

Email Surveys: Additional Research Insights

Paul D. Hutchison, Ph.D., (Email: hutchp@cobaf.unt.edu), University Of North Texas
Gary M. Fleischman, Ph.D., CPA, CMA, (Email: gflash@uwoyo.edu), University Of Wyoming
Dena L. Johnson, Ph.D., CPA, CIA, (Email: djohnson@tarleton.edu), Tarleton State University

Abstract

With tremendous advances worldwide being made in communication and information technology like the Internet, researchers have begun to explore new tools for conducting research like email surveys. The purpose of the present study is to review the extant literature on email survey research and present initial findings about strengths and concerns. Additionally, this study seeks to present results of an experiment conducted by the authors that compares email and mail surveys to better understand low email response rates. Results suggest there is little difference between mail and email respondents in regards gender, degree, rank, and regional location, while there are differences for accounting systems faculty and employment by universities.

Introduction

Survey research has been a staple methodology used by academicians, firms, and others to address questions pertaining to social, behavioral, cognitive, psychological, or economic variables that relate to facts, opinions, beliefs, and/or attitudes and behavior of a target population. Further, there have been tremendous advances worldwide with communication and information technology. Today, it is estimated that over 70 million North American adults alone use the Internet (Weible and Wallace, 1998). With all of the foregoing in mind, researchers developed a new tool for conducting research, email surveys. To gain additional insights about the appropriateness of using email surveys, experiments have been conducted to ascertain their strengths and concerns.

The purpose of the present study is twofold. First, to review the extant literature on email survey research and present initial findings about

the applicability for this new research tool. Second, to present results of an experiment by the authors that compares email and mail surveys to better understand low email response rates.

Initial Findings

To date, there have been many studies which have examined the appropriateness of email survey research. Drawn from various studies, the authors seek to present some of the initial findings about email surveys. Incorporating factors suggested by Weible and Wallace (1999) and Mehta and Sivadas (1995), there are six important factors to consider when collecting data using email surveys: speed, response rates, cost, response bias, population breadth, and technical difficulty. As they pertain to email surveys, each of these factors will be presented and discussed.

Speed

Faster response times for email surveys according to Oppermann (1995) are one of the

Readers with comments or questions are encouraged to contact the authors via email.

most important advantages for using them. Compared to other research tools, email responses tend to be faster than anything except overnight phone surveys. Sproull (1986) used both email and mail surveys within a company, and email responses were returned twice as fast as mail responses. Additionally, Mehta and Sivadas (1995) surveyed Internet users who read one or more of the diverse Newsgroups on the Internet and received half of all email questionnaires within two to three days. Likewise, Hutchison et al. (1998) received an email response for their study within minutes of its release and the majority (57.4%) of their email responses in two days. In an effort to ascertain whether the rapid increase in computer technology and users, and prolific expansion of the Internet would increase email response rates, Bachmann et al. (1999) replicated their 1995 study (Bachmann et al. 1996). In their second study, they received 45% of their email responses the same day as the release of their survey, while the mean response time for both the 1995 (4.3 days) and 1998 studies (4.7 days) were very similar. Therefore, research suggests that on average, responses to email surveys will be returned in 4-8 days.

Response Rates

Research by Oppermann (1995) indicates that response rates of email surveys have ranged from 19% to 73% and are generally lower than mail surveys. Response rates have been examined and compared to mail surveys by researchers whose target subjects were internal and external stakeholders. Internally, Parker (1992) received a response rate twice the mail rate for a company survey, while Tse (1995) received a very low response rate (6%) when performing a company survey on a controversial subject. Externally, Schuldt and Totten (1994) surveyed university professors and received only a 20% response rate with a problematic survey. Similarly, Hutchison et al. (1998) surveyed accounting faculty in the United States and received only a 29.7% response rate, Hutchison and Fleischman (1998) surveyed tax professors and got a

24.0% response rate, while Bachmann et al. (1999) surveyed business leaders in higher education institutions and received a 15.2% response rate. One must conclude from these varied research studies that response rates for email surveys are conditioned on whether they are directed toward internal or external stakeholders, the need for confidentiality by respondents, and survey design and implementation.

