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Learning Statistics: Tradition vs. Technology

Your global future begins here

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Introduction

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- **Implementing Technology as a Tool**
  (Books with CDs, Internet, video conferencing,…..)

- **Undergraduate and Graduate students:**
  - **Data Analysis**
    (Projects, Thesis,…)

- **Nowadays : Implementing Technology as a System?!!**
  (Social Sciences Fields)

- **Type of Technology: PowerPoints , Software, Internet---**

Literature Review

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PowerPoints

- **Improve the attitude of learners** ***(Hossein et al. ,2005).***
- **No effect on students' performance during exams** ***(Hossein,2008).***
- **Have a strong positive impact on learning** ***(Savoy et al., 2009).***

Literature Review

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Software *(Continued)*

- Comparison investigation between computer supervision and old-style teaching ***(Clark, 1983)***
  - Both are effective but it is based on the techniques they are used.
- Supported Clark's conclusion ***(Dynarski et al., 2007 & Kulik 2003)***
  - Variances in the technique
- Center for Educational Research (CER) ***(NAEYC & Fred Rogers Center, 2012).***
  - Individual capabilities of learners are rather expressed through computers than instructions performed by instructors themselves
- Professor Andy Tomarken teaches his statistics courses in a computer lab ***(Ellen, 2016)***
  - Old-style lecture vs software: Clarify abstractness ➡ Grasp

Literature Review

(Continued)

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Internet

- Internet required from instructors to learn more and follow their updates ***(Mary, 2013).***
- Professor Margaret Smithey prepare multi-media lecture presentations comprising clips downloaded through the Internet ***(Ellen, 2016).***
- Nowadays, bigger awareness in online learning. ***(Chris, 2016).***
  - Math subject came in the first place
  - Foreign language came in second place
  - Science came in the third place

Case Study 1

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- **Is there a significant difference between the proportion of men and the proportion of women who will vote Yes on Proposition A ?**

  - **In a random sample, 36 of 72 men and 31 of 50 women indicated they would vote Yes.**

  - **Test at 0.05 level of significance**

Case Study I

(Continued)

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- The hypothesis test is:

$H_0: \pi_1 - \pi_2 = 0$ (the two proportions are equal)

$H_A: \pi_1 - \pi_2 \neq 0$ (there is a significant difference between proportions)

- The sample proportions are:
  - Men: $p_1 = 36/72 = .50$
  - Women: $p_2 = 31/50 = .62$
- The pooled estimate for the overall proportion is:

$$\bar{p} = \frac{x_1 + x_2}{n_1 + n_2} = \frac{36 + 31}{72 + 50} = \frac{67}{122} = .549$$

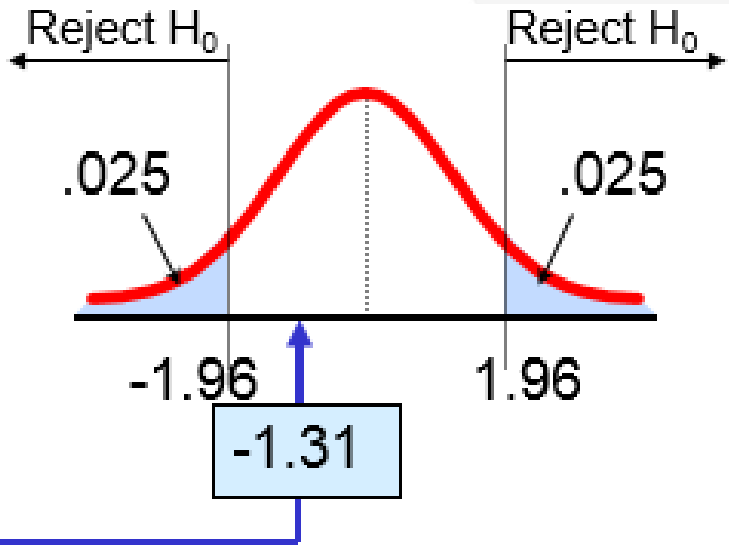
Case Study I

(Continued)

