Statistics 101L – Homework 1

Solution

Reading:  January 14 – January 18  Chapters 1, 2, & 3
         January 21 – January 25  Chapters 4

Assignment:

1) For each of the following situations answer the questions Who? and What? When answering the question What? be sure to indicate whether the variable is categorical (include categories) or quantitative (include units where appropriate).
   a) The proportion of registered voters in the U.S. who favor withdrawal of U.S. troops from Iraq.
      Who?  Adults in the U.S.
      What?  Answer to the question; “Do you feel that laws covering the sale of firearms should be made less strict?
              Categorical – Yes, No, Unsure
   b) The median assessed value of residential homes in the state of Iowa.
      Who?  Residential homes in Iowa.
      What?  Assessed value.
              Quantitative – $
   c) The average size of the high school graduating class for students attending Iowa State University.
      Who?  Students attending Iowa State University.
      What?  Size of high school graduating class.
              Quantitative – no units (count)
   d) The proportion of Stat 101 students (all sections) who live on campus.
      Who?  Students taking Stat 101
      What?  Answer to the question; “Do you live on campus?”
              Categorical – Yes, No, Unsure
   e) The average height of students in this section of Stat 101.
      Who?  Students in Stat 101, section L.
      What?  Height.
              Quantitative – centimeters or inches.
2) A sample of 327 students in grades 4 – 6 in selected schools in Michigan were asked the following question about their school goals, specifically “What would you most like to do at school?” The students could choose either “make good grades,” “be good at sports” or “be popular.” It was also noted whether the student was from a rural school or an urban school. A summary of how many students from each type of school and their answers to the question is given in the table below.

<table>
<thead>
<tr>
<th>What would you most like to do at school?</th>
<th>Grades</th>
<th>Popular</th>
<th>Sports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>57</td>
<td>50</td>
<td>42</td>
</tr>
<tr>
<td>Urban</td>
<td>103</td>
<td>49</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td>160</td>
<td>99</td>
<td>68</td>
</tr>
</tbody>
</table>

a) Answer the questions, Who? What? When? Where? Why? How? for these data. If the description does not indicate the answer to one of the questions indicate that you don’t know.

**Who?** Students in grades 4 – 6 in Michigan.

**What?** Answers to the question; “What would you most like to do at school?”

Categorical – Grades, Popular, Sports.

**Type of School**

Categorical – Rural, Urban

**When?** Don’t know because when the data were collected is not given in the description.

**Where?** Schools in Michigan.

**Why?** To learn about students’ goals.

**How?** Don’t know for sure but a questionnaire was probably used.

b) Combining rural and urban together, create an appropriately labeled bar chart for the percentage of students who answered the question “What would you most like to do at school?” What does the bar chart indicate about school goals for students in grades 4 – 6?

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<tr>
<td>Total</td>
<td>160</td>
<td>99</td>
<td>68</td>
<td>327</td>
</tr>
<tr>
<td>Percentage</td>
<td>48.9%</td>
<td>30.3%</td>
<td>20.8%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Almost 50% of the students say that they want to make good grades, while
30% say they want to be popular and only 20% say they want to be good at
sports.

c) Find row percentages for rural and urban schools. What do these percentages
indicate about the difference between rural and urban schools in terms of school
goals for students in grades 4 – 6?

Almost 60% of students from urban schools want to make good grades while
less that 40% of students from rural schools want to make good grades..
Only about 15% of students from urban schools want to be good at sports
while almost 30% of students from rural schools want to be good at sports.
About 30% of students, whether they are from urban or rural schools, want
to be popular. Therefore, one big difference between rural and urban
schools is that a much higher percentage of students from urban schools
want to make good grades. A second big difference is that a student from a
rural school is almost twice as likely “to want to be good at sports” than a
student from an urban school.
d) Create a graphical display of the row percentages you found in c).

e) **Extra Credit**: Use JMP to make a segmented bar chart (mosaic plot) that displays the percentages in c). Turn in the JMP output.

**Mosaic Plot**