Assessing Projects' Implementation: Statistics Technology to Say "Should it Stay or Should it go?"

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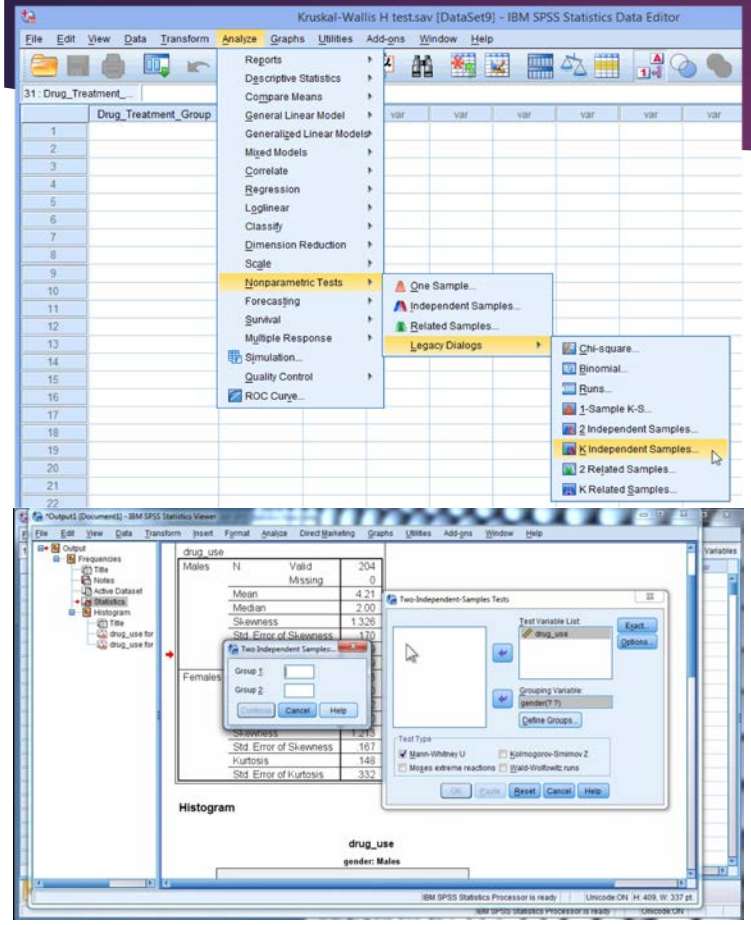
Abstract

- Accurate assessment of a project's success or failure is crucial in whether the project should be continued and funded.
- Quantitative tools for most DNP's in the workplace are challenging to use and produce output that is difficult for DNPs to understand.
- Too many DNPs don't know which quantitative methods to use, how to assess assumptions, or how to correctly interpret analyses. Students historically have difficulty performing and interpreting statistical analyses, and an inability to effectively navigate traditional statistical software.
- Given the importance of statistics and the need to use quantitative skills in practice, developing, employing, and testing new statistics technology in the service of competent, data-literate students and DNP practitioner-researchers is required.

The Problem

- DNP's are expected to make changes in various healthcare systems using information backed by data.
- For example, assessing the effectiveness of an program often requires quantitative analyses.
- The tools to conduct data analyses and interpret the findings are difficult for nurse researchers.
- The common tool is SPSS.

Confusing to Navigate



Difficult to Interpret

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.881[a]	.777	.769	.0505679

a. Predictors: (Constant), TEMP, XST, YST2, XSTYST, DO

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.378	5	.276	107.812	.000[a]
	Residual	.396	155	.003		
	Total	1.775	160			

a. Predictors: (Constant), TEMP, XST, YST2, XSTYST, DO

b. Dependent Variable: PH

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	6.294	.132		47.622	.000					
	DO	.135	.009	.974	15.355	.000	.536	.777	.583	.358	2.795
	XSTYST	-.036	.008	-.211	-4.623	.000	.088	-.348	-.175	.691	1.447
	YST2	-.033	.004	-.337	-7.748	.000	-.430	-.528	-.294	.763	1.310
	XST	-.042	.006	-.396	-7.159	.000	.235	-.498	-.272	.471	2.121
	TEMP	.060	.004	.668	15.928	.000	.331	.788	.605	.819	1.220

a. Dependent Variable: PH

Compare the Output

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Results. The results of the linear regression model were significant, $F(2,147) = 5293.04$, $p < .001$, $R^2 = 0.99$, indicating that approximately 99% of the variance in Reading1 is explainable by Reading2 and Reading3. Reading2 significantly predicted Reading1, $B = 0.98$, $t(147) = 13.90$, $p < .001$. This indicates that on average, a one-unit increase of Reading2 will increase the value of Reading1 by 0.98 units. Reading3 did not significantly predict Reading1, $B = 0.00$, $t(147) = 0.01$, $p = .992$. Based on this sample, a one-unit increase in Reading3 does not have a significant effect on Reading1. Table 4 summarizes the results of the regression model.

