

Sentiment Analysis of MA205 End of Semester Survey

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1 Introduction

This sentiment analysis is conducted using Python and basic Natural Language Processing and visualization tools and libraries such as **NLTK**, **Pandas**, **Numpy**, **Matplotlib**, and **Seaborn**.

The survey, that cadets took, contained five open-ended questions and one multiple choice (question three) and is displayed in the table below.

	Question
Q1	What type of lecturing style do you prefer more? (Think of Thayer method vs a more classical lecture type classroom)
Q2	Overall, do you think the instructor and the time spent in the classroom helped you gain a better understanding of the topics?
Q3	On a scale from 1 to 5 (with 1 being poor and 5 excellent) how well prepared do you think you were coming to each class?
Q4	Do you think your perception of class effectiveness would change if you came better prepared for class? Please elaborate if possible.
Q5	What were some of the things that you believe the Dr. Bucaj did well, and what are some others that you think he could improve on?
Q6	What did you hope to get out of this class, and how well were your expectations met? Elaborate.

The violin plot in Figure 1 below depicts the sentiment for questions 2,4,5, and 6. The sentiment is conducted on a scale from -1 to 1 , with -1 depicting the most negative sentiment and a 1 the most positive sentiment, and a 0 being of a neutral sentiment.

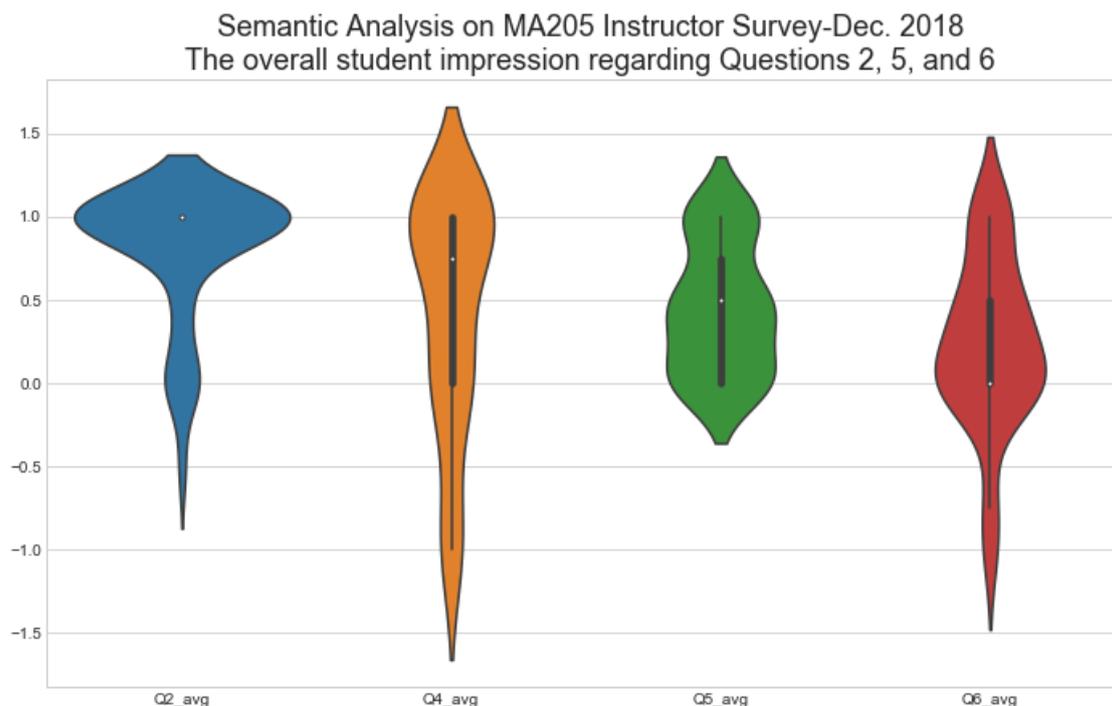


Figure 1: Sentiment analysis for questions 2, 4, 5, and 6.

In the tables below we give some typical answers of different sentiment scores for each of the questions.

Score	Question 2
1.0	absolutely. being able to ask more in-depth questions to dr. bucaj helped a lot too, he's willing to go in-depth on concepts if you need.
1.0	i feel like a lot of the material was rushed but we covered everything for the lesson which was good.
0.5	the teaching was good. i just struggle with learning math quickly
-0.5	i think the shift into a more traditional lecture setting was extremely helpful. a lot of times i would read the lesson and then try to do the stuff online but i would still have no idea what was going on.
0.0	somewhat

Looking at the table above, we see that the algorithm is obviously not perfect and misclassifications are present. This phenomenon is present partially because of the way students answer these questions and partially because of the fact that the algorithm I wrote is not very sophisticated to understand well the entire context of the sentence, but rather it mainly focuses in identifying positive and negative words in a sentence disregarding the entire context.