Cost

Probably the most compelling advantage for using email surveys is cost. Weible and Wallace (1999) determined that their email survey cost \$0.01 compared to \$1.56 for a mail survey. Further, Hutchison et al. (1998) determined that their variable costs for email were negligible (\$0.00) compared to \$0.54 for a mail survey. Inclusive of all fixed and variable costs involved in preparing and conducting survey research, Weible and Wallace (1999) also suggest that mail surveys are three times as costly as email surveys. Since the Internet can be accessed for free, the cost to deliver and receive email surveys is markedly cheaper than mail surveys.

Response Bias

Another important factor to address is response bias, whether a particular person is more likely to respond to one type of survey than to another. Research involving email surveys in this area is very tentative. According to Kiesler and Sproull (1986) respondents to email surveys tend to be more candid and frank than those responding to mail surveys. Hutchison et al. (1998) also suggest that many recipients view email surveys as intrusive and an invasion of a private communication medium. Therefore, the subject matter to be surveyed and the issue of confidentiality need to be addressed before using email surveys.

Population Breadth

Another issue involving email surveys is population breadth. Palmquist and Stueve (1998) found that respondents for their email

survey tended to be younger and more affluent than phone surveys. Bachmann et al. (1996) also expressed concern that email surveys are practical only for a select population who have access to the Internet and whose email addresses are accessible. Interestingly, Dyson (1993) suggests that the email surveys are less likely to be screened by another person, thus providing the researcher with assurance they are receiving data from the desired subjects. Dependent on the issue surveyed, one must exercise caution when using email surveys and realize they are limited to a narrow target audience, computer users who have access to the Internet, and are not appropriate for reaching the "unplugged" populations like older homemakers, food service workers, etc.

Technical Difficulty

A final concern that must be addressed when using email surveys is technical difficulty. First, survey design is paramount to increasing response rates. A succinct introduction with purpose is appropriate. While some survey response means like Likert scales are difficult to respond to on a computer survey, open-ended responses can be easily employed (Bachmann et al., 1999). Second, someone conducting an email survey must have an understanding of computer systems and the Internet. Issues such as getting email addresses, how to transmit an email survey, correcting bad email addresses, and the workings of the Internet must be understood before using email surveys. Overall, survey design and implementation are key issues in receiving favorable response rates to email surveys.

Results of Exploratory Study

The authors are attributed with completing the first known research study in accounting research that compared email and mail surveys (Hutchison et al., 1998). Another study (Odom et al., 1998) further examined email and mail surveys and also included web-based surveys. Both studies concluded that the choice of distri-

bution and response modes have a significant impact on response rates.

Additionally, Odom et al. (1998) suggest that lack of individual capability and/or knowledge regarding electronic communication are likely reasons for low email response rates in their study. Therefore, to gain further insights into the issue of low response rates of email surveys, the authors have elected to examine their email/mail survey results on computer technology to see if there are significant respondent differences with regards to computer capability of accounting faculty.

Brief Background Information

In 1997, the authors conducted email and mail surveys of accounting professors in the United States in order to assess the general effectiveness of email surveys as a new research methodology tool and obtain generalized opinions about the effect of computer technology on accounting academicians. Using a systematic random sample and *Hasselback's 1996 Accounting Faculty Directory*, 200 persons were identified for the email survey and 200 persons were identified for the mail survey. A one-page survey was employed, and both surveys were released in close proximity of dates (see Appendix A). While response speed was quicker, response rates for the email survey were lower. Our study will now focus on a comparison of respondent results to gain some insight about email response rates from this target population.

Comparative Email Vs. Mail Survey Response Rate

Both the email and the mail survey reported reasonable response rates in excess of 25%. Out of the 195 surveys transmitted by email, there were 62 responses (31.8%). Of the 62 responses, 4 surveys gave no response. This left us with 58 usable email responses for an overall response rate of 29.7%. The traditional mail survey received 79 useable responses out of 200 surveys mailed for a response rate of 39.5%.

