Population and Sampling Frames in SBAE Research: A Review of Recent Trends

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Introduction/Need for Research

Survey research is a fundamental method in educational research, providing insights into various aspects of school-based agricultural education (SBAE) programs, but understanding population and sample frames is crucial for ensuring validity and reliability of survey research across disciplines (Privitera, 2017). The population refers to the entire group of individuals or units that are the subject of the research (Privitera, 2017). For this study, populations of interest include SBAE teachers, or programs being considered in survey research designs. Sample frames are lists or methods that provide access to the members of the target population (Privitera, 2017). These frames can include all members of the population (i.e., a census approach) or a subset of individuals from the population (Dillman et al., 2014). Sampling frames should consider representation of the population, allowing researchers to make inferences without surveying every member (Dillman et al., 2014).

Sampling techniques vary, but include methods such as simple random sampling, stratified sampling, cluster sampling, and systematic sampling, each with its own advantages in minimizing bias and ensuring representation (Dillman et al., 2014; Privitera, 2017). However, non-response remains a significant challenge, as it can lead to bias if non-respondents differ significantly from respondents (Miller & Smith, 1983). To mitigate non-response, researchers can employ a variety of strategies as recommended by Lindner et al. (2001) and Johnson and Shoulders (2017). By implementing these strategies, researchers can enhance the reliability and validity of their survey findings, ensuring that the results are more representative of the entire population, improving the overall quality of research (Roberts et al., 2011). Therefore, this study aimed to describe sampling techniques used in SBAE survey research published in the Journal of Agricultural Education, identify trends in response rate, and outline common sampling practices to address response rate concerns.

Theoretical Framework

Social constructivism posits that knowledge is constructed through social interactions and shared experiences, emphasizing the role of culture and context in shaping understanding (Vygotsky, 1978). Based on underpinnings of social constructivism (Vygotsky, 1978), agricultural education researchers often employ best practices rooted in their training and norms. Within the context of this study, best practices considered are related to researchers' selection of sampling methods. By adhering to these standards, researchers contribute to collective construction of knowledge, ensuring that their findings are reliable and credible within their discipline. By framing this study in social constructivism, the role social and contextual factors play on research design and execution can be considered, leading to more nuanced and comprehensive analyses (Boylan et al., 2018).

Methodology

This study employed a content analysis of school-based agricultural education (SBAE) survey research published in the Journal of Agricultural Education (JAE) since 2020. Specifically, this inquiry began with Volume 61, Issue 1 and continued through the next five volumes, concluding with Volume 66, Issue 4. For a research article to be considered within this content analysis, it

must have employed a survey research design with SBAE professionals as the population of interest.

This content analysis included the defined population, population size, sampling method, sampling frame, sampling rationale, recruitment method, distribution method, incentivization, sample size, number of respondents, usable responses, and corresponding response rate. The research team established an analysis protocol based on the recommendations of Cornesse et al. (2020), which employed an Excel spreadsheet for data collection and interpretation. SPSS®, version 29.0 was used for inferential data analysis. Descriptive and means comparative analyses were conducted to explore research purposes.

Results

A total of 62 articles met the criteria outlined. Of the articles reviewed, 4 had related sub-samples to yield 67 total sampling instances for review within this study. The overall average response rate of studies was 38.02% (SD = 19.30, min 7.2, max 89.1). A majority of studies conducted used a single state population frame (n = 43; 64.2%), attempted a census (n = 38; 56.7%), did not incentivize (n = 59; 88.1%), used exclusively electronic communication (n = 56; 83.6%), and of those who use probability sampling, a majority did not oversample (n = 17; 65.4%).

A comparison of response rates by population frame and by sampling method. On average, response rates for single state studies were higher by 20.26 percentage points, BCa 95% CI [13.33, 27.19], than those who surveyed multiple states or nationally. This difference was significant $t(60) = 5.847$, $p < .001$, representing a large-sized effect (d = 1.208). On average, response rates for census studies were higher than those using other sampling methods by 12.16 percentage points, BCa 95% CI [3.07, 21.25]. This difference was significant $t(65) = 2.670$, p = .010 and represented a medium-sized effect (d = .651).

Conclusions, Implications, and Recommendations

Careful considerations should be taken when making methodological decisions related to sampling for SBAE survey research, as higher response rates increase the precision of the estimates made thus reducing non-response error (Dillman et al., 2014). Based on the findings of this study, conducting smaller, more localized studies may yield better response rates. The smaller, localized studies yielded higher response rates which may be a result of SBAE Teachers' previously established relationships with their state's university faculty (Dillman et al., 2014). While these increased response rates are valuable, the ability to generalize beyond the localized nature of the data collection is limited. In addition, relying solely on electronic communication for participant recruitment may be impacting response rates. When at least one contact was made via a method other than email within this sample, the response rate was 21 percentage points higher, on average. Incentivization, a commonly suggested way to increase response rate (Dillman et al., 2014; Doss et al., 2023), did not yield a substantive difference (increase of 7 percentage points), though few studies used incentives. Researchers wishing to study SBAE should consider their sampling methods, contact and recruitment methods, and scope of studies to maximize response rates and increase legitimacy and transferability of their findings.

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