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Subjective Evaluation of Data Checking Techniques

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ABSTRACT

The aim of this research was to analyze people’s subjective opinions about the data checking techniques double entry, visual checking, and read aloud. Previous research has shown that entering data twice is more effective in reducing the data entry errors. Thus, the research aims to hypothesize that participants would perceive the double entry technique as most accurate and reliable. A total of forty-eight undergraduate students answered a set of 16 items which were used to gather participants’ opinions on the three techniques. The results showed that the double entry technique was perceived as significantly more accurate ($F(2, 47) = 5.734, p = .006$) and reliable ($F(2, 47) = 7.91, p = .001$). No other technique received better ratings than double entry on any of the other items. Based on our results and the information found by previous research, we recommend that researchers use the double entry technique to check data.

INTRODUCTION

The purpose of the research is to distinguish between double entry, visual checking, and read aloud data checking techniques by considering people’s opinions about each one. In general, these three data checking techniques are used to ensure that errors found in the data are reduced drastically so that in the long-run results based on the data used are as accurate as possible.

LITERATURE REVIEW

Research data helps to examine many issues in life, and assists in determining whether certain hypotheses are correct. When data is not correct, one’s conclusions can be affected drastically (Burchinal & Neebe, 2006). With just one data entry error, a significant t-test or correlation can be made non-significant (Barchard, Scott, Weintraub, & Pace, 2008). Therefore, it is imperative that we check data in the most efficient way possible.

For a data checking technique to be the most efficient, it needs to be both accurate and user-friendly. A particular technique may be ignored because of the discomfort it causes the user, even if that technique is the most effective in reducing errors. If researchers do not like or do not have faith in a certain technique, then they probably will not use it. Therefore, it is important to consider what people think about the techniques, so that we understand what they prefer and what they do not prefer.

Among the three techniques being discussed, the visual checking technique results in more errors than the double entry and read aloud techniques (Verenikina, Anang, Jenkin, Grob & Barchard, 2012; Scott, Thompson, Wright-Thomas, Xu & Barchard, 2008). In fact, visual checking doesn’t even reduce more errors than single entry (Barchard et al., 2008) which takes place when researchers enter data a single time, without checking the data afterwards to make sure it is correct. This means that visual checking may not be appropriate use and may waste time and resources.

The research took into consideration people’s opinions about the three data checking techniques double entry, visual checking, and read aloud. The initial hypotheses, which stemmed from both previous research and experience with data checking will be including in the research. The researcher’s hypothesized that participants who use the double entry technique would perceive the technique as the most accurate and reliable.

METHODOLOGY

Participants

A total of 48 participants (26 females and 22 males) participated in this study for course credit. Their ages ranged from 18 to 39 (mean 22, standard deviation 5.26). The participants included African American (12.50%), Asian (22.92%), Caucasian (41.67%), Hispanic (14.58%), Pacific Islander (6.25%), and Other (2.08%).

Measures

This study used a self-report questionnaire that includes 16 items. Each of the items is measured on a 5-point Likert scale, which ranges from (1) “Strongly Disagree” to (5) “Strongly Agree.”

Procedure

The participants used the computer for the entire study. First, they watched a video that explained how to use Excel. Second, they were randomly assigned to a technique. Third, they watched a video that explained how to use the particular technique. Fourth, the participants were then given a set of data so they could practice their assigned technique. This set included five fake participants. After this, the participants checked data from twenty fake participants. Finally, after they completed checking the data, the participants were asked to complete the subjective evaluation of the technique they used. This evaluation took two to five minutes. See Figure 1.

Table 1
Means of Data Checking Techniques for the Evaluation Items

Means of Data Checking Techniques					
Items	Double Entry	Visual Checking	Read Aloud	F	p-value
Satisfying	4.00	3.69	3.30	1.60	.214
Comfortable	3.84	3.54	3.90	.33	.721
Pleasant	3.32	3.46	3.10	.27	.764
Relaxing	2.76	2.77	2.80	.01	.993
Accurate	4.28	3.62	3.10	5.73	.006
Enjoyable	2.88	3.08	2.60	.58	.564
Fun	2.56	2.77	2.30	.58	.566
Calming	2.92	2.92	2.90	.00	.998
Reliable	4.20	3.31	2.80	7.91	.001
Frustrating	3.64	3.15	3.80	.91	.411
Painful	3.76	3.54	4.20	.84	.437
Boring	2.32	2.31	2.10	.16	.855
Tedious	2.12	2.15	2.10	.01	.987
Uncomfortable	3.64	3.23	3.10	.75	.478
Annoying	3.32	2.38	2.90	3.07	.056
Depressing	4.00	3.92	4.40	.68	.512

Note. $df = 2, 45$

DATA ANALYSIS

To analysis the data, a one-way Analysis of Variance (ANOVA) was utilized. The dependent variables were the 16 items from the evaluation form. The independent variable was the group to which participants were assigned. This variable had three levels: double entry, visual checking, and read aloud.

RESULTS

- Participants rated double entry as significantly more accurate ($F(2, 47) = 5.734, p = .006$) and more reliable ($F(2, 47) = 7.91, p = .001$) than the other techniques. No other differences were significant. See Table 1
- Participants rated the double entry technique as satisfying and depressing, in addition to describing it as accurate and reliable.
- The read aloud technique was rated as painful and depressing.
- For the visual checking technique, none of the average ratings exceeded 4 on the 5-point scale.

DISCUSSION

Double entry was also described as satisfying and depressing. Participants may have rated this technique as satisfying because much effort is put into ensuring that errors are eliminated by checking the data a second time. However, because data has to be checked a second time, the double entry may be considered depressing because it involves so much time and energy. Visual checking had the highest average ratings for fun, enjoyable, and pleasant. These ratings for visual checking may be because this technique takes less time and therefore is less stressful to use.

The read aloud was rated as most painful and depressing. Some possible reasons why this technique had been rated as painful may be because of the speed at which the administrator was reading the items to the participant and how fast the participant was able to type the items. It could also be more frustrating and painful for individuals who do not enjoy interacting with others, or who prefer to work alone. Thus, our findings support our hypothesis which was that participants would perceive double entry as most accurate and reliable.

LIMITATIONS of the STUDY

The participants who completed the study were mainly young undergraduate students and may not have ever used any of the three data checking techniques. Participants may not be involved in any research and may not care about the importance of data or data checking. There is a chance that some of these participants may not have had enough computer training before participating in the study. The undergraduates take part in the study for only 1.5 credits.

FUTURE RESEARCH

Future research should explore whether age makes a difference in preference of data checking techniques. The study should be conducted using subjective opinions from actual researchers. Furthermore, future research may have to find another way to administer this study other than using a computer and should allow participants to have more time to adapt to the skills needed for this study before actually taking part in the study. Lastly, future research should consider what the participants consider to be the most important attribute of data checking techniques and should have each participants check the data using all three techniques.

CONCLUSIONS

Our study examined the subjective evaluation of participants who used the three data checking techniques double entry, read aloud and visual checking to correct errors in a data set. Based on the data we collected and analyzed, we concluded that the double entry technique is perceived to be the most accurate and reliable. These are the only significant results. However, data collection is ongoing and we expect additional differences between the techniques to emerge once we have a larger sample size. Because of our results and what past research has found, we recommend that researchers use the double entry technique to check data.

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