Score	Question 4
0.0	i think it would but sometimes the reading was more complicated from a non math major perspective
1.0	yes, i would have a better foundation in my knowledge of the material which will be reinforced during class.
-1.0	no, even on the days where i did prepare often times i was still lost with the material simply because i am bad at math
-0.5	not really, it was really hard to read the textbook for a lot of the content so it made it hard to do the practice problems. the class time is what i needed to clarify the ambiguity of the textbook.
0.143	i believe there is a difference in being prepared and understanding. being prepared means doing the reading assignments, take notes, and attempt at practice problems. that does not at all mean that i understood the reading, understood the notes i was taking, and had any idea how to attempt the practice problems. being prepared is beneficial and helpful for success in the classroom, yes. however, the thayer method and trying to teach myself new concepts will not better class effectiveness, in my opinion. what would help, is possible daily homework problems that went over what was just taught in the last lesson. homework and class preparation should be an enhancement on what we've been taught in class.

From the table regarding Question 4, it appears that the algorithm did a better job. Looking at the last entry, since the comment was much longer, the algorithm was able to give a more accurate representation of the sentiment of the comment.

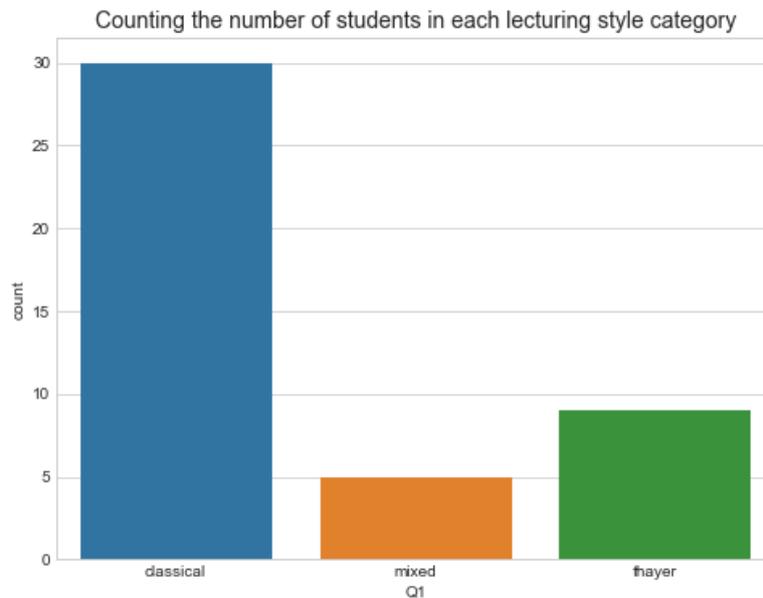
Score	Question 5
1.0	he was very much so able to teach the whole lesson. very interested about the material.
0.5	he knew very well on the things he taught, and was always open to questions. i feel that the lesson was a bit fast-paced however
0.0	dr. bucaj did well at providing times where the math we were learning would be helpful. something that can be improved is his explanations of topics because sometimes we would be talking about one thing but go off talking about something else then never really returning to the original problem.
0.33	he did well at giving us time in class to work on problems. he could improve on the variety of problems. it seemed like some classes we would only cover one problem.
0.5	i could tell dr.bucaj cared a lot and i enjoyed the fact that he tried to integrate military related topics into math. one thing that could be improved upon is to go through problems step by step instead of skipping steps and assuming people understand where numbers are coming from.

From the table regarding Question 5, again, we notice that the algorithm is not excellent, in some cases it tends to grade higher some comments that maybe should be graded a bit lower, and in other cases it does the opposite.

