

# Statistics Software Survey Results

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*The following survey was administered in October, 2004 to two business statistics classes (139 students in Stat 1100) who had been taught to produce basic displays and summaries using Excel. The identical survey, with the word “Excel” replaced by “Minitab” was administered to a general introductory statistics class (68 students in Stat 1000) who had been taught to produce the same displays and summaries using Minitab. All three classes were taught by the same lecture professor, Carl Bodenschatz, whose requirements and presentation were quite similar for those three classes.*

Do not write your name on this survey. Take it with you, complete it, and bring it back to our next lecture class. Then you will copy your responses onto the right side only of the Pearson NCS sheet (General Purpose questions 1 to 17) provided by your instructor. Leave blank the left-hand section on personal information. Hand in this survey, too, so that your additional comments can be recorded.

1. What introductory statistics course are you enrolled in? (a) 200 (b) 1000 (c) 1100
2. Excel is (a) very easy (b) fairly easy (c) fairly difficult (d) very difficult to **learn**.
3. After learning Excel, it is  
(a) very easy (b) fairly easy (c) fairly difficult (d) very difficult to **use**.
4. Using Excel, it is (a) very easy (b) fairly easy (c) fairly difficult (d) very difficult to obtain **histograms**.
5. Producing a **histogram** using Excel requires about how many steps?  
(a) 1 to 3 (b) 4 to 6 (c) 7 to 9 (d) 10 or more (e) don't know
6. Using Excel, it is (a) very easy (b) fairly easy (c) fairly difficult (d) very difficult to obtain **stem-and-leaf** displays.
7. Producing a **stem-and-leaf** display using Excel requires about how many steps?  
(a) 1 to 3 (b) 4 to 6 (c) 7 to 9 (d) 10 or more (e) don't know
8. Using Excel, it is (a) very easy (b) fairly easy (c) fairly difficult (d) very difficult to obtain **single** boxplots.
9. Producing a **single** boxplot using Excel requires about how many steps?  
(a) 1 to 3 (b) 4 to 6 (c) 7 to 9 (d) 10 or more (e) don't know
10. Using Excel, it is (a) very easy (b) fairly easy (c) fairly difficult (d) very difficult to obtain **side-by-side** boxplots,

11. Producing a **side-by-side** boxplot using Excel requires about how many steps?  
(a) 1 to 3 (b) 4 to 6 (c) 7 to 9 (d) 10 or more (e) don't know
12. Using Excel, it is (a) very easy (b) fairly easy (c) fairly difficult (d) very difficult to obtain **scatterplots**.
13. Producing a **scatterplot** using Excel requires about how many steps?  
(a) 1 to 3 (b) 4 to 6 (c) 7 to 9 (d) 10 or more (e) don't know
14. Using Excel, it is (a) very easy (b) fairly easy (c) fairly difficult (d) very difficult to obtain **summaries** such as Five Number Summary, mean, and standard deviation.
15. Obtaining all of the above **summaries** (Five Number Summary, mean, and standard deviation) using Excel requires about how many steps?  
(a) 1 to 3 (b) 4 to 6 (c) 7 to 9 (d) 10 or more (e) don't know
16. In general, Excel makes it  
(a) much easier (b) somewhat easier (c) somewhat more difficult (d) much more difficult to learn **Statistics**.
17. Should Excel be used again for teaching this course?  
(a) definitely yes (b) probably yes (c) not sure (d) probably no (e) definitely no

### **Additional Comments About Software Used in this Course:**

*(compiled on separate sheets)*

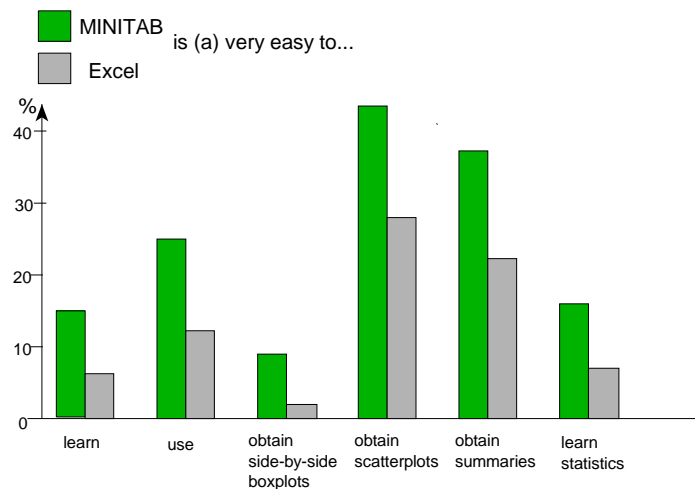
## Statistical Comparison of Above Survey's Results

Question #1 was for identification purposes only.

Of the remaining questions, #2, #3, #4, #6, #8, #10, #12, #14, and #16 all required students to rate the software as being (a) very easy (b) fairly easy (c) fairly difficult (d) very difficult to learn, or to use, or to produce specific displays/summaries, or to learn statistics. The sample proportions rating MINITAB as being (a) *very easy* were higher than those rating Excel as being very easy for all but #6 (stemplots), for which the sample proportions were equal. The table below summarizes all statistically significant results, and the bar graph displays them.

