Online”: online -> 1; center -> 0



Conclusion



01

Focus on Segment 2

Create a collaborative learning environment for students to meet the needs of segment 2

02

Personalized trajectory

Provide personalized trajectory to students for highest score improvement based on the trajectory analysis

03

Balancing Center-Based and Online Programs

Keep providing center-based classes while improving online-based programs

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