

## INTRODUCTION

My project is about how to improve the classroom environment for students, focusing on **Special Education** students with **ADHD** and **Autism**, using the **Montessori Method**. This project has significant importance to me, as I recently figured out that I was diagnosed with Aspergers; I primarily wanted to know more about a community that I should understand better, but also sought to address potential ways to improve the educational experience. My personal experiences with the **GATE program** and learning of others' experiences with the Special Education system show me that there is room for improvement.

When asked "How would you improve your classroom concerning these topics (collaborative work, student choice, hands-on learning)?" students made suggestions with these themes.

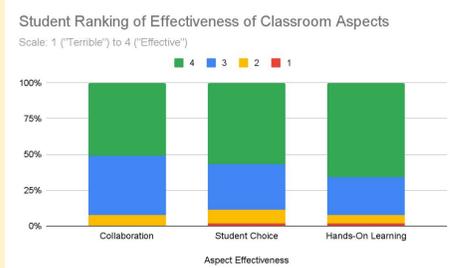


## RESEARCH METHODOLOGIES

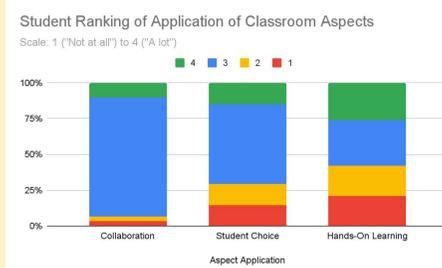
My research was conducted through two surveys given out to **LBHS** students, grades **9 to 11**. The first survey asks how students felt about their current classroom, the **effectiveness** and **use of** three core principles of **Montessori education (collaboration, student autonomy, and hands-on learning)** in their classes, and what they would improve their class in regards to the three aspects. The second is a feedback survey concerning the schoolwide **FLOW unit** at LBHS. I also observed two classrooms, one "**honors**" and one "**integrated**" (standard classroom with some Special Education students), to discern how students engaged with types of teacher instruction. My data is purely **qualitative** and **observational** since the data is based on my personal insight and compares student opinion before and after the FLOW unit. The first survey, responders will be asked for their name, grade level, teacher, and to specify if they have any **neurodevelopmental disorders**. This will create groups that will assist in drawing connections/conclusions.

## DATA AND FINDINGS

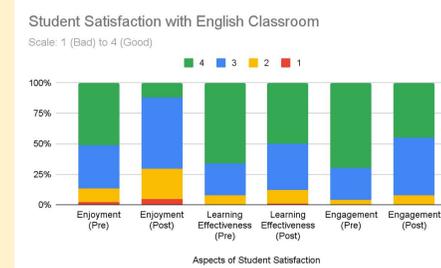
### General Opinions on Montessori Method and FLOW Project:



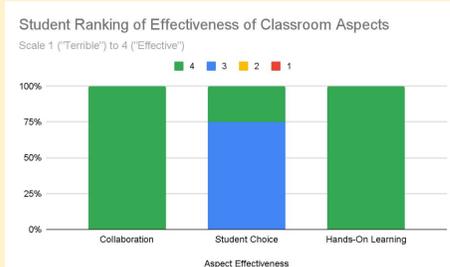
**Figure 1a:** 9th grade students rate how effective their instructor(s) apply collaboration, (limited) student autonomy, and hands-on learning techniques during class to impact students' learning; 1 = "Terrible" to 4 = "Effective". **Data showcases 9th grade students mostly believe these aspects are effective for learning, especially hands-on learning.**



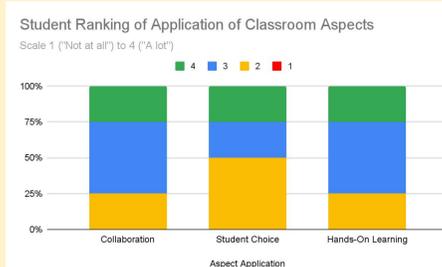
**Figure 2a:** 9th grade students rate how often their instructor(s) apply collaboration, (limited) student autonomy, and hands-on learning techniques during class to impact students' learning; 1 = "Not at all" to 4 = "A lot". **Data demonstrates 9th-graders see most collaboration on average compared to student choice and hands-on activities.**



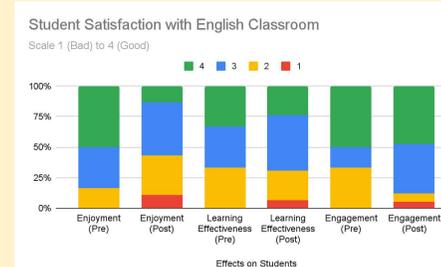
**Figure 3a:** 9th grade students rate their overall enjoyment, ability to learn, and engagement in their English classes pre- & post- completing their project; 1 = "Bad" to 4 = "Good". **Self-reported data consists of mostly positive feedback about the everyday classroom before FLOW project. Respondents had mixed evaluations of the hands-on learning project.**



