

## **Twelve Tips for Preparing an Evaluation of a Medical Education Program**

Running head: Preparing an Education Evaluation

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Professional advancement in today's academic climate requires medical educators to fulfil not only their clinical and teaching responsibilities, but also to publish at a similar rate as their peers in order to be promoted. Medical educators sometimes struggle to publish their important and innovative work due to time constraints and/or a lack of formal research and evaluation training (Levinson and Rubenstein 2000; Albert et al. 2007). Rigorous evaluations of medical programs are essential to developing evidence-based interventions to improve medical training. However, without the necessary social science or educational research training, clinician educators make missteps that can limit the strength of the results and broader implications of their research. Many crucial mistakes occur during the study design phase, and poor study design cannot often be overcome later. Being systematic and structured in your design, and considering the future goals and implications of those decisions will ease the data collection, analysis, and dissemination process later.

The purpose of this article is to provide medical educators with a step-by-step guide they can follow to start to develop a rigorous evaluation of the innovative programs they create and execute, so that this work can be disseminated. Increased dissemination among clinician educators serves a twofold benefit: 1.) increased likelihood of advancement for the clinician educator him or herself; 2.) an increased shared body of knowledge among clinician educators, which will ultimately improve clinician training broadly.

- 1.) **Develop a clear research question.** What are you interested in examining? Booth et al. (2003) suggest the following formula to begin moving from topic to question:

**Step 1: Topic:** I am studying \_\_\_\_\_

**Step 2: Question:** because I want to find out what/why/how \_\_\_\_\_

You've likely already identified a topic of interest, but try to be as specific as possible. For example, let's say you're interested in examining the impact of a dedicated professionalization program for underrepresented minority students. Understanding the topic is only the first step – the second step is motivating what about the topic is particularly interesting or problematic. In our example, you may be interested in examining this professionalization program for underrepresented minority medical students because you want to find out how to reduce inequalities in medical training, or increase underrepresented minority self-efficacy in medical school, or support underrepresented minority students to improve the numbers of medical providers who are from underrepresented groups. In our case, we are studying *the impact of a dedicated professionalization program for underrepresented minority students* because we want to find out *whether the program will have an impact on residency placement*. Once you've decided on the specific focus of your research, you can reframe it to a question: What impact does our professionalization program for underrepresented minority medical students have on residency placement?

- 2.) **Identify the significance or innovation of your intervention/program.** Identifying the topic and question is only part of the process. To ensure the greater impact of this research, you need to identify the significance of your question. Take some time to

understand why your research question would matter to anyone else. How is what you're doing particularly innovative or unique to what is going on at other institutions? Booth et al. (2003) add this third step to steps 1 and 2:

**Step 1: Topic:** I am studying \_\_\_\_\_

**Step 2: Question:** because I want to find out what/why/how \_\_\_\_\_

**Step 3: Significance:** in order to help my reader understand \_\_\_\_\_.

In our case, we are studying *the impact of a dedicated professionalization program for underrepresented minority students* because we want to find out *whether the program will have an impact on residency placement* in order to help my reader understand the *importance of professionalization on medical school success for underrepresented minority students*. To check whether what you think is significant would be significant to others, examine your ideas through a literature search, an informal survey of relevant people at other institutions, or other groups of individuals focused on similar areas of research.