Table 4

Results for Linear Regression with Reading2 and Reading3 predicting Reading1

Variable	*B*	*SE*	95% CI	β	*t*	*p*
(Intercept)	0.61	0.83	[-1.02, 2.25]	0.00	0.74	.458
Reading2	0.98	0.07	[0.84, 1.12]	0.99	13.90	< .001
Reading3	0.00	0.07	[-0.14, 0.14]	0.00	0.01	.992

Note. Results: $F(2,147) = 5293.04$, $p < .001$, $R^2 = 0.99$
Unstandardized Regression Equation: Reading1 = 0.61 + 0.98*Reading2 + 0.00*Reading3

Test Differences in Statistics Packages

An independent usability research lab in Southern California tested graduate students using SPSS verses Intellectus Statistics on Usability, Ease of use, Usefulness, and Software preference dimensions.

Research Questions

Research question 1: Is there a difference in the Perceived Usability by software (SPSS vs. Intellectus)?

Research question 2: Is there a difference in Ease of Use by software (SPSS vs. Intellectus)?

Research question 3: Is there a difference in Usefulness by software (SPSS vs. Intellectus)?

Research question 4: Describe the preference of the statistical software on a continuum from Intellectus (=1) to SPSS (=7)

Methodology

Participants

- The participants were 12 graduate students from a Southern California University who had taken one semester in statistics using SPSS.
- Each participant spent approximately 90 minutes in testing under the constant supervision of a research assistant.

Materials

- Participants were given both SPSS and Intellectus Statistics program to conduct analyses as well as instructions to conduct several tasks.
- Participants were also given outcome items (an adapted Technology Acceptance Model scale) to rate the Usability of the software, Perceived Ease of Use, Accuracy, Perceived usefulness, and Preference of the software.

Procedure

- Students were given a 2-minute video of Intellectus Statistics to orient them to the Intellectus program. (Students has previously taken a 16-week course in SPSS, so no SPSS training was provided).
- Students were then asked to perform several tasks (counter-balanced) in both SPSS and Intellectus including entering data, creating composite scores, creating a histogram, conducting descriptive statistics, conducting a t-test and a regression.

Data Analysis Plan

The data plan was to conduct three ANOVA's on the DV's by condition (SPSS vs. IS) to examine the first three research questions. Research question 4 was examined descriptively.

