Statistics I Case Study 1

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1. Thought Question 5 points

This question does not require computation using Minitab.

A company has 30 employees, including a director. The lowest salary among the 30 employees is $22,000.The director's salary is $180,000, which is more than twice as much as anyone else's salary. Decide for each of the following statements about the 30 salaries whether it is true, false, or you cannot tell on the basis of the information at hand.

- The median salary is below $60,000.
- The average salary is below $60,000.
- If all salaries are increased by $1,000, that adds $1,000 to the average.
- If the director's salary is doubled, and all other salaries remain the same, that increases the average salary.
- If the director's salary is doubled, and all other salaries remain the same, that increases the median salary.
- The standard deviation of the salaries is larger than $180,000

2. Working with Minitab 5 points

In this question we will practice our Minitab skills by reading in data from a small survey done by visitors to a regional mall. The survey data is *smallsurvey.csv*

- How many rows of data are in this data set?
- How variables are in this data set?
- One way to examine categorical variables is with a pie chart. Produce a pie chart of where people live(the residence variable). Comment on the graph.
- Another way to examine categorical variables is with a bar chart. Produce a bar chart of political affiliation (the politicalparty variable). Comment on the graph-why can't we use a histogram for this variable?
- Find the average of the income variable.
- Compare the average income and standard deviation of income for men and women.
- The variable jobhappy measures on a 1-10 scale how happy someone is with their job. Compare the average income for someone with a jobhappy rating of 8 or more versus the average income of someone with a jobhappy rating of 3 or less. What do you find?

3. Case Question 10 points

"That Owen is costing us money!" stated Billings in a clear, loud voice at the meeting. "Look, I have proof. Here's a histogram of the materials used in production. You can clearly see two groups here, and it looks as though Owen uses up a few hundred dollars more in materials each and every shift than does Purcell."

You're in charge of the meeting and this is more emotion than you'd like to see. To calm things down, you try to gracefully tone down the discussion and move toward a more deliberate resolution. You're not the only one; a suggestion is made to look into the matter and put it on the agenda for the next meeting.

You know, as do most of the others, that Owen has a reputation for carelessness. However, you've never seen it firsthand, and you'd like to reserve judgment just in case others have jealously planted that suggestion and because Owen is well respected for expertise and productivity. You also know that Billings and Purcell are good friends. Nothing wrong there, but it's worth a careful look at all available information before jumping to conclusions.

After the meeting, you ask Billings to e-mail you a copy of the data, with one row per shift supervised. Now you are ready to spend some time getting ready for the meeting next week.

You should start by reading the data (*billings_case.csv*) into Minitab.

- Does the distribution of Materials Used look truly bimodal? Or could it reasonably be normally distributed with just a single group?
- Do separate histograms for Owen and Purcell agree with the contention by Billings that Owen spends more?
- Should we agree with Billings at the next meeting? Justify your answer by careful analysis of the available data.

Based on a case from *Practical Business Statistics* by Andrew Siegel