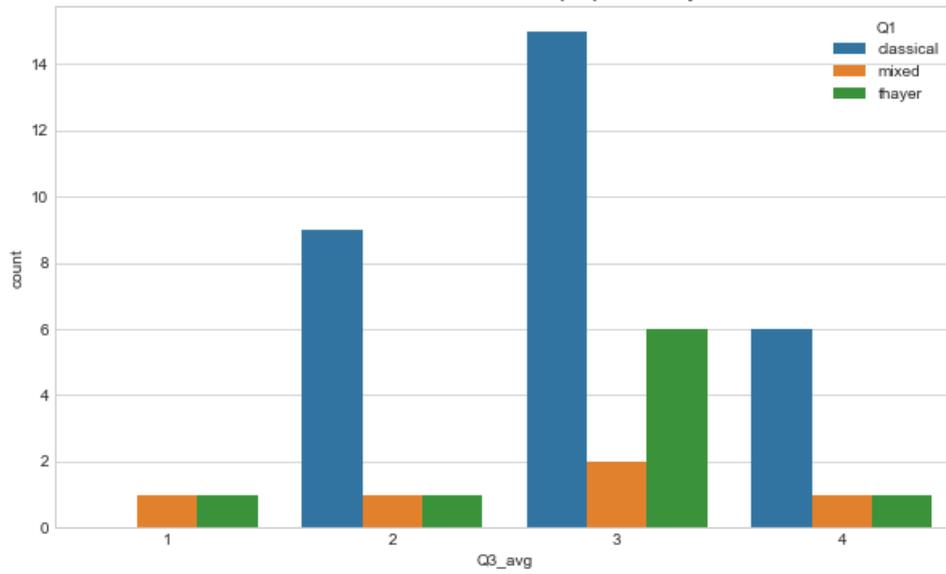
Score	Question 6
-1.0	i was hoping to have a firm grasp on calculus 2 topics, however i did not put in enough time for that to happen
0.0	i was hoping to get a better foundation of calculus but i failed to do so.
0.5	i expected to gain more knowledge of mathematics so that i could apply them to real life. i believe that i learned a lot of application of tools to help me do so as well as learning of other maths to help with different aspects of science/life.
0.33	i hoped to learn more about derivatives and integrals. my expectations were met and then some. i believe i have learned a lot of new material as a result of this course.
-0.75	i hoped to understand calculus ii a little more, but with everyday a lecture, i did not put in enough work on my own time to study. not that i need someone to force me to study, but other classes have big assignments and i know we will just have a lecture in class. this gave me a reason to not study enough for calculus ii. this reflected towards my grade.

As in the previous cases, the algorithm could be improved to better classify individual comments. However, on average, I believe the results fairly represent the overall sentiment.

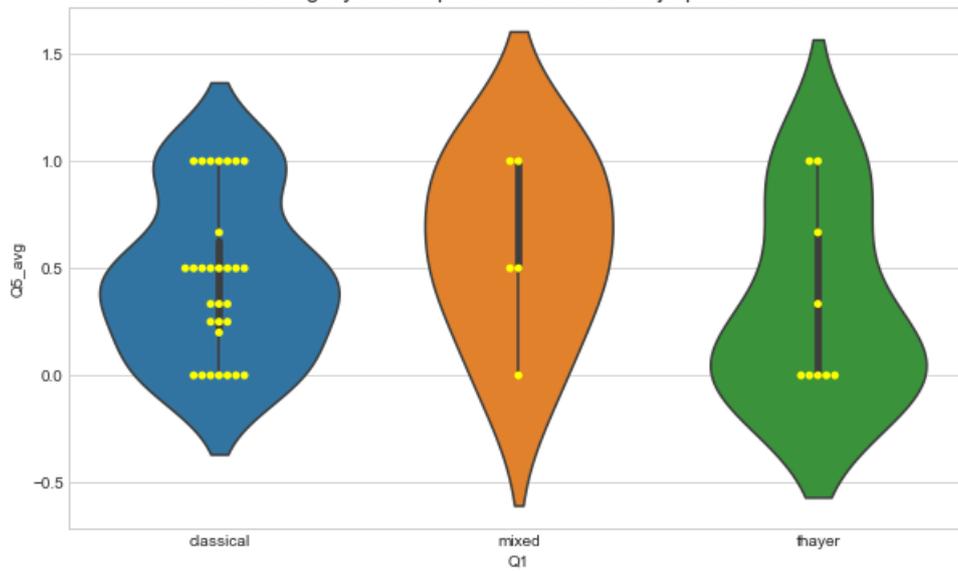
In what follows, we will include many plots when we compare one category to another. I will not add any further comments at this point.