The test statistic for $\pi_1 - \pi_2$ is:

$$z = \frac{(p_1 - p_2) - (\pi_1 - \pi_2)}{\sqrt{\bar{p}(1-\bar{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

$$= \frac{(.50 - .62) - (0)}{\sqrt{.549(1-.549)\left(\frac{1}{72} + \frac{1}{50}\right)}} = -1.31$$

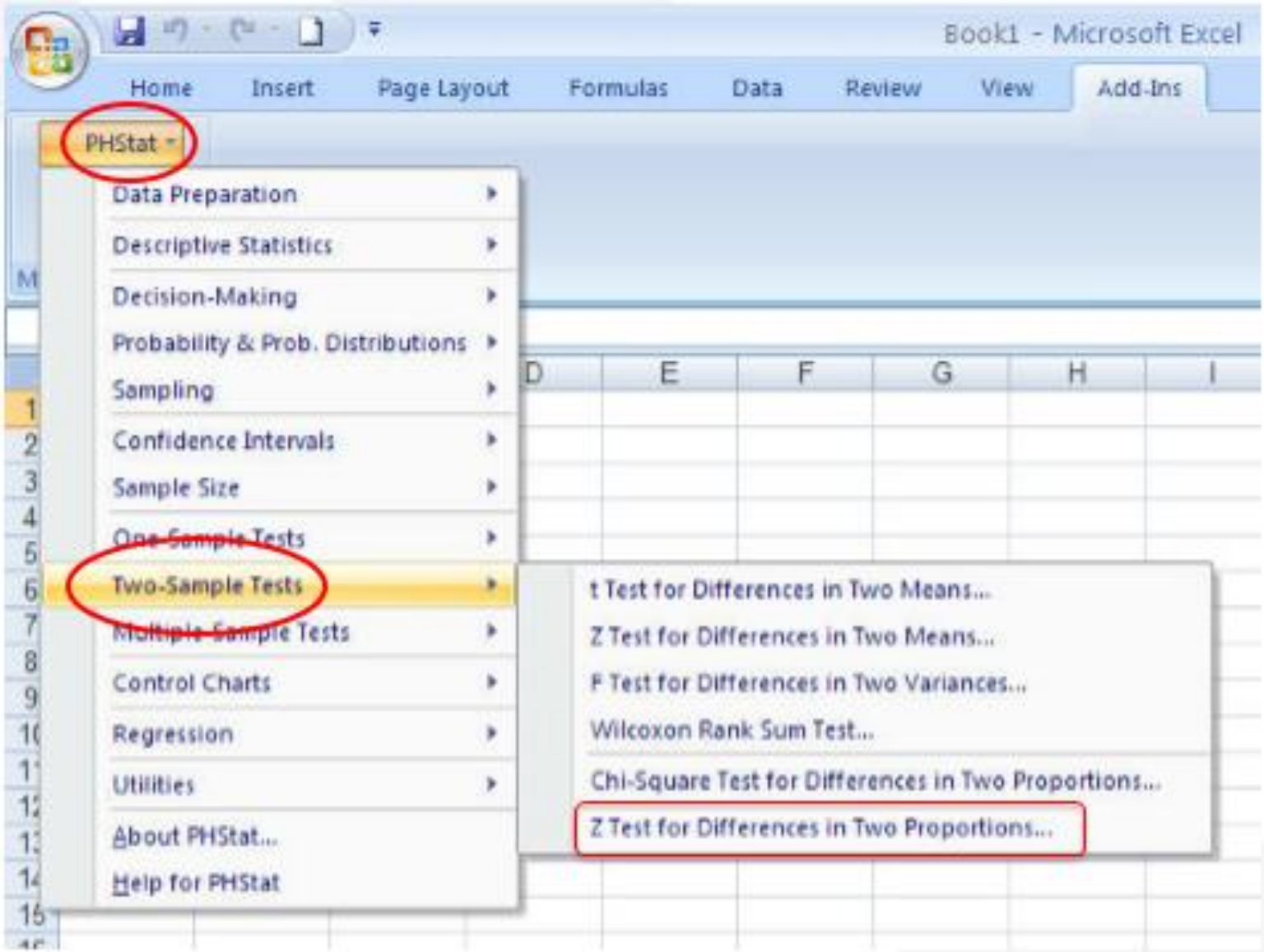


Critical Values = ±1.96
For α = .05

Decision: Do not reject H_0

Conclusion: There is not significant evidence of a difference in the proportion who will vote yes between men and women.