Table 1
Subject Responses to Survey Variables

| <u>Variable</u> | <u>Expected Email Vs. Mail Respondent Difference</u> |
|--|--|
| GENDER | There is no a priori reasoning to suggest a significant difference. |
| DEGREE | One would expect Ph.D.s to generally be more computer-oriented, which should lead to a higher percentage of Ph.D.s responding to the email survey versus the mail survey. |
| RANK | There is no a priori reasoning to suggest a significant difference. |
| REGION | There is no a priori reasoning to suggest a significant difference. |
| SYSTEM | One would expect that Accounting Systems professors would be more computer-oriented, which should lead to a higher percentage of Accounting Systems professors responding to the email survey versus the mail survey. |
| UNCOL | One would expect that university research requirements would generally lead university professors to be more computer-oriented than their college counterparts. This should cause a higher percentage of university professors to respond to the email survey versus the mail survey compared with college professors. |
| Q1 | One would expect that persons perceiving that computer technology has changed the way they do their job <i>most</i> would be more likely to respond to an email survey than to a mail survey. |
| Q2 | One would expect that persons that perceive that computer technology has affected their classroom delivery the <i>most</i> would be more likely to respond to an email survey than to a mail survey. |
| Q3 | One would expect that persons that perceive that computer technology has affected the way they conduct their research efforts the <i>most</i> would be more likely to respond to an email survey than to a mail survey. |
| Q4 | One would expect that the more hours per day that one spends on a computer, the more likely one would be to respond to an email survey than to a mail survey. |
| Q5 | One would expect that the more hours per day that one spends sending/receiving email or accessing the Internet, the more likely one would respond to an email survey than to a mail survey. |
| Q6 Variables: EM, WWW, WP, SS, PRES, STAT, DB & OTH | It is difficult to make an a priori statement regarding these variables in Question 6. The questionnaire asks respondents to choose the type of processing that they use the <i>most</i> from this <i>entire group</i> of computer technology sources. Unfortunately, the various respondents interpreted this question differently. |

Research Approach

The authors utilized both email and mail surveys pertaining to the same questionnaire in order to make direct comparisons of the two data gathering techniques. More specifically, the authors wanted to ascertain whether or not there were demographic differences between the email versus mail respondents. Further, there was interest regarding email versus mail respondent differences in computer expertise as well as preferred computer software packages.

Therefore, this study statistically compared the email versus mail responses associated with each primary variable in the short questionnaire to ascertain any significant differences. The authors also developed a priori expectations regarding many of the variables. We do not present formal hypotheses because this is an exploratory study with very little prior literature. Instead, Table 1 presents informal a priori expectations, where appropriate.

Research Method

The authors analyzed the differences in the email versus mail response data using triangular techniques and provide comparative email versus mail simple statistics in Tables 2 - 4 in order to orient the reader to the data. Then, the authors utilized both parametric and nonparametric tests to analyze the differences in the email versus mail responses for each variable. First, the authors chose the parametric *Pooled t Test* as well as the nonparametric *Wilcoxon Two-Sample Test* for analysis. Then, they used the *Wilcoxon One-Sided Normal Approximation* for those variables where the authors had a priori expectations, and incorporated the *Wilcoxon Two-Sided Normal Approximation* for the more exploratory variables where no obvious a priori expectations existed.

Discussion Of Statistical Results

There were no statistically significant differences in email versus mail surveys for the variables GENDER, RANK, and REGION (see Table 2). This was not surprising, since no prior literature suggests that persons with similar professional training should respond differently to alternative survey mediums based on these three variables. The authors also had no a priori expectations for these variables (see Table 1).

It was initially somewhat surprising that there was no statistically significant difference in the DEGREE variable. The authors expected that Ph.D.s would be more computer-oriented than lawyers. Unfortunately, only two lawyers responded to either questionnaire, so DEGREE was really only comparing Ph.D.s with persons holding masters degrees, for practical purposes.

As expected, the SYSTEM variable was significant and in the expected direction (see Table 2). The t-value was 1.74 (Pr. > t = .0837 where alpha = .10) and the *Wilcoxon One-Sided Normal Approximation Z* was 1.7263 (Pr. < Z = .0421). It is not surprising that Accounting Systems professors have a higher response rate

to email surveys versus traditional mail surveys. The SYSTEM mean response was .2241 for the email survey, but only .1139 for the mail survey.

The *Wilcoxon One-Sided Normal Approximation* (Z = 1.2583, Pr. < Z = .1041) was marginally significant for the UNCOL variable, and in the projected direction. The authors expected that university research requirements would generally guide university professors to be more computer-oriented than their college counterparts. This increased computer orientation should lead to a higher percentage of university professors responding to email surveys versus mail surveys.

