CIS 620 – Topics in Teaching Secondary Subjects: Data

Real World Lesson Plan Involving Data

By

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Introduction

I regularly teach a course titled *Mathematical Topics and Applications* at the college level. It is designed for students with a documented learning disability in mathematics. These students are placed into the class (with departmental approval) by the UNLV Disability Resource Center. The primary goal of the course is to present students with mathematical topics in a stress-free atmosphere where they can focus on learning real life skills, as opposed to passing exams. Without this course, these students would typically be waived out of their general education mathematics requirement. Of the topics presented, we do a segment on data analysis. In this topic, we discuss chart types and their characteristics, misrepresentation of data, and how to create these charts in Microsoft Excel.

For my lesson, I chose to revamp the project that involves creating the graphs in Excel. I originally had detailed instructions using Excel 2003. Since UNLV has upgraded to Excel 2007, I thought it would be wise to revisit this lesson, changing to the newer version and adding some real-life experience. I also included an introductory activity, where they collect data themselves, which we will compile and graph together. This way, I can be sure the data is something they will find interesting.

Time

The entire lesson on data will take approximately 2 class periods. One 2.5 hour class to present the material on plots, and one 2.5 hour class to go through the lesson on graphing in Excel. I am omitting the notes for the lesson, and focusing my attention on Day 2 – graphing in Excel 2007.

Class/Level

The course is college level, though the material could be presented to any student who has an elementary understanding of computers (in particular Excel), and types of graphs.
Goals and Objectives

For students to take a set of data, and create the following plots in MS Excel 2007: bar, line, pie, scatter, and box/whisker.

CCSD Standards

I did not look up the CCSD standards for this particular lesson.

Materials and Resources

- Individual student computers with Microsoft Excel 2007, and an Internet connection (or access to data sheet)
- Pre-lesson material sheet (for teacher only)
- Premade data sheet (provided to students electronically or via the web)
- Project guide (provided to students as a handout)

Vocabulary

- Graph types (bar, line, pie, scatter, and box/whisker)
- Measures of central tendency (max, min, range, mean, median, mode, percentile)

Pervious Skills Needed

- Basic knowledge of navigating in MS Excel
- Data collection
- Characteristics of graphs (bar, line, pie, scatter, and box/whisker)
- Finding measures of central tendency (max, min, range, mean, median, mode, percentile)
**Motivation**

Most college students will, at some point in their academic career, have the need to generate a plot for research purposes, or to convey information. Creating these graphs, while not a difficult endeavor, needs some training. This project will introduce students to the process of creating such graphs.

**Lesson Procedure**

1. After the review of material presented during day 1, students now have a understanding of when each graph type is used, and its characteristics. This is not included as part of this lesson, as I am focusing on Day 2.
2. Students are presented with ‘homework’ at the end of Day 1, for which they need to collect the following information:
   a. How much money they spent during their last visit to a grocery store.
   b. Reflection on how many children they might consider having at the age of 23 (or had, depending on age and gender).
   c. Identify which category (Democrat, Republican or neither) they consider themselves.
   d. Research and determine the current level of spending per pupil and the average teacher salary in Clark County.
   e. Research professors rank. In particular, how are professors classified, and what do the classifications mean in terms of experience and salary?
3. At the beginning of Day 2, the class as a whole will go through the Pre-Lesson Activity (attached). The intent of the homework is to encourage students to tie data into their own lives by collecting data themselves. At the end of each part of the Pre-Lesson Activity, the data is then organized in a way to graph using Excel.
4. Students will then log onto the computer, each working individually (but next to each other for some collaboration). I will provide them with a copy of Project 4 (attached), which is a step-by-step guide to creating graphs in Excel.

5. The students will open the Excel file, which contains a tab for each data chart (bar, line, pie, scatter, box and whisker). These data sets will already be formatted to facilitate graphing.

6. Together, with the instructor leading the way, and walking around checking each individual, the class will go through the steps in creating the graphs.

NOTE: The solutions are presented as an attachment, for your reference.

Closure

We will review each graph, one by one, and go over the following questions as a class.

For the Bar Graph:

1. Is the data normally distributed? [No, it is skewed to the left]
2. Which category has the highest frequency? [$12 to $22 dollars]
3. What does this say about what people are doing (mostly) at this store? [Buying for short term]

For the Line Graph:

4. What do you notice overall about births from 1917 to 1975? [It goes up and down]
5. What could account for the dip in the 1930’s, the peak in the 1960’s, and yet another dip in the 1970’s? [the Depression, the ‘free love’ movement, and the advent of the birth control pill]

For the Pie Graph:

6. Which is the largest category? How much greater is it then the next largest? [Democrats, 1% more]

For the Scatterplot:

7. Is there a correlation between teacher salary and per pupil spending? If so, describe what it means?

[Yes. The positive correlation indicates that as teacher pay goes up by $1, per pupil spending goes up by $0.20]
For the Box and Whisker Plot:

8. Which group is overall paid better? [Full professors]

9. Which group is paid most consistently? [Assistant professors, because the data is more compact]

10. Is it possible for an Assistant professor to make the same salary as a full professor? [Yes, the ranges overlap]

11. Is it possible for an Associate professor to make more than a full professor? [Yes]

Extension

Students will be allowed an opportunity to explore the Data and Story Library, located at

http://lib.stat.cmu.edu/DASL/.

Modifications

No modifications are provided.

Assessment

Students are asked to find any data set of interest to them, copy and paste the data into Excel, and use the most appropriate graph to represent it. The next class, they will each present a copy of their graph, along with why it interested them and what they learned from it, to the class as a whole.