

A Comparison of Paper and Online Survey Responses

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Introduction/Theoretical Framework

Survey research is the most commonly used methodology in agricultural education research broadly defined (Doss et al., 2021; Dyer et al., 2003). Research has experienced a shift in survey response mode use from paper to online over the last two decades (Dillman et al., 2014). How could the change in response mode affect the data collected? According to Roberts (2007) and Sedwick (2003), differences in scale measurement are possible with web surveys compared to a paper survey. This has the potential to have implications for survey data collected in agricultural education research. Under research priority five of the American Association for Agricultural Education's national research agenda lies the question: What evaluation methods, models, and practices are effective in determining the impacts of educational programs in agriculture and natural resources (Thoron et al., 2016)? If we are to have accurate research addressing this question, we must explore our research methodologies designed to do so. This leads to the need for this study. The purpose of this study was to compare summated construct score responses from a paper and online survey.

The theoretical framework underpinning this study was Ajzen's (1991) Theory of Planned Behavior (TPB). TPB attempts to predict and explain human behavior in specific contexts (Ajzen, 1991). Attitude toward the behavior, subjective norms, and perceived behavior control can influence behavior. In the context of this study, the desired behavioral change is for agricultural education researchers to examine possible effects of survey mode use related to scale scores and make educated decisions on mode usage with future research. Findings from this study could change attitude, shed light on subjective norms, and influence perceived behavior control related to survey mode usage.

Methods

This study was part of a larger experimental study related to survey response rates. As part of the experiment requirements, a 131-item questionnaire was sent to 1,096 randomly sampled school-based agricultural education (SBAE) teachers across the United States. The purpose of the survey study, conducted simultaneously with the experiment, was to determine challenges faced by SBAE teachers. The instrument was broken up into a demographics section and six different constructs: 1) SBAE relationships, 2) classroom activities, 3) SBAE program activities, 4) miscellaneous activities, 5) professionalism activities, and 6) personal activities. Individual items related to each construct were rated on a Likert-type scale of $1 = \textit{very negative influence}$ to $6 = \textit{very positive influence}$. Instrument content and face validity were established by a panel of seven professors in SBAE teacher education at five different institutions in three different states. Construct reliability was calculated following a pilot test of the instrument with 40 SBAE teachers. A Cronbach's alpha was calculated for each construct, all with results greater than $\alpha = 0.86$. Reliability was acceptable according to recommendations by Field (2018).

Half of the 1,096 participants selected to participate in the study received a paper copy of the questionnaire while the other half received instructions to access an online version. Both the paper and online versions looked identical. After receiving IRB approval from Texas Tech

University, SBAE teachers were mailed either the paper questionnaire or instructions to access the online questionnaire. After waiting two weeks, reminders were emailed to teachers one week apart for a total of five contacts (Dillman et al., 2014). An overall response rate of 40.85% ($N = 444$) was achieved. To control for nonresponse error, a comparison of construct summated scores of early and late respondents was conducted with no significant differences found (Lindner et al., 2001). Data for this study were analyzed with an independent samples t -test for average summated scores for each construct. Statistical significance was established *a priori* at $p \leq 0.05$.

Findings

At the completion of the study 227 paper responses and 217 online responses were received. Findings presented in Table 1 indicate all average summated scores were higher for paper responses compared to online responses. Responses for constructs one, two, five, and six were all significantly higher for those answering on paper compared to those answering online. Responses for constructs three and four were not significantly different.

Table 1
Comparison of Construct Scores by Final Response Mode (N = 444)

Construct	Paper ($n = 227$)		Online ($n = 217$)		t_{442}	p
	M	SD	M	SD		
1. Relationships	4.82	0.45	4.73	0.46	1.99	.05
2. Classroom	4.57	0.51	4.45	0.60	2.26	.02
3. Program	4.68	0.65	4.58	0.63	1.63	.10
4. Miscellaneous	4.04	0.67	3.92	0.73	1.85	.06
5. Professionalism	4.65	0.70	4.48	0.73	2.59	.01
6. Personal	4.13	0.94	3.93	0.95	2.28	.02

Note. Scale was 1 = very negative influence, 2 = negative influence, 3 = slightly negative influence, 4 = slightly positive influence, 5 = positive influence, 6 = very positive influence.

Conclusions/Implications/Recommendations

In this study, SBAE teachers produced significantly more positive responses on four of the six constructs measured when responding on paper, confirming differences in scale measurement are possible when comparing web and paper surveys (Roberts, 2007; Sedwick, 2003). Since the design of the questionnaire was the same across both modes, a possible explanation for why differences in scale scores occurred is that those responding online felt a higher level of anonymity and were able to express more negative feelings. Higher perceived anonymity for web surveys is an advantage of using online response modes according to several scholars (Evans & Rooney, 2008; Fraenkel et al., 2019; Gay et al., 2012; Roberts, 2007). Those answering on paper may have felt like their responses were less anonymous and were more reluctant to indicate negative feelings toward different aspects of their job. Based on this information, we recommend using mixed-mode studies whenever possible. This would allow researchers to average responses across modes, reducing measurement error (Dillman et al., 2014). Researchers should consider anonymity when designing a survey study and select an appropriate mode. Further research should be conducted to investigate why differences in scale measurement can exist across different survey response modes and assess how this impacts data and generalizability.

References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method* (4th ed.). Wiley.
- Doss, W., Rayfield, J., Burriss, S., & Lawver, D. (2021). A quantitative content analysis of survey research methods over a 40-year time period in the *Journal of Agricultural Education*. *Journal of Agricultural Education*, 62(3), 310-328. <https://doi.org/10.5032/jae.2021.03310>
- Dyer, J. E., Haase-Wittler, P. S., & Washburn, S. G. (2003). Structuring agricultural education research using conceptual and theoretical frameworks. *Journal of Agricultural Education*, 44(2), 61-74. <https://doi.org/10.5032/jae.2003.02061>
- Evans, A. N., & Rooney, B. J. (2008). *Methods in psychological research*. SAGE Publications.
- Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE Publications.
- Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2019). *How to design and evaluate research in education* (10th ed.). McGraw-Hill.
- Gay, L. R., Mills, G. E., & Airasian, P. (2012). *Educational research: Competencies for analysis and applications* (10th ed.). Pearson.
- Lindner, J. R., Murphy, T. H., & Briers, G. E. (2001). Handling nonresponse in social science research. *Journal of Agricultural Education*, 42(4), 43-53. <https://doi.org/10.5032/jae.2001.04043>
- Roberts, L. D. (2007). Opportunities and constraints of electronic research. In R. A. Reynolds, R. Woods, & Baker, J. D. (Eds.), *Handbook of research on electronic surveys and measurements* (pp. 19-27). Idea Group Reference.
- Sedwick, J. L. (2003). *A comparison of three data collection survey modes among Southern Baptist youth workers: Group administered, e-mail/web, and mail* (Publication No. 3108671) [Doctoral dissertation, Southwestern Baptist Theological Seminary]. UMI Microform.
- Thoron, A. C., Myers, B. E., & Barrick, R. K. (2016). Research priority 5: Efficient and effective agricultural education programs. In T. G. Roberts, A. Harder, & M. T. Brashears (Eds.), *American Association for Agricultural Education national research agenda: 2016-2020* (pp. 41-48). UFL Department of Agricultural Education and Communication. http://aaaeonline.org/resources/Documents/AAAE_National_Research_Agenda_2016-2020.pdf