Case Study I "Using Technology ”



Case Study I "Using Technology "

(Continued

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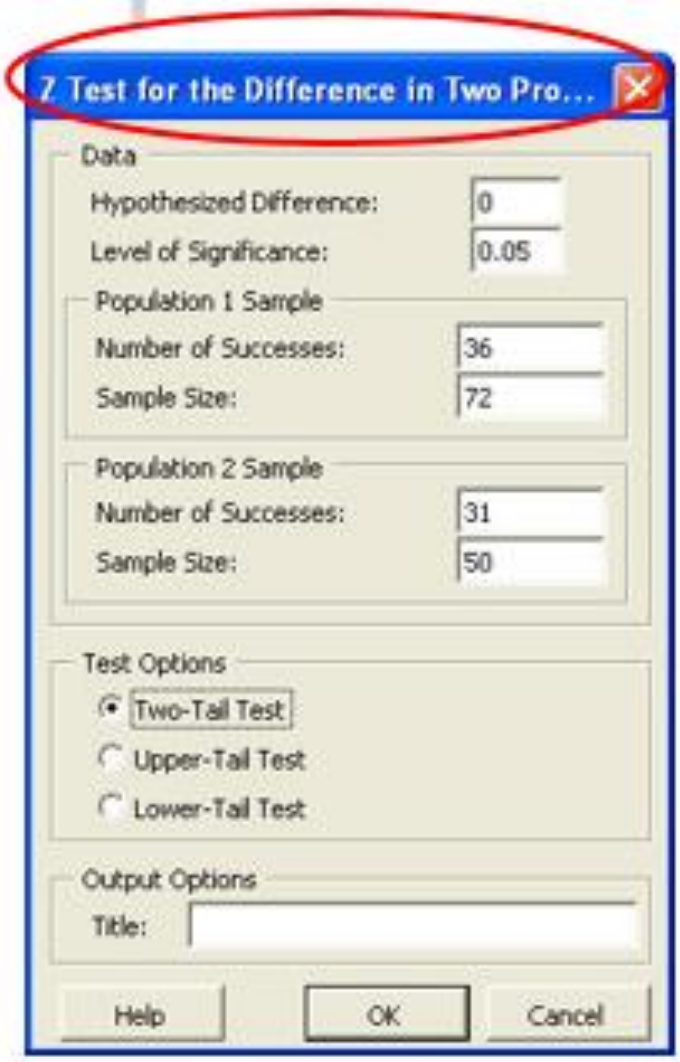

	A	B
1	Z Test for Differences in Two Proportions	
2		
3	Data	
4	Hypothesized Difference	0
5	Level of Significance	0.05
6	Group 1	
7	Number of Successes	36
8	Sample Size	72
9	Group 2	
10	Number of Successes	31
11	Sample Size	50
12		
13	Intermediate Calculations	
14	Group 1 Proportion	0.5
15	Group 2 Proportion	0.62
16	Difference in Two Proportions	-0.12
17	Average Proportion	0.549180328
18	Z Test Statistic	-1.310067478
19		
20	Two-Tail Test	
21	Lower Critical Value	-1.959963985
22	Upper Critical Value	1.959963985
23	p-Value	0.190173009
24	Do not reject the null hypothesis	

Input

Output

Case Study II

(Continued)

- A real estate agent wishes to study the descriptive statistics of selling price of a house in a certain region.
- A random sample of 10 houses is selected.

