

## Qualitative Group Project Part II

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### **An Analysis of Students that Smoke in the Classes of Math 171 and Math 301 Fall 2019**

In the fall of 2019, students in Math 171 and Math 301 participated in a survey, totaling 325 participants. The survey is categorized as an observational study due to the data being collected with no variable imposed on the participants. Our group focused on the question: “Do you smoke tobacco?” We chose this question because we believed it would receive a large response from college students since smoking has become more popular with the rise of electronic cigarettes. Before reviewing the data, we hypothesized that the majority of students (over 50%) answered that they smoked. This assumption was concluded with the idea that the rise in electronic cigarettes with college-aged individuals (about age 18-24) would heavily affect the surveyed students’ answers.

To find our simple random sample of 30, we used our Ti-84 Plus calculator’s random integer function. After creating an excel file with each participant associated with ascending numbers 1-325, we calculated  $\text{RandInt}(1,325,5)$  to randomly select five digits between 1 and 325. We only calculated five at a time due to our calculator only displaying five digits at a time and not allowing us to scroll over. When the calculator repeated a number, we would keep calculating until we got to a total of 30 different numbers. The final 30 selected participants and the data they gave can be found in the chart below (see Table 1).

We used a hypothesis test to test our claim that the majority, meaning more than 50%, of Longwood students enrolled in Math 171 and Math 301 in fall 2019 smoke tobacco. The null hypothesis is that  $P$  is less than or equal to .5, and our alternative hypothesis is that  $P$  is more than .5. We stated that  $P$  is the proportion of students in Math 171 and Math 301 in the fall semester 2019 who said they smoked; meaning, they answered the survey question with “rarely”, “occasionally”, or “regularly”. We used a 1-PropzTest in order to test our hypothesis. A 1-PropzTest is used when comparing two sets of categorical data. In our case, we focused on those that smoke and those that do not.

The conditions for using this test include having a simple random sample of at least ten or an expected success and failure of at least 10. Since our sample is of 30, we do not have to worry about the number of successes and failures. Once we checked this, we had to indicate that there is a nonresponse bias, some participants chose not to respond, and undercoverage bias, not all students at Longwood University were surveyed. The bias is important to note here because it affects the reliability of the survey and, therefore, the reliability of our hypothesis test.

The number of people in our sample who do smoke is 6 out of 30, and those that do not smoke is 24 out of 30. To calculate using the 1-PropzTest, we went to STAT, then TESTS, then selected the 1-PropzTest and input our findings. We entered the  $P$  null (.5),  $X$  which is the number of participants that do smoke (6), and  $N$  which is our sample size (30). The calculator gave us a  $P$ -value of .0005076 and a  $z$ -score of -3.2063. The negative  $z$  score means the data is

on the left side of the null hypothesis, and our alpha was at the .01 level - where our alternative hypothesis is located. This, regardless of the size of the P-value, indicates that our hypothesis is not true because our alternative hypothesis falls to the far right. The results are summarized in a simple graph in Table 2. We concluded that there is not significant evidence that more than 50% of students in Math 171 and Math 301 in fall 2019 that smoke rarely, occasionally, or regularly.

## Appendix

Table 1: Simple Random Sample Data

Number	Sex	Class	Survey Answer
6	Female	Sophomore	Rarely (couple of times per year).
13	Female	Freshman	Never.
27	Female	Junior	Rarely (couple of times per year).
30	Female	Junior	Never.
40	Male	Sophomore	Never.
42	Female	Sophomore	Rarely (couple of times per year).
73	Female	Sophomore	Never.
85	Female	Freshman	Never.
110	Female	Sophomore	Never.
111	Male	Freshman	Never.
122	Female	Sophomore	Never.
147	Female	Sophomore	Never.
148	Female	Senior	No data
153	Male	Freshman	Never.
161	Female	Freshman	Never.
178	Male	Junior	Never.
181	Female	Freshman	No data
202	Female	Freshman	No data
204	Female	Sophomore	Never.
206	Female	Junior	Occasionally.
209	Male	Sophomore	Never.
228	Female	Sophomore	Never.
229	Male	Sophomore	Never.
261	Male	Junior	Never.
264	Female	Sophomore	Never.
267	Female	Junior	Rarely (couple of times per year).
283	Female	Senior	Never.
288	Male	Senior	Rarely (couple of times per year).
302	Female	Sophomore	Never.
321	Male	Freshman	Never.

Table 2: Summary Test Results Graphed