The *Wilcoxon One-Sided Normal Approximation* also indicated that the Q1 variable was significant (Z = 1.3805, Pr. < Z = .0837) (see Table 3). The variable ascertains whether computer technology changed the way respondents do their job. The authors expected that persons perceiving that computer technology had changed the way they do their job *most* would be more likely to respond to an email survey than to a mail survey.

The Q2 variable was very similar to Q1, except it queried respondents regarding the impact information technology had on actual classroom delivery. Results indicate that there was no significant difference in response for Q2 among the email versus mail respondents.

The Q3 variable asks respondents whether computer technology affects the way they conduct research. Results suggest that both email and mail respondents perceive that technology has had a substantial impact on their research (email mean = 2.3445; mail mean = 2.2151). These means are not significantly different between the two groups, however.

The Q4 variable measures approximately how many hours per day the respondent spends working on their computer. The study reports that email respondents spend significantly longer

Table 2
Survey Variables

| Variable | Gender | | Degree | |
|---------------------|-------------------------------|--------|-------------------------------|--------|
| | Email | Mail | Email | Mail |
| OBSERVATIONS | 58 | 79 | 58 | 79 |
| MEAN | 0.7414 | 0.7975 | 1.1552 | 1.2025 |
| MEDIAN | 1.0 | 1.0 | 1.0 | 1.0 |
| MODE | 1.0 | 1.0 | 1.0 | 1.0 |
| STD. DEV. | 0.4417 | 0.4044 | 0.3652 | 0.4635 |
| RANGE | 1.0 | 1.0 | 1.0 | 2.0 |
| POOLED t-TEST | t = -0.77 Pr > abs. t = .4419 | | t = -0.64 Pr > abs. t = .5202 | |
| WILCOXON 2 SAMPLE Z | Z = -.7694 | | Z = -0.7190 | |
| One-sided: | Pr < Z = .2215 | | Pr < Z = .2361 | |
| Two sided: | Pr > abs. Z = .4430 | | Pr > abs. Z = .4733 | |

Where: Gender: Male vs. Female Degree: JD= 0; PHD=1; Masters= 2

| Variable | Rank | | Region | |
|---------------------|------------------------------|--------|-------------------------------|--------|
| | Email | Mail | Email | Mail |
| OBSERVATIONS | 58 | 79 | 58 | 79 |
| MEAN | 1.2586 | 1.2278 | 3.5000 | 3.5695 |
| MEDIAN | 1.0 | 1.0 | 3.0 | 4.0 |
| MODE | 2.0 | 2.0 | 3.0 | 4.0 |
| STD. DEV. | 0.9470 | 0.9763 | 2.2498 | 1.8652 |
| RANGE | 3.0 | 3.0 | 8.0 | 7.0 |
| POOLED t-TEST | t = 0.20 Pr > abs. t = .8447 | | t = -0.20 Pr > abs. t = .8436 | |
| WILCOXON 2 SAMPLE Z | Z = .1774 | | Z = -0.3272 | |
| One-sided: | Pr < Z = .4296 | | Pr < Z = .3718 | |
| Two sided: | Pr > abs. Z = .8592 | | Pr > abs. Z = .7436 | |

Where: Rank: Asst. Prof. = 0; Assoc. Prof. = 1; Full Prof. = 2; Lect./Inst. = 3 Region: Pacific = 0; Mtn. = 1; SW = 2; MW = 3; S = 4; MdAtl. = 5; NE=6; NewEng. = 7; Oth. = 8

| Variable | System | | Uncol | |
|---------------------|------------------------------|--------|------------------------------|--------|
| | Email | Mail | Email | Mail |
| OBSERVATIONS | 58 | 79 | 58 | 79 |
| MEAN | 0.2241 | 0.1139 | 0.8793 | 0.7975 |
| MEDIAN | 0.0 | 0.0 | 1.0 | 1.0 |
| MODE | 0.0 | 0.0 | 1.0 | 1.0 |
| STD. DEV. | 0.4206 | 0.3198 | 0.3286 | 0.4044 |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 |
| POOLED t-TEST | t = 1.74 Pr > abs. t = .0837 | | t = 1.26 Pr > abs. t = .2082 | |
| WILCOXON 2 SAMPLE Z | Z = 1.7263 | | Z = 1.2583 | |
| One-sided: | Pr < Z = .0421 | | Pr < Z = .1041 | |
| Two sided: | Pr > abs. Z = .0866 | | Pr > abs. Z = .2083 | |

