Estimating Dates - Civil Rights

Author: This activity was developed by Semra Kilic-Bahi and it is based on another activity developed by Alicia Seville and Kay Somers in Quantitative Reasoning.

Overview: In this activity, we first estimate the dates of some major events in civil rights history in US. Then we use scatter plots and linear equations to compare the estimations with actual dates. At the end of the activity we use correlation coefficients to determine the best overall estimate.

Context for Use: This activity can be used in any class where students have basic skills in using a spreadsheet. It takes almost an hour to complete the activity in class.

Quantitative Skills:

1. Identify dependent and independent variables
2. Describe the relationship between two quantitative variables by using
   - scatter plots
   - linear equations
   - regression lines
3. Interpret a correlation coefficient

Materials Needed: The students need access to a spreadsheet application. The instructor can provide students with correct dates or the students can search the internet to find the correct dates after they fill in their estimation.

Assessment: A pre and post test assessing the listed quantitative skills.
Main Activity
ESTIMATING DATES-CIVIL RIGHTS

Retrieve Estimate Dates_Civil Rights.xls file.

1. Fill in the “Estimated Year” column with your estimations of the dates for the listed events. Please do not use internet to find the correct answers. Copy and use Paste Special option to paste your data as an Excel Object here.

2. Wait for instructions to get the actual dates these events occurred. After you have the actual dates, create a scatterplot of the data with x representing “year event occurred” and y representing “estimated year event occurred.” Paste your graph here.

Instructions to Use Excel to Create a Scatterplot

a) To create a scatterplot of the x-y data with x representing “year event occurred” and y representing “estimated year event occurred,” select the two columns of data, including the labels. Go to the Insert tab and choose Scatter from the Charts group and click on the first type of graph.

b) Go to Chart Layouts and select a Layout type which lets you label your axes and enter a chart title.
3. Sketch the line $y=x$ on your graph. How do you determine from the graph if you overestimated more than you underestimated?

4. The regression line is used to show how a response variable changes as an explanatory variable changes. You can use such a line to predict the value of the response variable for a particular value of the explanatory variable. Use the following instructions to add a regression line, its equation, and R-squared value on the graph.

Instructions to Use Excel to Add a trendline to a scatterplot

<table>
<thead>
<tr>
<th>I.</th>
<th>To add a trendline, right click at one of the points on the scatterplot, and select “add Trendline” from the menu.</th>
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<tbody>
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<td>II.</td>
<td>In the trendline options menu, choose “Linear” for Trend/Resgression Type, and check the boxes next to “Display Equation on chart” and “display R-squared value on chart.” Then close the menu. Your equation and R-squared value will be displayed on your graph. You can click and drag the equation to any spot on the graph.</td>
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