House Price in $1000s
245
312
279
308
199
219
405
324
319
255

Case Study II

(Continued)

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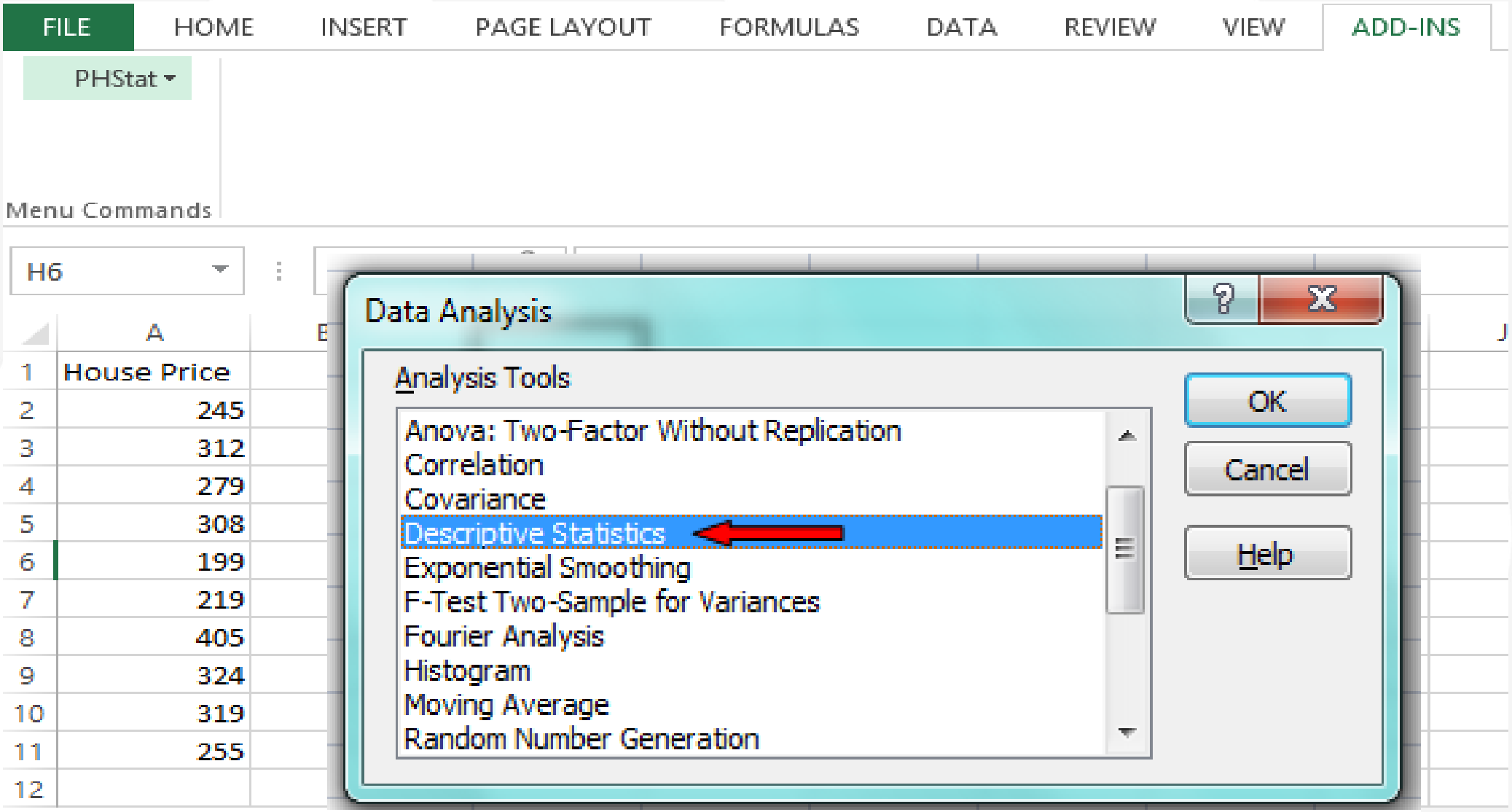
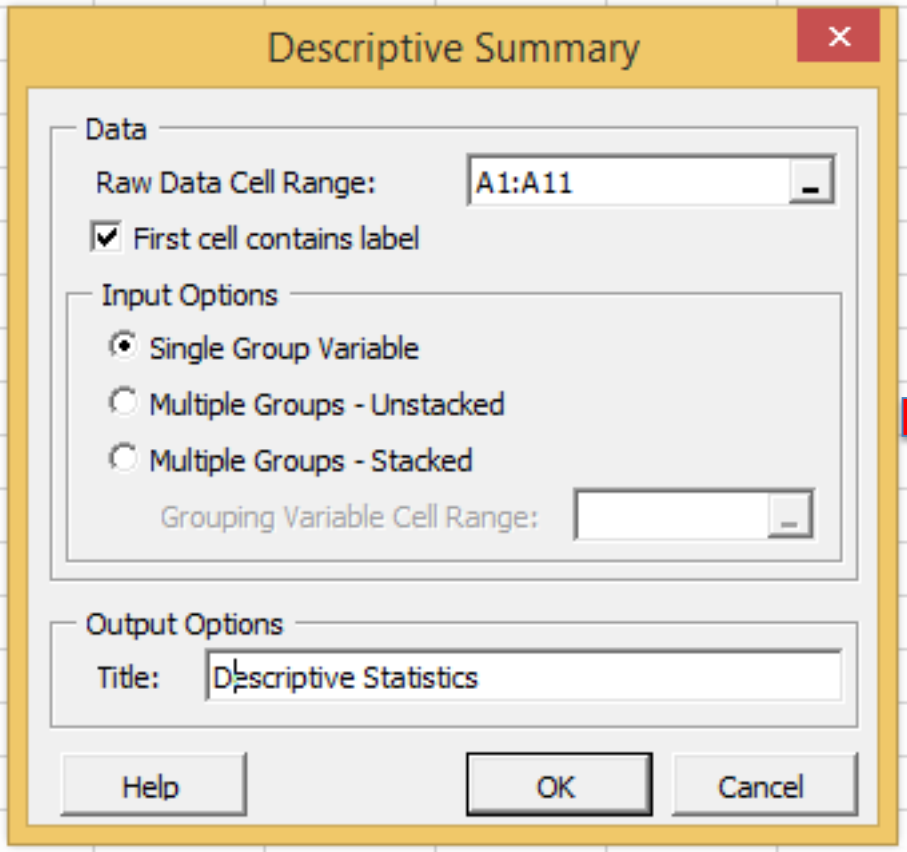