Where: System: Systems Prof. = 1; Otherwise= 0 UNCOL: Teach at College= 0; University = 1

Table 3
Survey Variables

| Variable | Q1 | | Q2 | |
|---------------------|--|--------|--|--------|
| | Email | Mail | Email | Mail |
| OBSERVATIONS | 58 | 79 | 58 | 79 |
| MEAN | 2.6034 | 2.4937 | 2.1379 | 2.0506 |
| MEDIAN | 3.0 | 3.0 | 2.0 | 2.0 |
| MODE | 3.0 | 3.0 | 2.0 | 2.0 |
| STD. DEV. | 0.5905 | 0.5517 | 0.6869 | 0.6385 |
| RANGE | 2.0 | 2.0 | 2.0 | 2.0 |
| POOLED t-TEST | t = 1.12 Pr > abs. t = .2661 | | t = 0.77 Pr > abs. t = .4452 | |
| WILCOXON 2 SAMPLE Z | Z = 1.3805 | | Z = 0.7968 | |
| One-sided: | Pr < Z = .0837 | | Pr < Z = .2128 | |
| Two sided: | Pr > abs. Z = .1674 | | Pr > abs. Z = .4255 | |
| Where: | Q1: To what extent would you say that computer technology has changed the way you do your job? | | Q2: Has computer technology affected your classroom teaching delivery? | |

| Variable | Q3 | | Q4 | |
|---------------------|--|--------|---|--------|
| | Email | Mail | Email | Mail |
| OBSERVATIONS | 58 | 79 | 58 | 79 |
| MEAN | 2.3445 | 2.2151 | 4.0689 | 3.4367 |
| MEDIAN | 2.0 | 2.0 | 4.0 | 3.0 |
| MODE | 3.0 | 2.0 | 3.0 | 3.0 |
| STD. DEV. | 0.6895 | 0.7280 | 2.2926 | 2.2149 |
| RANGE | 2.0 | 2.0 | 9.75 | 10.0 |
| POOLED t-TEST | t = 1.05 Pr > abs. t = .2943 | | t = 1.63 Pr > abs. t = .1062 | |
| WILCOXON 2 SAMPLE Z | Z = 1.0238 | | Z = 1.9021 | |
| One-sided: | Pr < Z = .1530 | | Pr < Z = .0286 | |
| Two sided: | Pr > abs. Z = .3059 | | Pr > abs. Z = .0572 | |
| Where: | Q3: Has computer technology affected the way in which you conduct your research? | | Q4: Approximately how many hours per day do you spend working on your computer? | |

| Variable | Q5 | |
|---------------------|---|--------|
| | Email | Mail |
| OBSERVATIONS | 58 | 79 |
| MEAN | 1.1077 | 1.0525 |
| MEDIAN | 1.0 | 1.0 |
| MODE | 1.0 | 1.0 |
| STD. DEV. | 0.7134 | 0.8586 |
| RANGE | 2.75 | 6.0 |
| POOLED t-TEST | t = 0.40 Pr > abs. t = .6906 | |
| WILCOXON 2 SAMPLE Z | Z = 0.6457 | |
| One-sided: | Pr < Z = .2592 | |
| Two sided: | Pr > abs. Z = .5185 | |
| Where: | Q5: How much time is spent sending/receiving email or accessing the Internet? | |

Table 4
Survey Variables

| Variable | EM | | WWW | |
|---------------------|-------------------------------|--------|-------------------------------|--------|
| | Email | Mail | Email | Mail |
| OBSERVATIONS | 58 | 79 | 58 | 79 |
| MEAN | 0.4655 | 0.5063 | 0.2413 | 0.3544 |
| MEDIAN | 0.0 | 1.0 | 0.0 | 0.0 |
| MODE | 0.0 | 1.0 | 0.0 | 0.0 |
| STD. DEV. | 0.5032 | 0.5031 | 0.4317 | 0.4814 |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 |
| POOLED t-TEST | t = -0.47 Pr > abs. t = .6398 | | t = -1.42 Pr > abs. t = .1585 | |
| WILCOXON 2 SAMPLE Z | Z = -0.4679 | | Z = -1.4101 | |
| One-sided: | Pr < Z = .3199 | | Pr < Z = .0793 | |
| Two sided: | Pr > abs. Z = .6398 | | Pr > abs. Z = .1585 | |