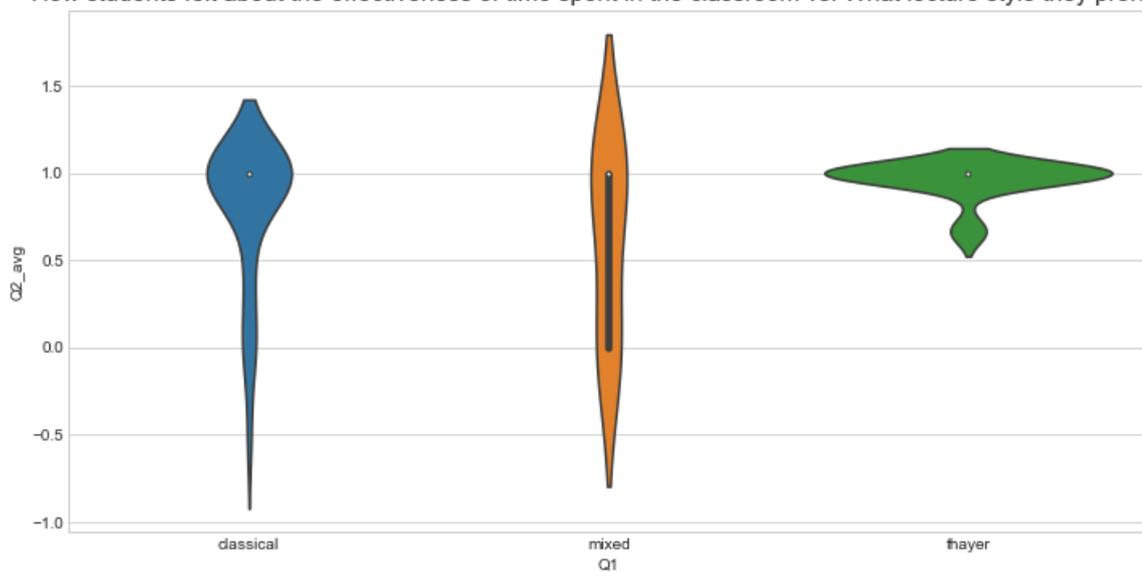
Number of students based on how well prepared they came to class