- 3.) **Identify what your theory of change is.** As part of the development of your research question, identify what you think is causing the change you are investigating. Identifying a theory of change can seem challenging to new researchers, but it can help you gain insights from existing work to interpret your empirical observations (Gibbs et al. 2011; Bolander Laksov et al. 2017). When we use the term “theory” you may think of some theories such as the Ecological Model or the Stages of Change, but we’re more interested in a pragmatic understanding or explanation of why the relationship exists or how the change of interest is happening. In the case of examining the impact of medical programs or interventions, it’s the theory of whether and/or how the intervention works (De Silva et al. 2014). In our case, we think the reason that our professionalization of underrepresented minority students may have an impact on residency placement because the program supports the identity of underrepresented minority medical student. The program does this by: 1) exposing medical students to underrepresented medical providers to model behavior and expectations and 2) explicitly discussing their current role of medical student and future roles of resident/fellow/physician to set appropriate role expectations and goals.
- 4.) **Conduct a complete literature review.** An important first step in developing your program and identifying your theory of change is to examine the existing literature. There are a number of fantastic resources to assist medical education researchers in conducting literature searches (Pautasso 2013; Maggio et al. 2016). In our example, we would want to look at all aspects of our research topic, question, and theory. We would search for information about professionalization in medical school, ways to improve placement for underrepresented minorities, the parts that role models and role expectations play in affirming underrepresented minority identity, and so on. We want to be able to write a convincing argument with supporting literature that would string together our hypothesis

for why our program is going to impact our outcome of interest (residency placement in our case).

5.) **If appropriate, conduct a needs assessment with your target audience and/or with key informants.** In some cases, there may not be existing rigorous literature to support your ideas, or you may want to get additional information about how the processes you're interested in work in your setting or similar peer settings. In this case, you may want to conduct a needs assessment with key stakeholders, potential participants, and other invested members of the community (Pautasso 2013). To conduct a needs assessment, you'll want to identify key informants (potential beneficiaries of the intervention, individuals with unique perspectives on the intervention, etc.), and determine the best way to collect the information you need (a short survey, interviews, focus groups, etc.). The key informants can both provide you invaluable information, and can become important allies in the ongoing development of your program. In our case, we may want to conduct a focus group with some recent underrepresented minority medical students to ask about their experience in residency placement. Alternatively, we may also want to interview underrepresented minority medical faculty about their ideas to support medical students, or talk to faculty at other institutions about how they support their underrepresented minority medical students. Through this process, we can get ideas about potential program components, and we have identified allies to assist us in the process.

6.) **Identify a journal or two to which you are interested in submitting the resulting manuscript.**

If you have completed a thorough literature review (as explained in Tip 5), you should have a sense of what journals are likely to publish research in your topic area and using methods similar to yours. However, if your project is particularly innovative, there may be a dearth of related literature. In that case, the Journal/Author Name Estimator ([jane.biosemantics.org](http://jane.biosemantics.org)) can be helpful to determine likely journals for your topic area. Look into the information about the journal: what are their standards of rigor? What sorts of research methods do they encourage/allow (e.g. how many interviews/focus groups are acceptable for publication? What is the average sample size for quantitative evaluations?). If you are unsure if your article is suitable for a particular publication, simply reach out to the editor and ask.

7.) **Select an appropriate research method to conduct your study.** Selecting an appropriate research method is central to the success of your study. There are a lot of available options – pre-/post-assessments, quantitative experience surveys, open-ended qualitative experience surveys, semi-structured interviews, focus groups, observational methods and more. When considering what method to use to study your outcomes, you should select a research method based on your research question. If your question is exploratory or descriptive, such as describing the strengths and weaknesses of a new program, you may find qualitative methods (interviews, focus groups) more helpful. If

your question is explanatory or focused on detecting differences between groups or over time, you may find that quantitative methods (close-ended survey questions) may be more useful. However, if you are planning to do a pre- post- assessment and want to make a quantitative comparison between the two, make sure you have a system in place to link the data (and make sure that this system is in-line with your institution's ethical practices – see Tip 12). You should also consider the number of available participants in selecting a research method. Your study may be a pilot and only involve a small number of participants, in which case quantitative measures may have limited capabilities of providing interesting results. Conversely, interviews and focus groups may not provide enough information about the degree of change that occurred across all group members. Because both quantitative and qualitative methods have limitations, a mixed methods approach can provide a deeper understanding of how your program is working, compared to using either a quantitative or qualitative approach. In our case, we're interested in comparing participants of our professionalization for underrepresented minority medical student program to similar students who didn't participate on their residency placement. We would want to get rates of placement and rankings of placements to compare the two groups quantitatively. Secondly, we may be interested in what components of the program participants identified as being important to their residency placement, in which case we may want to use qualitative (open-ended response) surveys or interviews.