Where: EM: Use email with the majority of computer time? Yes = 1; No=0 WWW: Use World Wide Web with the majority of computer time? Yes = 1; No = 0

| Variable | WP | | SS | |
|---------------------|-------------------------------|--------|------------------------------|--------|
| | Email | Mail | Email | Mail |
| OBSERVATIONS | 58 | 79 | 58 | 79 |
| MEAN | 0.7241 | 0.8354 | 0.4655 | 0.3797 |
| MEDIAN | 1.0 | 1.0 | 0.0 | 0.0 |
| MODE | 1.0 | 1.0 | 0.0 | 0.0 |
| STD. DEV. | 0.4508 | 0.3731 | 0.5031 | 0.4884 |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 |
| POOLED t-TEST | t = -1.58 Pr > abs. t = .1168 | | t = 1.00 Pr > abs. t = .3178 | |
| WILCOXON 2 SAMPLE Z | Z = -1.5669 | | Z = 1.0001 | |
| One-sided: | Pr < Z = .0586 | | Pr < Z = .1586 | |
| Two sided: | Pr > abs. Z = .1171 | | Pr > abs. Z = .3173 | |

Where: WP: Use word processing with the majority of computer time? Yes = 1; No = 0 SS: Use spreadsheet software with the majority of computer time? Yes = 1; No = 0

(continued on next page)

hours at the computer than do mail respondents. The mean hours spent by email respondents was 4.0689 (Median = 4 hours) while the mean hours spent by mail respondents was only 3.4367 hours (Median = 3 hours). The *Wilcoxon One-Sided Normal Approximation* corroborates these differences (Z = 1.9021, Pr. < Z = .0286).

Surprisingly, the related Q5 variable that queries the amount of time spent sending/receiving email or accessing the Internet was not significant. Apparently, the difference in computer time between email and mail respondents is due to work associated with computer

software other than email and Internet activities.

The remaining variables in the study (EM, WWW, WP, SS, PRES, STAT, DB, and OTH) are all related to Question 6 of the survey. Question 6 asked respondents to indicate what type of processing that they spent the majority of their computer time working on. The question then lists eight choices. Unfortunately, the various respondents interpreted this question differently. For example, 82 respondents checked more than one of the technology sources, while 54 checked just one source. It is unclear whether respondents that made just one choice

Table 4 (continued)

| Variable | PRES | | STAT | |
|---------------------|--|--------|---|--------|
| | Email | Mail | Email | Mail |
| OBSERVATIONS | 58 | 79 | 58 | 79 |
| MEAN | 0.1896 | 0.2278 | 0.1724 | 0.1518 |
| MEDIAN | 0.0 | 0.0 | 0.0 | 0.0 |
| MODE | 0.0 | 0.0 | 0.0 | 0.0 |
| STD. DEV. | 0.3954 | 0.4221 | 0.3810 | 0.3612 |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 |
| POOLED t-TEST | t = -0.54 Pr > abs. t = .5919 | | t = 0.32 Pr > abs. t = .7488 | |
| WILCOXON 2 SAMPLE Z | Z = -0.5356 | | Z = 0.3185 | |
| One-sided: | Pr < Z = .2961 | | Pr < Z = .3750 | |
| Two sided: | Pr > abs. Z = .5922 | | Pr > abs. Z = .7501 | |
| Where: | PRES: Use presentation software with the majority of computer time? Yes = 1; No = 0 | | STAT: Use statistical software with the majority of computer time? Yes = 1; No = 0 | |

| Variable | DB | | OTH | |
|---------------------|--|--------|---|--------|
| | Email | Mail | Email | Mail |
| OBSERVATIONS | 58 | 79 | 58 | 79 |
| MEAN | 0.0689 | 0.1392 | 0.0862 | 0.1012 |
| MEDIAN | 0.0 | 0.0 | 0.0 | 0.0 |
| MODE | 0.0 | 0.0 | 0.0 | 0.0 |
| STD. DEV. | 0.2556 | 0.3484 | .2831 | 0.3036 |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 |
| POOLED t-TEST | t = -1.30 Pr > abs. t = .1958 | | t = -0.30 Pr > abs. t = .7684 | |
| WILCOXON 2 SAMPLE Z | Z = -1.2928 | | Z = -0.2918 | |
| One-sided: | Pr < Z = .0980 | | Pr < Z = .3852 | |
| Two sided: | Pr > abs. Z = .1961 | | Pr > abs. Z = .7704 | |
| Where: | DB: Use database software with the majority of computer time? Yes = 1; No = 0 | | OTH: Use computer software other than that already described above the majority of computer time? Yes = 1; No = 0 | |

use only that one source of technology or, alternatively, does the one choice represent the technology that they use *more often* than the other choices? Consequently, we must interpret the results associated with these exploratory variables with extreme caution. Further, it is not possible to postulate a priori expectations, which means that the *Wilcoxon Two-Sided Normal Approximation* test must be used instead of the associated one-sided test.

