

Text Messaging is Time Consuming What Gives?

LSRL Graded Investigation

Introduction

Many of us send lots of text messages throughout a day. What factors could be related to the number of text messages one sends in a day? In this activity, we will explore the relationship between the number of text messages one sends in a day and a few other potential explanatory factors. Once each group has obtained their results, we will work together as a group to draw further conclusions.

Choose one of the following questions to explore:

1. Does the number of hours you spend hanging out with friends in a day increase or decrease with the number of text messages you send?
2. Does the number of hours you spend doing homework in a day increase or decrease with the number of text messages you send?
3. Does the number of text messages you receive in a day increase or decrease with the number of text messages you send?

To answer the question you choose, you are going to download and work with a real data set. To download the data set, go to the following website: <http://www.amstat.org/censusatschool/>

In this activity, we will be drawing random samples of students to analyze their results.

Carry out the following steps:

1. Click on Random Sampler
2. Accept the Terms & Conditions
3. Select a sample size of 100 from All States and 9, 10, 11, and 12 grade levels. Include All Genders and All Years of data collection.
4. Download the data into Excel.
5. Open the data in Excel. You will see a large number of variables (labeled in each column).
6. Delete all the columns except for the following:
Gender, Text Messages Sent Yesterday, Text Messages Received Yesterday,
Hanging out with Friends Hours, Doing Homework Hours

7. Depending on which question you choose above, determine which is the dependent variable (y) and which is the independent variable (x)?
8. Depending on which question you choose above, plot a scatterplot to visually see the data (Print the scatterplot and turn it in with this investigation). Does the relationship appear to be linear? Are there any outliers? What are some possible explanations for why there could be outliers? Should you eliminate the outliers in your data set? Why or why not?
9. Depending on which question you choose above, estimate the least squares regression line for your downloaded data. To carry out this step, you may use any technology available to you in the classroom. For example, you may use Excel, a graphing calculator, or Fathom. Use whatever technology you typically use in your classroom.

$$\hat{Y} = \underline{\hspace{2cm}} X + \underline{\hspace{2cm}}$$

- Interpret the slope (b) in the context of the question.
 - Interpret the y-intercept (a) in the context of the question.
 - Interpret the correlation coefficient (r) in the context of the question.
10. Create a residual scatterplot of the data. Does it appear to provide appropriate conditions in order to accept the L.S.R.L. and linear model?
11. What does r^2 represent? Calculate r^2 and define it in terms of your scatterplot.