



This material is based upon work supported by the National Science Foundation under Grant No. 0802245. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

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**October 2011**

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*Defining the context of analysis in evaluation can be challenging as evaluators generally cannot interview, observe, and/or survey an entire population of desired participants. Effective sampling and representation is an important aspect of meaningful program evaluation. Capturing data from small samples complicates measuring impact as greater sampling error is associated with smaller samples. In planning evaluation of technical educational programs, aligning the evaluation objectives with the practicalities and logistics in sample framing is essential. The following are considerations for avoiding data quality problems with small samples and strategies for maximizing data from a small sample when planning an ATE evaluation study.*

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- **Prior to approaching program evaluation, consider what the rationale for the evaluation is.** Be careful to consider the trade-offs. For instance, is generality of learning outcomes among advanced automotive students the goal? Is the aim to understand the perceived value of education and utility of clinician training with major industry leaders? Early deliberation regarding the core purpose of evaluation (e.g., measuring participation, benchmarking program satisfaction, assessing learning outcomes, determining cost effectiveness, etc.) will help produce utility.
  - **Before making methodological decisions, determine the scope of the evaluation and unit(s) of analysis** (E.g., What is the issue at hand? Who will be involved in the assessment—all students, a subset, only graduates? Faculty/staff?) What should be studied? Will the evaluation examine technical education curriculum units, program activities, the reach of a regional center?). Doing this will assist in creating an evaluation plan that is thorough with planned procedures that correspond to realistic identification of key factors/variables of interest and adequate recruitment of participants.
  - **Make sampling procedures one of the first considerations in evaluation design in order to generate reliable inferences about what the data can actually provide.** Do not solely rely on the percentage rule of thumb as your sampling procedure (i.e., sampling 10 percent of a population or 20 percent in case of potential losses to secure reliable data). Clearly define your population, estimate their characteristics, and note the process for selection (i.e., advantages and disadvantages of different approaches such as random selection, theoretical sampling, stratified sampling, intentional oversampling, systematic sampling, cluster sampling, nonprobability sampling, snowball/chain sampling, quota sampling, emergent, and/or sequential sampling).
  - **Document and justify your sampling criteria in terms of the adequacy of information as well as soundness of evidence recognizing the level of impact drawn from your ATE project.** Also be sure to document changes in the sample during the course of the evaluation as this bears impact on the evaluation results (bear in mind participant dropout).
  - **Problematic sample sizes are contextual in nature.** Don't let a small sample size be a headache in your program evaluation if you have no choice or control regarding sample size. If you have small program numbers (e.g., 50 students in the applied management program), conduct census sampling and assess the whole population, as surveying 10-20 percent of students would only result in 5-10 participants).
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- **Budgetary restraints can commonly determine the sample size and scope of an evaluation.** Case in point, if the program evaluation for an applied baccalaureate degree in radiation and imaging sciences has a limited budget, the sample size in turn will be affected. Having a study too large with a tight budget can underpower the results and subsequent recommendations.
  - **Be pragmatic!** Plan a study that is not overly sophisticated but adapts to elicit the most useful information to be garnered, employing good techniques for evaluating the merits of your technical education program within the existing boundaries.
  - **Realize while small samples are considered a barrier in evaluation work, there is an upside.** A reduced sample size may be more cost-efficient and still provide the basic information sought depending on the evaluation design, outcomes of interest, funding, and available expertise.
  - **Sampling in qualitative research is more flexible and less stringent, as sampling criteria are open to change as the study develops.** Additionally, there is no need to seek generalization and by contrast evaluative efforts would endeavor to extract rich data that is purposefully gathered. Hence, sampling decisions are guided by a desire to capture the perspectives of the participants (for illustration, an evaluation of student engagement among registered nursing program students at a community-technical college would not seek large quantities of data as depth and detailed description of the experience of individuals is sought).
  - **Sample size is only one of a myriad of issues to consider in designing a quality evaluation study.** Small sample size is thought to lack representation, catch significant differences or produce accurate results. One the other hand, you can utilize purposeful sampling and optimize small sample sizes when level of precision and generality are not considerations and descriptive statistics are sufficient (i.e., when rigorous impact evaluations are not planned). Finally, small sample sizes that are intentional can be useful in iterative sampling which promotes reflexivity, encompasses a flexible evaluation design, to draw out in-depth, rich information.

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#### FOR MORE INFORMATION

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