MAT 152: Statistical Methods I: Activity 1

This course provides a project-based approach to introductory statistics with an emphasis on using real-world data and statistical literacy. Topics include descriptive statistics, correlation and regression, basic probability, discrete and continuous probability distributions, confidence intervals and hypothesis testing. Upon completion, students should be able to use appropriate technology to describe important characteristics of a data set, draw inferences about a population from sample data, and interpret and communicate results.

Global Learning Outcomes:

1) Investigate and understand global issues through statistical analysis.

2) Use statistical techniques to draw inferences about global populations.

3) Interpret and communicate results in a cultural context.

Sampling: Obstacles **by Daphney Hill**
Students will discuss the difficulties faced when sampling from a population in a cultural context.
Objective:
The objective of this activity is to expand students' understanding of the difficulties faced when sampling from a population. Students will focus on obtaining population parameters through the use of a census. Focusing on difficulties allows students to gain an insight into the obstacles that are faced when drawing inferences about global populations.
Time:
30 minutes
Materials:
1. Copy of the Activity for each student 2. Planning for Africa's Growing Cities introduction video (https://youtu.be/1tU9QA7RIO4) 3. Global map (http://geology.com/world/world-map.shtml) 4. GEOHIVE (http://www.geohive.com/earth/pop_urban.aspx)
Procedure:
This activity is intended for use after students have been introduced to sampling methods. The activity can be assigned to students as an outside of the class assignment or could be used as a group activity. If using as an in-class group activity, follow the below precedures: **Preparation**: Give students the activity scenario and have students watch the introduction video and complete questions 3 and 4 of the activity on their own before class. **In Class**: Divide students into groups of 3 to 4 and procede with the activity. If students have not completed the preparation work, group those students together and allow them to watch the introduction video before beginning (note the intro video is less than 3 minutes). While students are working, have them focus on questions 1 – 5 and question 10. Make sure there is one person in each group in charge of submitting the groups findings/ question answers. Questions 6 – 9 should be done if time permits or as a homework assignment to expand on the in-class activity and any classroom discussions.

The below activity gives possible answers in [brackets]. If students are having a difficult time identifying possible obstacles for question 1, ask other groups to volunteer to share one of their obstacles and why they chose that obstacle. If you have a quiet group, use possible answers listed as discussion points.

At the end of the activity, have a whole – class discussion on questions 1 – 5 and question 10. As an extension to qustion 10, discuss variables that could influence the weight of the populations beside urbanization.

Assessment:

Students will complete the activity while documenting their findings. At the end of class, collect and grade each group's questions 1 -5 and 10. Grade should be based off of effort, thoughtfulness, and creativity.

If the assignment is given as a take-home assignment. Collect and grade based off of effort, thoughtfulness, and creativity.

Additional Resources:

There are many variables that effect the demographics of a population. To name a few: urbanization, global warming, education, pollution, changing weather patterns, and viruses all have effects on the demographics of a population. When researchers are interested in demographics, such as the weight of a certain population, they often rely on the country's census to obtain population parameters needed to make inferences about the population.

For this activity, you will be wearing the researcher's shoes and identifying possible obstacles that can be present when sampling from a population. Complete the review questions and then each question for the given scenarios.

Review

- To recall, what is a census?
  [Possible answer: A collection of data from every member in the population]

- What type of sampling method is used in obtaining data for a census?
  [Possible answers: voluntary response sample, self-selected sample]

Scenario: You are interested in the effects urbanization has on a population. More specifically, you are interested in the effects urbanization has on the weight of a population. Begin by watching the quick video linked below by clicking the link (opens in new window) in order to familiarize yourself with your topic of interest: https://youtu.be/1tU9QA7RIO4.

With Africa's move toward urbanization, you decide to focus on the changes in the weight of the population. You want to compare the weights of people in an African country that has been urbanized to one that is more rural using data gathered from the country's census.

1. Name at least two obstacles that could stand in the way of using the African census to obtain the most accurate measurement of the countries average weight and the population standard deviation.

[Possible obstacles: Volunteer response sample, low response rates, inaccurate measurements, high percent of African children not registered with the government, government]

2. Choose one of your identified obstacles when using a census to make inferences and discuss its effect on obtaining the most accurate population parameters. Please include at least one source.

3. Using the following GEOHIVE website link, identify two African countries that had the highest urban population in 2015 and two African countries that had the lowest urban population in 2015: http://www.geohive.com/earth/pop_urban.aspx (opens in new window).

4. Use the following world map and identify the four regions countries in question 3: http://geology.com/world/world-map.shtml .

5. What parameter(s) would we be interested in obtaining about a population if we were wanting to describe the weight of the population of interest?
   [Answers: Population mean and population standard deviation.]

6. Search the internet for one data source that could be used when determining the weight of one identified urban country and identified rural country in question 3. Include each source and discuss any challenges faced with obtaining the sources.

7. What sampling method did the identified source in the previous question use?

8. Do the data sources you provided give the parameters of the populations of interest from question four? If so, provide those parameter values.

9. Revisit the first question and list any obstacles that have presented themselves with obtaining the needed population parameters to infer about the weight of the populations.

10. Suppose the population parameters reveal that there has been an increase in weight since the country of focus has started to urbanize. Would it be correct to say that urbanization caused the weight increase? Why or why not?
    [Possible answer: Correlation does not imply causation]