Question	_____very easy to...	% for MINITAB	% for Excel	1-sided p-value
#2	learn	15%	6%	.043
#3	use	25%	12%	.016
#10	obtain side-by-side boxplots	9%	2%	.034*
#12	obtain scatterplots	44%	28%	.012
#14	obtain summaries	37%	22%	.017
#16	learn statistics	16%	7%	.036

\*Caution: sample sizes should have been larger to justify use of a normal approximation.

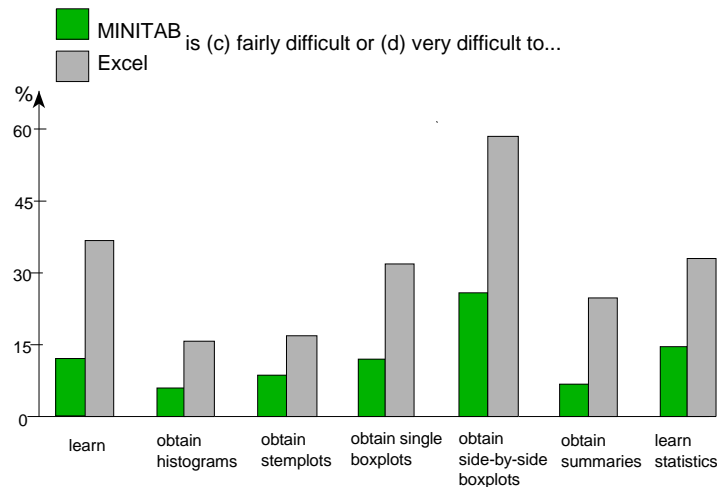


Typically, at least twice as many students found MINITAB to be very easy compared to the percentage for Excel.

For a different look at these questions, a comparison was made with regards to proportions of students responding (c) fairly difficult or (d) very difficult. The sample proportions rating Excel as being *fairly difficult* or *very difficult* were higher than those rating MINITAB as being fairly or very difficult for all of these questions. The table below summarizes all statistically significant results, and the bar graph displays them.

Question	_____fairly/very difficult to...	% for MINITAB	% for Excel	1-sided p-value
#2	learn	12%	37%	.000
#4	obtain histograms	6%	16%	.009*
#6	obtain stemplots	9%	17%	.034
#8	obtain single boxplots	12%	32%	.000
#10	obtain side-by-side boxplots	26%	58%	.000
#14	obtain summaries	7%	25%	.000
#16	learn statistics	15%	33%	.001

\*Caution: sample sizes should have been larger to justify use of a normal approximation.

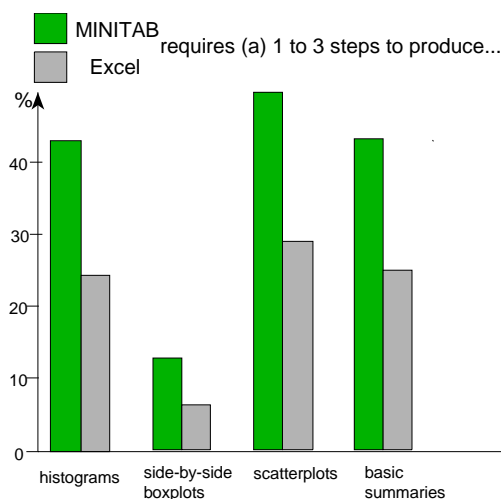


Typically, at least twice as many students found Excel to be difficult compared to the percentage for MINITAB.

Questions #5, #7, #9, #11, #13, #15 asked students how many steps were needed to produce histogram/stemplot/single boxplot/side-by-side boxplot/scatterplot/summaries. The options were (a) 1 to 3 (b) 4 to 6 (c) 7 to 9 (d) 10 or more (e) don't know.

The sample proportions reporting MINITAB to require only *1 to 3 steps* were higher than those reporting Excel to require only 1 to 3 steps for all but #7 (stemplot), for which the sample proportion was slightly higher for Excel (36% vs. 35%) but certainly not significant. The table below summarizes all statistically significant results, and the bar graph displays them.

Question	_____requires 1 to 3 steps to...	% for MINITAB	% for Excel	1-sided p-value
#5	produce histogram	43%	24%	.005
#11	produce side-by-side boxplot	13%	6%	.050
#13	produce scatterplot	50%	29%	.002
#15	obtain summaries	43%	25%	.007



In conclusion, most of the differences in proportions of favorable ratings were statistically significant, and all of these significant differences favored MINITAB over Excel. In spite of the overwhelming evidence of MINITAB's relative ease when compared to Excel, there was no statistically significant difference in proportions responding definitely or probably yes to the last question (#17), as to whether MINITAB/Excel should be used again to teach the course. The instructor, Dr. Bodenschatz, had a strong sense of the students in the business course being somewhat prejudiced in favor of Excel; when asked to comment on the use of software, several business students pointed out the advantages of Excel because of its near-universal availability and prevalence in other contexts outside of their statistics class. The other frequent comment was the expression of a need for more instruction in the use of Excel. The fact that MINITAB students did not express this need suggests to me that MINITAB is more self-explanatory than Excel.