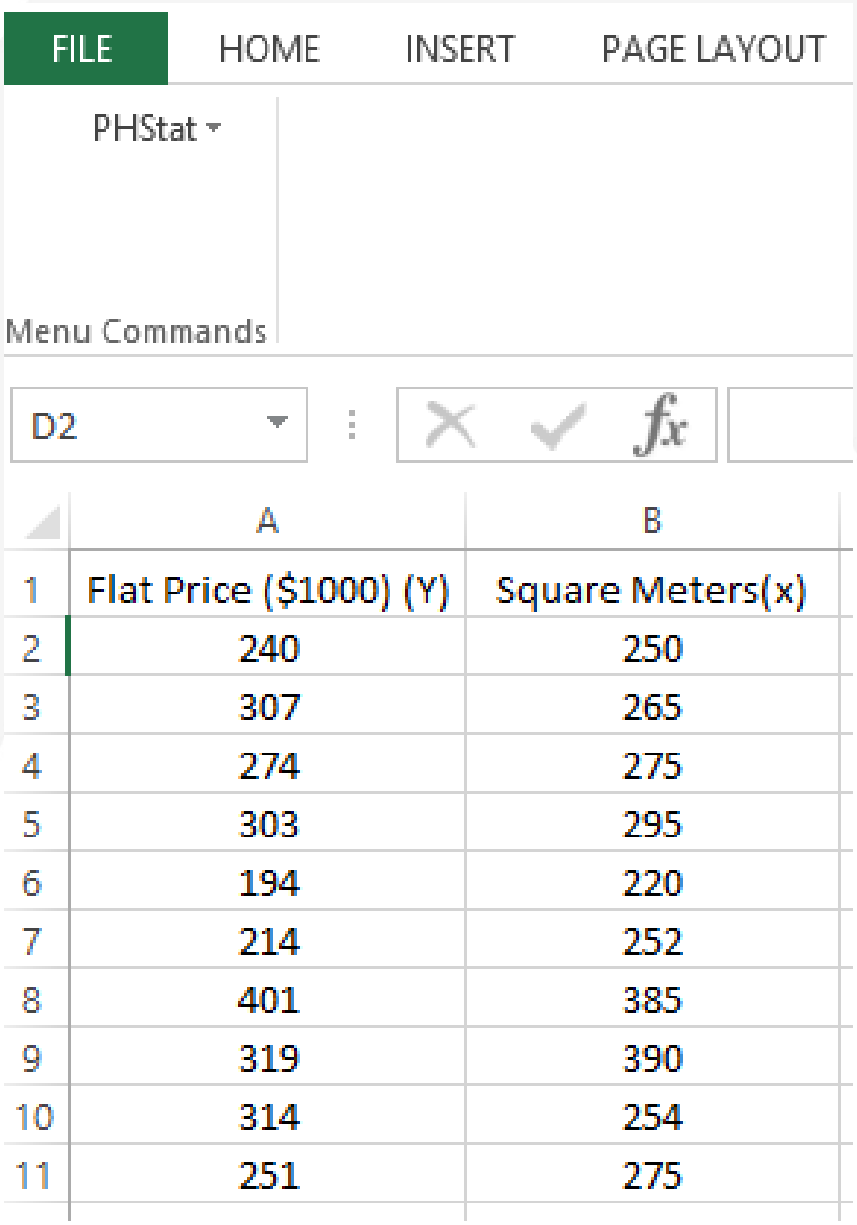
Case Study II

(Continued)