Results

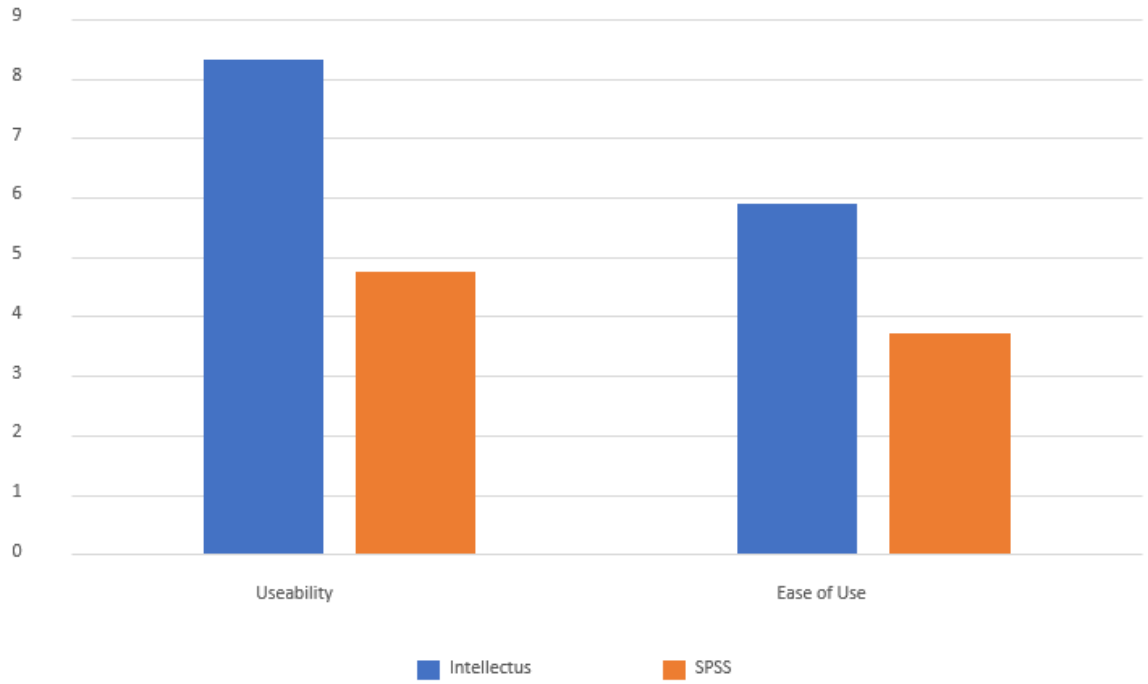
Research Question 1

An ANOVA was conducted where participants indicated that IS was more Usable compared to SPSS, $F(1,11) = 28.29$, $p < .001$, $\eta^2_p = 0.65$. The mean Usability of Intellectus ($M=83.33$) was statistically greater than the mean Usability of SPSS ($M=47.5$; Figure 1).

Research Question 2

An ANOVA was conducted where participants indicated that IS was Easier to Use compared to SPSS, $F(1,11) = 29.93$, $p < .001$, $\eta^2_p = 0.64$. The mean Ease of Use of Intellectus ($M=5.88$) was statistically greater than the mean Ease of Use of SPSS ($M=3.77$; Figure 1).

Figure 1. Measures Comparing Intellectus Statistics to SPSS



Research Question 3

An ANOVA indicated that participants had no difference in Usefulness by program, $F(1,11) = 1.80$, $p = .21$. The mean Usefulness of Intellectus ($M=5.60$), while greater, was statistically similar to the mean Usefulness of SPSS ($M=5.06$).

Research Question 4

Participants indicated a mean of 2.75 on the software preference scale (IS = 1 to SPSS = 7; Figure 2).

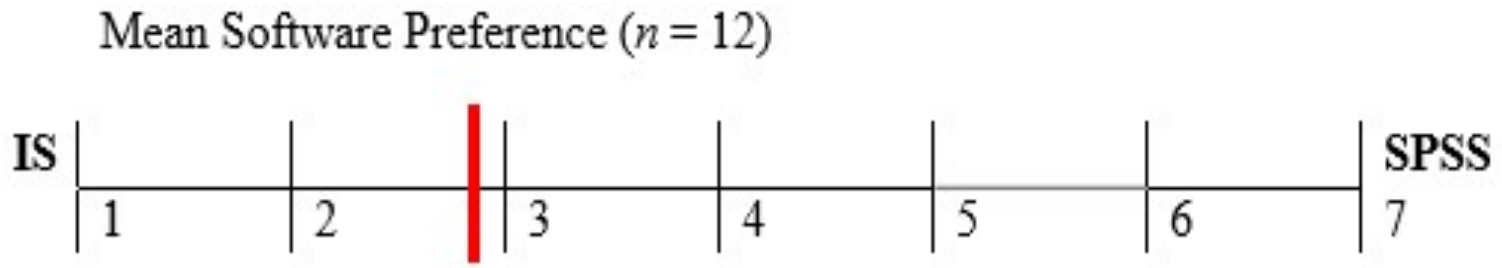


Figure 2. Mean Software Preference

Discussion

- In this study, Intellectus Statistics, compared to SPSS, showed statistically greater scores on Usability and Ease of Use, while there was not difference on Usefulness.
- Participants showed a preference for using Intellectus compared to SPSS. In helping students to conduct and interpret data, students' comfort in using Intellectus was 50%-75% more useable and easier to use than SPSS.

Discussion

- Intellectus was the preferred statistical application. Given these findings, combined with just a 2-minute training video, data skills of researchers and students should be greatly enhanced by using Intellectus Statistics.

Conclusion

- Data driven decisions are here to stay
- Tools need to be useable to make such decisions
- Better tools will help researchers and students evaluate their projects and programs.

References

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