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Mat-258

Lab 3: Goodness of fit.

In this lab, we’re going to look at data that is a subset of NCES’s “Digest of Education Statistics” for the year of 2014. The data (summarized) below describes several majors offered throughout the United States and the amount of students enrolled in them. I chose this topic of research because I was interested to see what the distribution of majors around the nation is. I thought it’d help highlight if there are and which are the most popular majors for students in post-secondary educational institutions around the country.

Here is a summary of a subset of the total data we’ll be analyzing. As you can see by the table; there are a total of 6 majors to be looked at. The sample size of students with these such majors is 6588000.

**College Majors**

(Totals in thousands)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Business | Communications | Psychology | Liberal Arts and Humanities | Computer and Info Sciences | Biology | Mathematics |
| 3,487 | 535 | 794 | 2,341 | 942 | 719 | 111 |

Presented below is a graph summarizing the data shown in the table.

Now that we’ve taken a glance at the data; we must seek the answer to the main question of concern for this lab. Are the proportion of students in these majors across the country evenly distributed? Observe below.

Solution

Ho: The proportions are evenly distributed.

Ha: The proportions are not evenly distributed.

N = 8,929,000.

Degrees of Freedom = 6 – 1 = 5.

Test Contribution

Category Observed Proportion Expected to Chi-Sq

Business 3487000 0.166667 1098000 5197924

Communications 535000 0.166667 1098000 288679

Liberal Arts 794000 0.166667 1098000 84168

Computer & Info Sci 942000 0.166667 1098000 22164

Biology 719000 0.166667 1098000 130821

Mathematics 111000 0.166667 1098000 887221

N DF Chi-Sq P-Value

6588000 5 6610976 0.000

According to the results displayed above; we have a P-value that is far less than our standard significance level of 0.05. Therefore, we reject our null hypothesis. We can conclude that no, the proportion of students in the six majors chosen above are definitely not evenly distributed. Some of the majors hold a far greater population than the others. There are however a few lurking variables that can be altering the results of this experiment. For example, there are far more than six majors offered throughout the nation. The fact that we only looked at 6 of them could be having unintended side effects.