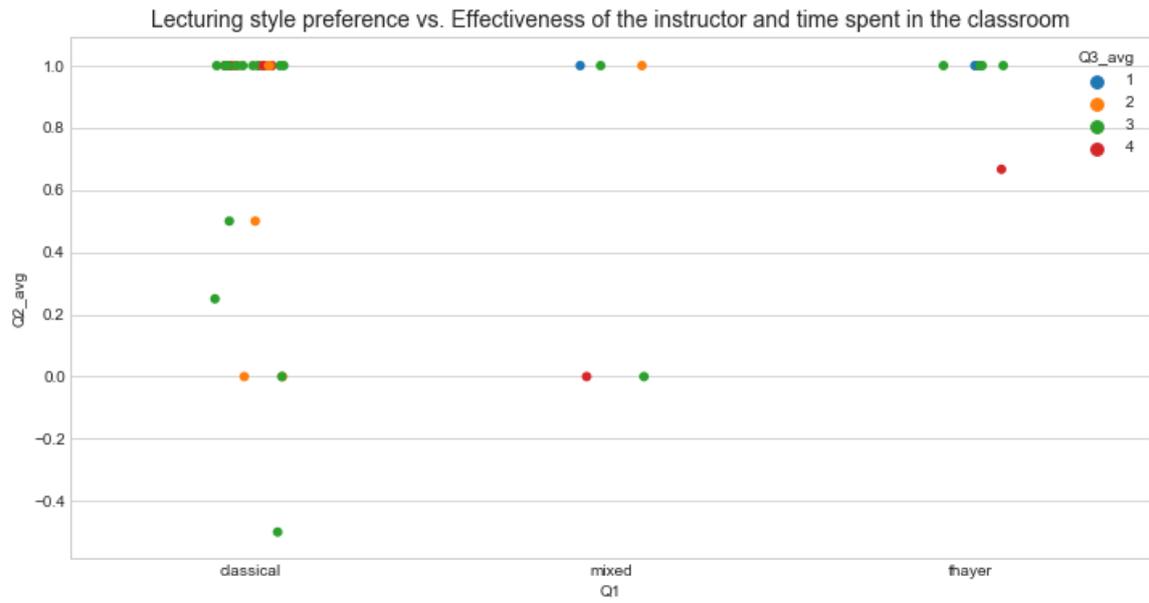


Lecturing style vs. Impressions on Dr. Bucaj's performance

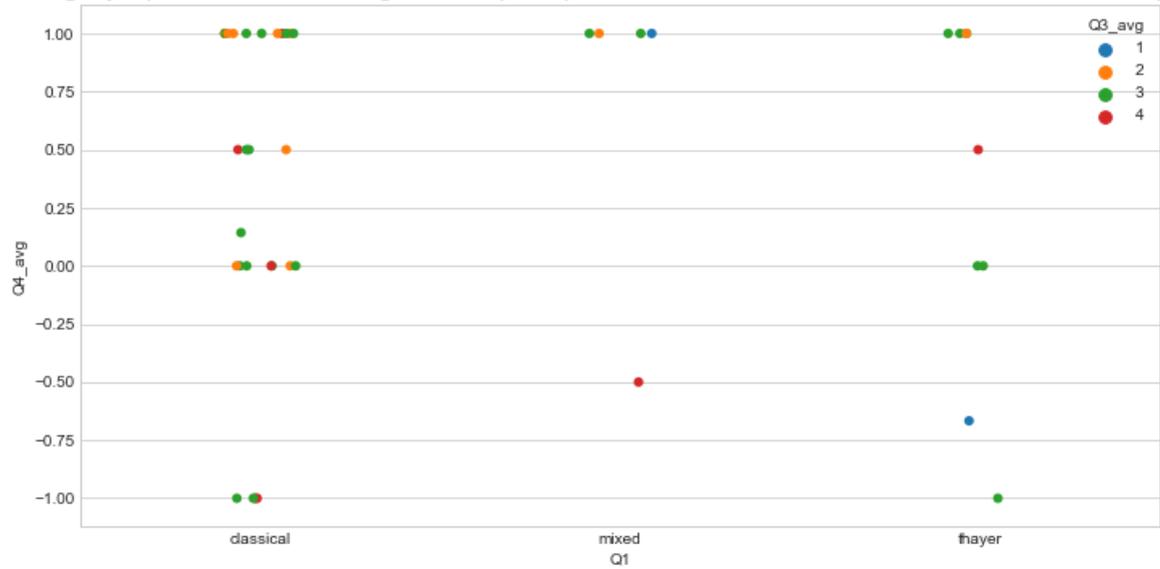


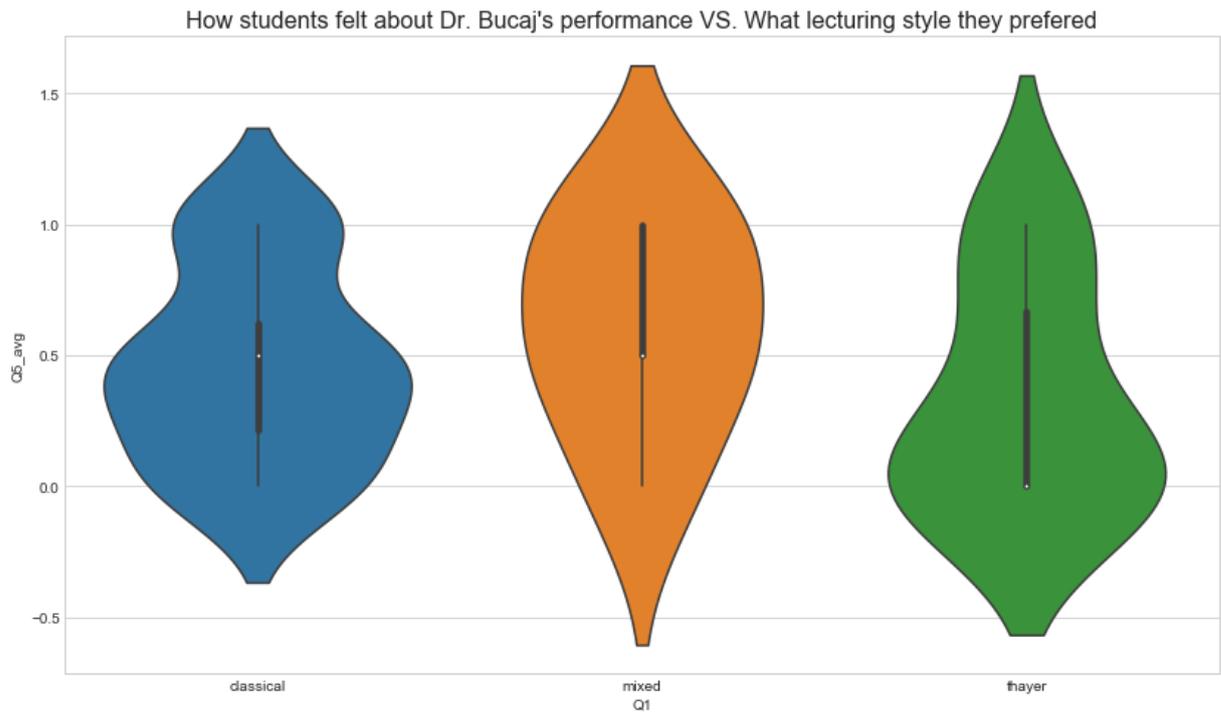
How students felt about the effectiveness of time spent in the classroom vs. What lecture style they preferred



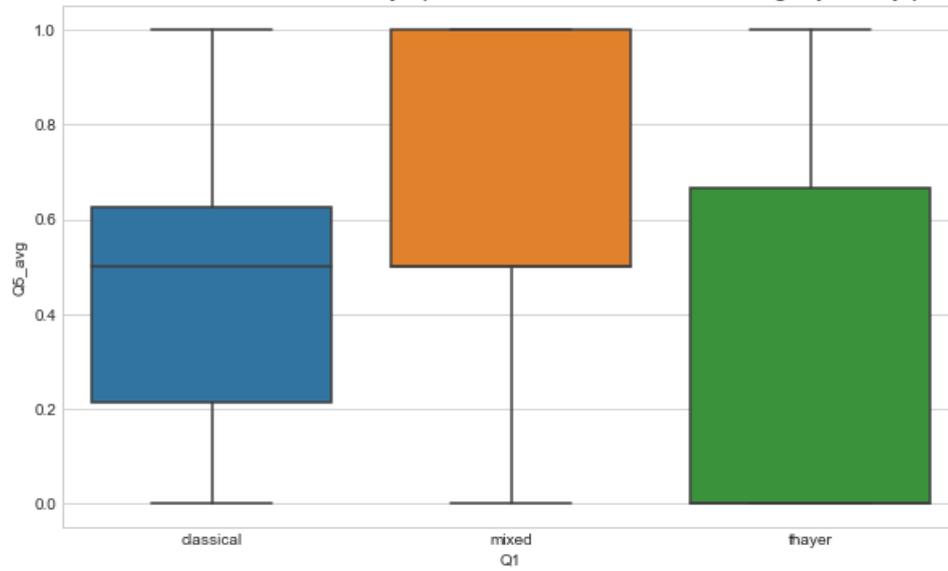


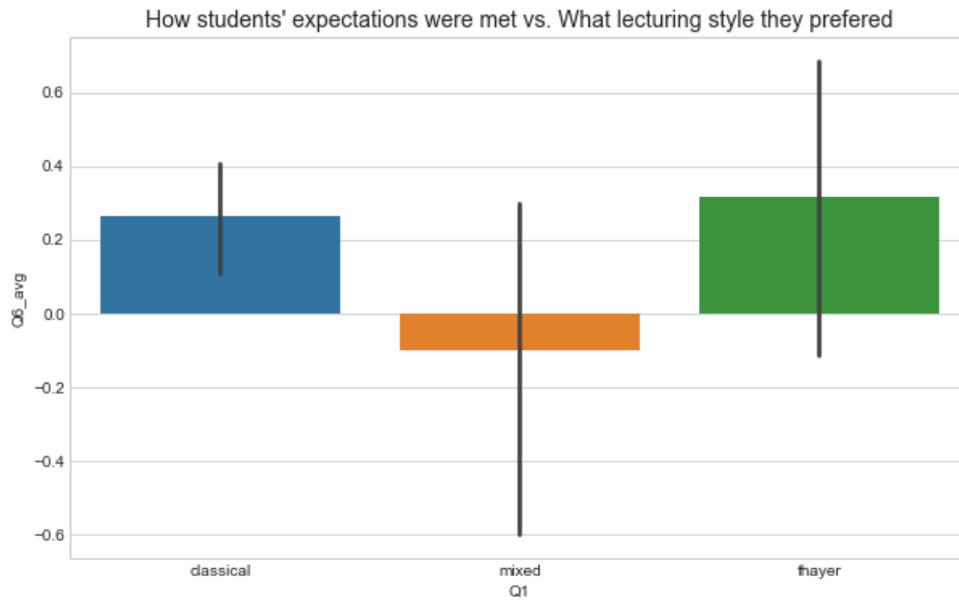
Lecturing style preference vs. Change in their perception of class effectiveness had cadets come better prepared





How students felt about Dr. Bucaj's performance VS. What lecturing style they preferred





How students felt about the effectiveness of time spent in the classroom vs. How well prepared students came to class