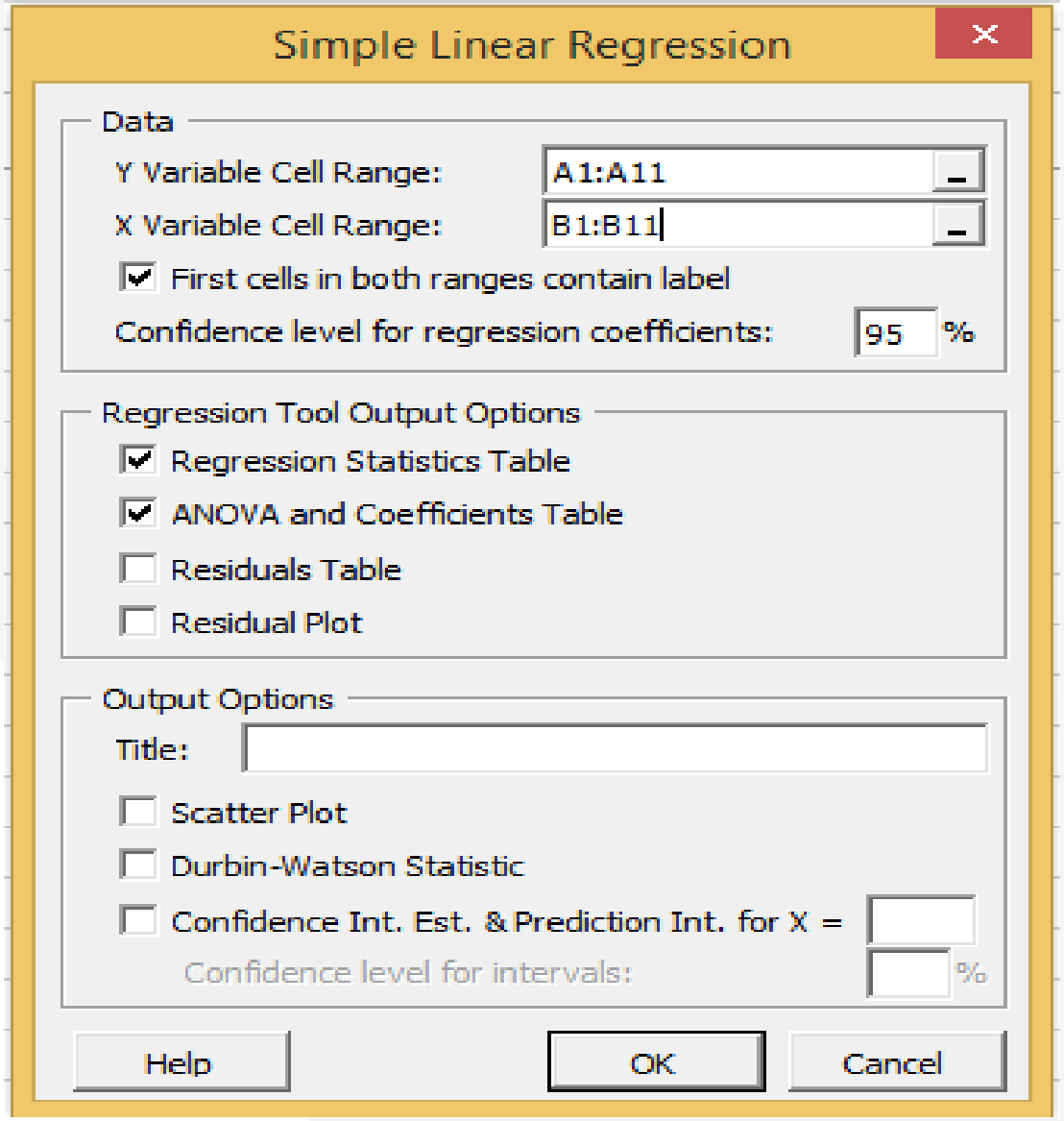


	A	B
1	**Descriptive Statistics**	
2		
3		**House Price**
4	**Mean**	286.5
5	**Median**	293.5
6	**Mode**	#N/A
7	**Minimum**	199
8	**Maximum**	405
9	**Range**	206
10	**Variance**	3622.2778
11	**Standard Deviation**	60.1854
12	**Coeff. of Variation**	21.01%
13	**Skewness**	0.4440
14	**Kurtosis**	0.3889
15	**Count**	10
16	**Standard Error**	19.0323
17		

Case Study III



	A	B
1	Flat Price ($1000) (Y)	Square Meters(x)
2	240	250
3	307	265
4	274	275
5	303	295
6	194	220
7	214	252
8	401	385
9	319	390
10	314	254
11	251	275



Case Study III

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	A	B	C	D	E	F	G	H	I
1	**Simple Linear Regression Analysis**								
2									
3	*Regression Statistics*								
4	Multiple R	0.7863							
5	R Square	0.6182							
6	Adjusted R Square	0.5705							
7	Standard Error	39.5480							
8	Observations	10							
9									
10	**ANOVA**								
11		*df*	*SS*	*MS*	*F*	*Significance F*			
12	Regression	1	20263.7704	20263.7704	12.9560	0.0070			
13	Residual	8	12512.3296	1564.0412					
14	Total	9	32776.1000						
15									
16		*Coefficients*	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95%*	*Upper 95%*
17	Intercept	43.4183	67.3704	0.6445	0.5373	-111.9382	198.7748	-111.9382	198.77483
18	Square Meters(x)	0.8329	0.2314	3.5994	0.0070	0.2993	1.3664	0.2993	1.36644

Conclusion

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- Technology in learning statistics becomes essential
- Technology should be used as a system not only as a tool
- The use of technology in statistics helps students' researchers
- The use of technology in learning statistics makes it comprehensive rather than theoretical.
- The use of technology in statistics would be very effective if the faculty believe in it.
- The use of technology would encourage self learning

References

- Ellen,M.(2016).How Technology Enhances Teaching and Learning. CFT'snewsletter, Teaching Forum. Retrieved from https://cft.vanderbilt.edu/...teaching.../how-technology-
- Hossein, N. and Abdus, S. (2005). The Effect of PowerPoint Presentations on Student Learning and Attitudes. Global Perspectives on Accounting Education. Volume 2, 2005, 53-73.
- Hossein, N. and Abdus, S. (2008). The Effects of PowerPoint Lecture Notes on Student Performance and Attitudes. The Accounting Educator's Journal. Volume XVIII 2008, 103 -117 .
- Maryellen, W. (2012). Does PowerPoint Help or Hinder Learning? Faculty Focus: Higher ED Teaching Strategies from Magna Publications. Retrieved from www.facultyfocus.com.
- Savoy, A., Proctor, R. & Salvendy, G. (2009). Information retention from PowerPoint traditional lecture. Computers and Education, 52,858867 http://dx.doi.org/10.1016/j.compedu.2008.12.005

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THANK YOU