- 8.) **Present your preliminary plan to trusted colleagues.** We all get blinded by our 'great ideas,' but it can be helpful to get in depth feedback about a program evaluation before you are too far ahead. Take some time to reach out to trusted colleagues about your research question, theory of change, supporting literature, identified journal(s), research methods, and outcome measures/questions.
- 9.) **Identify or develop your data collection instruments.** The next step in designing your evaluation is to determine how you are going to capture the appropriate data. In ideal circumstances, you should use existing validated data collection instruments. However, it is not always the case that you will find existing instruments that are adequately aligned with what your outcomes are. Although it is important for data collection instruments to be well-designed, it is not necessarily wise to select an instrument *solely* because it has been validated if it doesn't get at what you are hoping to measure. As a result, you will likely find yourself needing to create an original data collection instrument. This dilemma is one with which researchers have struggled for years. And, as a result, there are many useful resources for developing qualitative interview or focus group guides (McNamara ; Turner 2010; Kallio et al. 2016) and quantitative surveys (Bradburn 2004; Sullivan and Artino 2017).
- 10.) **Pilot your data collection instruments.** Even the best researchers ask questions that don't land with the target audience. Pilot your surveys and interviews to ensure that they are easy to read, understandable and to gauge response time. You want your instrument to flow naturally and for questions to be clear and easy to understand. For these reasons,

you will want to pilot your instruments with people who are similar to your intended participants, but will not be in your final sample. In our case we might be interested in piloting our interviews of participants in the underrepresented minority medical student professionalization program with individuals who have participated in the program in previous years but aren't in the current sample, or similar students who didn't participate. If you are unable to find similar enough individuals with whom to pilot the data collection instruments, perhaps try piloting the instruments with other experts or invested individuals who can provide additional insight into the questions and structure of your instruments.

- 11.) **Learn what research support services and trainings are available to you.** Many institutions hold software trainings and/or offer methodological and statistical consulting services. Talk to your colleagues and to your departmental leadership about what services are available to you. Periodically check the IT department's website for upcoming software trainings (e.g., NVivo, SPSS, Excel, Qualtrics). If there is a particular software that you're interested in learning, ask if your colleagues are also interested. Chances are you are not alone in your desire to expand your skill set, and with enough support perhaps IT will consider hosting a training for you. Similarly, if you are having trouble finding articles or would like assistance with citation management software such as Endnote or Mendeley, reach out to your librarian. Don't be afraid to admit you don't know how to do something, because you are not alone in feeling that way. You may be surprised at how much available help is out there!
  
- 12.) **Get ethical approval for your evaluation.** Most (if not all) journals require study procedures related to human subjects by an Institutional Review Board (IRB) or ethics committee in order to publish them. Although it is true that at many institutions you can file for retroactive approval, if you know you are going to want to publish your evaluation, you should apply for approval prior to any data collection activities. Most educational evaluation studies are considered 'exempt' by ethics committees, so it will be considerably less work than a full-board application. If you have never completed an application for human subjects research before, do not be shy about reaching out to committee members to set up an appointment. Although it may seem daunting at first, once you understand what is needed to complete your application, it is a very straightforward task.

Whether you are interested in learning if teaching strategies you've been using for years are effective or if you have a new innovation you'd like to evaluate, knowing how to rigorously study the efficacy of educational practices is of clear benefit to educators and students. By publishing the results of your education evaluations, this benefit extends beyond the classroom to an entire community of medical educators. However, in order for educational interventions to be publishable it is important that program evaluations follow best research practices.

By organizing the process of approaching evaluation into smaller, achievable steps, we hope to have provided a recipe for medical education researchers who may feel stuck or unsure of where to begin when starting a new research project. With some planning, and by taking advantage of the research supports around you, undertaking an education evaluation is both manageable and worthwhile: not only will students benefit from more effective education interventions, faculty will also benefit by increasing the likelihood that their educational activities lead to scholarship.

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