Unfortunately, there were no differences between email and mail respondents for these

Question 6 variables (see Table 4). The only variable even *marginally* significant was WP (word processing use) with a t value of -1.58 (Pr. > t = .1168) and a Z value of -1.5669 (Pr. > Z = .1171). This suggests that email respondents use word processing software less often than mail respondents. Although this sounds counterintuitive, email respondents may use other computer software more often than mail respondents, such as spreadsheets (even though this difference as measured by the SS variable was not significant in this study).

Conclusion

The analysis of email versus mail literature reviewed in this manuscript indicates that email response times are faster, much cheaper, and generally more convenient for respondents that already use email as compared with traditional mail surveys. Mail surveys, on the other hand, generally result in higher response rates than their email counterpart.

This study also conducted an exploratory comparative study that delivered the same survey using both the email and mail mediums. Similar to the above conclusion, we found that we received email responses in a more timely fashion, even though the overall response rate for the mailed questionnaires was higher by almost 10 percent. We also analyzed the differences in email versus mail respondents in a number of ways. While there were not significant differences for the GENDER, DEGREE, RANK and REGION variables, the statistical results indicated that a greater percent of accounting Systems professors will respond via email as compared with the traditional mail medium. Further, professors teaching at universities tend to prefer responding to email surveys as compared with professors teaching at colleges.

The results also suggest that professors that believe computer technology has changed the way they do their job tend to give a greater response to email surveys. In addition, professors that work on their computers more hours than the average faculty member tend to prefer the email medium. Although tentative, results of the present study do not support the explanation for low email response rates by Odom et al. (1998), lack of individual capability and/or knowledge regarding electronic communication.

Implications For Future Research

There are many opportunities for future research with regards to email surveys. One area that needs to be fully explored is the type of

questions that are successful using email surveys. There is some evidence that open-ended questions are easier to respond to than other question types like Likert scales and probably increase response rates. Another issue which needs to be addressed is length of survey. Some believe that short surveys elicit a better response rate than multi-page surveys. Finally, an email study needs to be conducted to examine some demographic variables like socio-economic background and access to email and the Internet to determine if target populations are currently limited. □

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**Appendix - A
Email Survey**

Dear Accounting Colleague:

February 3, 1997

You have been selected to participate in a survey involving the effect of computer technology on the accounting profession. Please take a few minutes to answer the following questions. If possible, use REPLY and include the entire contents of this survey. If unable to include the contents of this survey, then use the FORWARD function of your email package to send this message to ODENA@TTU.EDU

Please answer the following questions as honestly as possible. Any comments you wish to make about your answers will be appreciated.

1. To what extent would you say that computer technology has changed the way you do your job?

1-----2-----3
Not at all Moderately Completely/Extensively

ANSWER:

2. Has computer technology affected your classroom teaching delivery?

1-----2-----3
 Not at all Moderately Completely/Extensively

ANSWER:

3. Has computer technology affect the way in which you conduct your research (i.e., have changes such as the Internet affected the way in which you conduct research)?

1-----2-----3
 Not at all Moderately Completely/Extensively

ANSWER:

4. Approximately how many hours per day do you spend working on your computer?

ANSWER:

5. How much time is spent sending/receiving e-mail or accessing the Internet?

ANSWER:

6. On what type of processing is the majority of your time spent while on the computer?

| | | | |
|-----------------|-------|-------------------------|-------|
| E-mail | _____ | Presentation | _____ |
| World Wide Web | _____ | Statistical software | _____ |
| Word processing | _____ | Database | _____ |
| Spreadsheet | _____ | Other: (please specify) | _____ |
| | | _____ | _____ |

Thank you very much for your time and your input. If you would like to receive a copy of the results of this survey, please indicate your email address in the following space:

Comments: