

## Revised Introduction and Method

### Introduction

The majority of Westminster students do not know what they will declare as their major until the end of their college career. They may begin studies in one capacity and discover a passion or interest in another. Over the four years of attending college, a student is exposed to a variety of new information, ideas, and sometimes a unique way of thinking due to a wide range of classes that are required at a liberal arts college. The focus of this study will be on the proportion of seniors who changed their majors from freshmen year to senior year. The study is relevant because it can identify trends within the academic experience of students at Westminster College. This data could also be used to show incoming freshmen that exploring different areas of interest is a common practice in college. A major doesn't necessarily need to be decided before entering college.

According to the National Center for Education, "About 80 percent of students in the United States end up changing their major at least once...On average, college students change their major at least three times over the course of their college career." This study may support these findings or because of the size and flexibility of Westminster, the study results could potentially differ the National Center for Education's findings.

### Methods

The researchers are planning on collecting data by surveying seniors. The researchers will accomplish this by visiting upper level classes and distributing a survey. The survey will ask seniors the following question: Over the course of your academic undergraduate experience have you changed your intended major before submitting your final major declaration form? If yes, please estimate how many times you changed your intended major before submitting your final

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official major declaration form, and write this estimate on the line below. If no, please write "0".

This survey is collecting categorical data through cluster sampling method. The researchers will be going into senior capstone classes. Attached is an example.

### Survey for Westminster Senior Students

Over the course of your academic undergraduate experience have you changed your intended major before submitting your final major declaration form?

Circle one:

Yes

No

If yes, please estimate how many times you changed your intended major before submitting your final official major declaration form, and write this estimate on the line below. If no, please write "0".

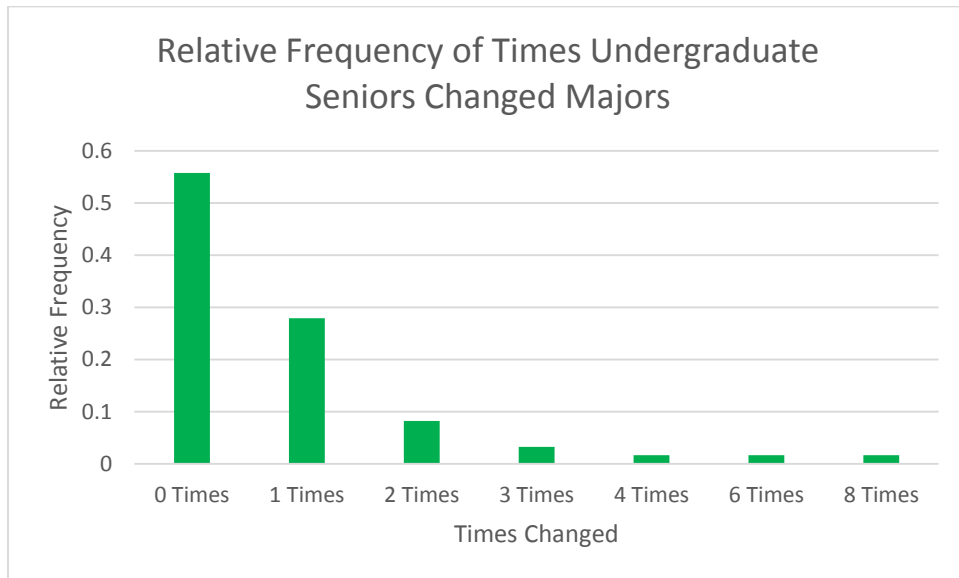
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The statistics and graphs that will be presented are a relative frequency chart. The researchers believe that this is the best representation of the data gathered because relative frequency charts will allow us to compare the relative frequency of proportions of times students change their major throughout their undergraduate experience.

The hypothesis is that was tested is whether the following data the National Center for Education is true, "About 80 percent of students in the United States end up changing their major at least once." The hypothesis is that the proportion of students who changed their major at least once is 0.80. The researchers will first observe the proportion of students who change their major at least once and then they will perform a one proportion hypothesis test.

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## Results



Times Changed	Number of Respondents	
0 Times	34	
1 Times	17	
2 Times	5	
3 Times	2	
4 Times	1	
6 Times	1	
8 Times	1	Sum=
	61	27
Times Changed	Relative Frequency	
0 Times	0.557377049	
1 Times	0.278688525	
2 Times	0.081967213	
3 Times	0.032786885	
4 Times	0.016393443	
6 Times	0.016393443	
8 Times	0.016393443	

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The distribution can be said to follow the Normal model, because the randomization condition, the 10% condition, and the Success/Failure condition were all met. The distribution had a standard error of 0.0512. The sample proportion had a z-score of -6.97801 and the P-value of 2.9939E-12.

The relative frequency of seniors who have changed their major zero times is 0.557, meaning that only 0.443 of seniors changed their major at least once. A first glance at this raw data suggests that the results of the hypothesis test are valid, because the proportion gathered in this study is shockingly smaller than the predicted proportion of 0.800.

### Discussion

Our data was starkly different from the data gathered by the National Center for Education. There was a greater proportion of undergraduate seniors who had changed their majors 0 times in the study, then found in the study by the National Center for Education. This may have occurred because several of the seniors surveyed came from capstone STEM courses, indication that our data could have been slightly skewed. STEM majors are usually high-intensity courses that require students to begin coursework in their majors early on in their undergraduate experience, thus there are few opportunities to change majors. If there was more variability in the capstone classes that we surveyed, perhaps the results would have included more respondents who changed their major at least once.

If the researchers were to start over, they would narrow the study to only STEM majors, so that they could compare data between undergraduate seniors in this category only. It is unlikely that the researchers could have obtained a larger sample size in the given time-frame, so narrowing our study's focus would be a better method.

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The results were unusual, so the null hypothesis was rejected. This indicates that there is sufficient evidence to suggest that the proportion of undergraduate seniors who have changed their major at least once is not 0.800. This conclusion is important, because it demonstrates that changing majors is a normal phenomenon and students should not be ashamed of changing majors from the time they enter college to the time they graduate.