**Figure 1b:** 11th grade students rate how effective their teacher(s) use core Montessori principles in their classrooms; 1 = "Terrible" to 4 = "Effective". **Data shows mostly positive feedback about the effectiveness of collaboration, student choice, and hands-on learning in classroom environments.**



**Figure 2b:** 11th grade students rate how often their teacher(s) apply core Montessori principles in their classrooms; 1 = "Not at all" to 4 = "A lot". **Data shows mixed application of collaboration, student choice, and hands-on learning in 11th grade English classrooms; there is especially a lack of student choice.**



**Figure 3b:** 11th grade students rate their overall enjoyment, ability to learn, and engagement in their English classes Pre- & Post- completing the grade-respective FLOW project; 1 = "Bad" to 4 = "Good". **Raw data highlights negative feedback for enjoyment and learning effectiveness but noticeable positive feedback for engagement.**

### Observational Data:

**English 10H (Control)**  
Primary Positives- Effective student discussions, sense of choice on activity  
Primary Negatives- Students worked alone, uncreative activity

**English 9 Collab (Experimental)**  
Primary Positives- Students worked together, sense of choice on activity, creative activity  
Primary Negatives- Lack of effective discussions

Control	Positive/Negative	Experimental	Positive/Negative
Off-topic, often disruptive student conversation	Negative (1)	Teacher guides students to solve questions	Positive (2)
Teacher guides students to solve questions	Positive (2)	Off-topic, often disruptive student conversations	Negative (1)
Students ask relevant questions	Positive (1)	Students ask relevant questions	Positive (1)
Lack of student participation; only 3 students answered focus questions	Negative (1)	Students were mostly focused	Positive (1)
Teacher did not force specific students to participate	Positive (1)	Students chose whether to read with or without a partner	Positive (2)
Body Language: students focused on their book/teacher/notes	Positive (1)	Lack of diverse student participation; only 2 students answered focus questions	Negative (1)
Quality notetaking	Positive (1)	Teacher does not force specific students to engage	Positive (1)
Students, as a class, made a decision on what to work on; read as a class or online activity	Positive (2)	Disruptive students made to stand outside the classroom briefly, temporarily stops behavior but does not address the root of the problem	Negative (2)
		Friendly, lively classroom environment	Positive (1)
		Students learned activities at a limited, individual pace	Positive (2)
		Students learned activities in a creative variety of ways; students translated Old-English words to modern words/slang that are similar in denotation/connotation and feel relatable	Positive (2)

\*Collab; class which Special Education students transitioned to standard classroom with a Student Aid; Students took introductory notes on a new book (*Life of Pi* | *Romeo and Juliet*)  
\*From the table: **Total score (Control) = 6, Total score (Experiment) = 8**; there was a greater qualitative positive effect on student behavior in the Experimental compared to the Control classroom

## DISCUSSION, ANALYSIS, AND EVALUATION

- Analysis of survey responses concludes that even though students show mostly positive feelings about the effectiveness of the Montessori principles, they experienced worse enjoyment, learning effectiveness, and engagement in their classes after the FLOW project, which incentivized these Montessori principles in the unit's content.
- However, the "pre-FLOW/experiment" data for the 10th & 11th grade for student satisfaction, the ranking of application of classroom aspects, and the ranking of effectiveness of classroom aspects are skewed.**
- This is due to an extremely small sample size within an extremely small time window and respondent bias from previous encounters with the application/avoidance of these aspects in the classroom. The lack of students with ADHD and/or Autism also made getting results much more difficult. To improve my data collection, I will plan earlier and search for ways my data can get skewed in order to prevent those issues.
- Free response data analysis shows students feel encouraged and believed they learned better under more creative, collaborative environments; students showcased that a sense of choice benefits collaboration and group work.

## CONCLUSIONS, IMPLICATIONS, AND NEXT STEPS

- Conclusions**
  - In general, students, across all demographics, stated that the FLOW unit (focused on collaboration, student choice, and hands-on learning) was not satisfactory. This is due to many reasons including lack of **creative freedom, less focus on research, and scheduling issues**. Students also noted that the implementation of Montessori Method principles is somewhat present in their classroom; however, the principles themselves are **preferred**. Students also believe these aspects effectively engage them and have importance in educational settings.
  - In conclusion, the Montessori Method would benefit a variety of high-school students, but the ways they are implemented are either **too minimal, lack the support** of other Montessori aspects, or **improperly engage** the student (ex. lack of clarity/guidance from the teacher, insufficient creative control).
- Recommendations and Next Steps**
  - The goal moving forward is to figure out how to **effectively apply** these principles in the classroom to give students the resources and motivation to learn, especially in the **FLOW unit**. I recommend educators to always add a form of student autonomy to any collaborative setting and provide opportunities for students to **directly engage** with concepts/topics.

## ACKNOWLEDGEMENTS

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### Full Research Paper:

