EDLD704: Methods and Instruments for Data Collection

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Table of contents

Description of the Course

The purpose of this course is to teach you about research methods and instruments for collecting data. The course will expose you to several research methods and offer guidance for collecting both quantitative and qualitative data. You should finish the course knowing:

- how to select an appropriate research method for investigating a question for a study arising from a problem of practice

- how to conceptualize, develop, and test an instrument for collecting data

- how to evaluate the quality of data collected, and how to express your evidence-based argument in clear, simple prose, using APA format, to a skeptical reader

To provide you opportunity to learn these skills, the course expects you to complete two projects: one quantitative, one qualitative. In each project, you will:

1. frame one or more questions to guide inquiry into a problem of practice

2. select a research method appropriate to the nature and purpose of your inquiry question/s,

3. conceptualize and design a small study using your selected research method,

4. design or select instrumentation to collect data,

5. collect a small sample of data,

6. critically evaluate the quality of your data

7. draw any appropriate inferences or make any appropriate claims from your study.

Questions, Methods, and Data

In your setting, surely you've seen data collected and presented in various ways to get your attention, stimulate your thinking, illuminate an issue, and the like. Maybe you've done such data-related work yourself.

Like appreciation for fine art or food acquired over time, you probably have a sense of "bad" data when you see it.

Do you also have a sense of "good" data when you see it? And can it still be "good" even if you disagree with it?

I want this course to help you collect better data from now on by focusing your attention on *how data are collected* – that is, **methods** – for conducting inquiry, which includes considerations how to collect data in ways that optimize their quality.

The central concerns of this first module are the question and decision of what method to use to carry out a study. As I see it, methods depend, fundamentally, on the <u>nature of the research question</u>: What specific kind of information or understanding does the question seek? Here I make a fundamental and admittedly over-simplistic distinction between **qualities** and **quantities**.

To investigate questions that betray interest in <u>quantities</u> – *"To what extent…?", "How prevalent…?", "What predicts….?"* – one should use quantitative methods. This includes surveys, experiments, quasi-experiments, and the like.

To investigate questions that betray interest in <u>qualities</u>, we employ qualitative designs and instruments. These include interviews, observations, in-depth case studies, analysis of content, and so on.

Often the research question is so self-evident that the choice of method and instrumentation is obvious.

But perhaps just as often we are interested in *both*, and the qualities-quantities distinction is not so clear cut. To illustrate, consider this case study:

A Case Study

In 2006, all public high schools in Washington State were required to administer the state's large-scale assessment, the Washington Assessments of Student Learning (WASL) in mathematics and reading, to all tenth grade students. By law, these students were the first graduating class required to pass the test in order to receive their high school diplomas. High stakes accountability testing was getting "real."

Public educators throughout the state were anxious. Questions abounded:

- How many students would meet the standard? How close are we?

- Which students are less likely to reach the standard?

- What reforms, interventions, or other restructuring are necessary in elementary and middle school to better prepare students for the high school proficiency standard?

- What exactly are the high school proficiency standards in reading and math?

- What reforms, interventions, or other restructuring are necessary in high school to better prepare students who failed the test in tenth grade to pass the test by their senior year?

This state policy was controversial. Many people decried the requirements as fundamentally unfair. Leading psychometricians (experts in test design) criticized the high stakes policies as invalid uses of (largely high quality) standardized tests. Some public educators retired early or found other jobs. Others defended the policies as necessary to bring about long overdue reforms. Many of my colleagues in the district where I worked understandably grumbled and complained … then we all got to work to help our students succeed.

At the time, I was somewhere in the middle. It was early in my career in public education. I was employed as a data analyst in my district's curriculum and instruction department, and on the side I was working on my doctorate. My job, in essence, was to help educators understand student achievement data. I was unique because I had come to education not from classroom teaching but the academic world: sociology. I saw things differently, which is to say I was *less partisan* and *more curious* than others. I cared more what *data* said than what people with sway claimed. Here are the kinds of questions I asked at the time:

- What is the historical and/or social scientific evidence that these high stakes accountability testing policies actually work? Where and when have these policies already worked?

- And what does "actually work" really mean: To improve instruction? To help students overcome demographic disadvantages?

- Part of the theory of action of these accountability policies is "measurement-driven instruction": testing data should provide instructionally valuable feedback. Teachers should look at data; and when they do, they should see and do …. *what*?

- "Data-based decisionmaking" is all the rage. But what exactly does it mean for a district or school to be "data-driven"?

- How does a district or school become "data-driven"? By what process of evolution?

- High school teachers already see state assessment at a high level in the summer during inservice days. How often do they look at the state assessment data for their own students? And when they do, how much instructional utility do they derive from the data?

- The policies assume that external accountability pressure will cause teachers to look at data. Can I test that empirically? Do teachers who perceive more pressure tend to look at state assessment data more often than teachers who perceive less pressure?

- Professional learning communities are all the rage. They are hailed as a very effective model for organizing and motivating teachers to collaborate. Are high school teachers in professional learning communities more likely to use high school assessment data to improve instruction than those not in professional learning communities?

They are not the most sophisticated research questions, but they were on a par with what people were writing at the time and they lended themselves readily to data. Now let's consider all the different kinds of research questions in this topic.

Questions for quantitative data

The quantitative questions are fairly obvious:

How often do high school teachers use state assessment data? This is a question is a no-brainer because it is about *frequency*, which ranges from *less* frequent ("hardly ever') to *more* frequent ("all the time"). To study this I needed a sample of teachers who varied in their use of data along this range of frequency.

Are teachers who perceive more external accountability pressure to improve test scores *more likely* to examine their own students' state assessment data more often? This too is an unmistakably quantitative research question (or hypothesis). Implied is comparison between two groups (which is "more likely") along scales of intensity for accountability pressure (less to more intense), frequency ("rarely" to "often") of data use. To study this I needed a sample of teachers who varied in their perceptions of accountability pressure and their frequency of data use.

Notice that questions for quantitative data come from an understanding of the situation of enough sophistication to know what the important variables are and how the variables might be related (do the values of one depend on the values of the other). In most cases, quantitative analysis is **deductive**; we know what to look for and we understand the situation well enough to test competing theories or understandings.

Quantitative methods are also appropriate when you want to <u>make generalizations about a population</u>. They seek to show what is **generally true** of a **large number** of "cases" (most often, people).

Questions for qualitative data

Notice the questions that are more clearly about qualities than quantities.

What does it mean for a district or school to be "data-driven"? Nothing here is quantified or quantifiable. The quest is for *attributes* or *states* of "data-driven". The result could be a typology of different kinds of "data-driven"-ness. Or it could be some kind of evolutionary process with beginning and more advanced stages of development.

What does it mean for a teacher to "use" state assessment data? "Using state assessment data" could mean different things among high schools than my understanding from the district office, the professional research literature, and my background in social science. I needed to talk to sample of teachers to ask them to describe in their own words how they use data.

What sense do high school teachers make of state assessment data? Similar to the question above, I needed to ask teachers to describe what (if anything) they learn from state assessment data in their own words.

For each of these questions, the focus is full understanding of a small number of cases (most often, people). <u>Generalization to a large population is *NOT* the point of qualitative methods.</u> Qualitative methods aim to understand what is **deeply true** *of a* **small number** *of cases.*

Your turn

Having considered the different angles for research in this case study, now think about your own problem of practice as it seems to you in your setting or milieu. Maybe this is your nascent capstone project.

Write down your guiding question/s that best capture your true interest.

Then consider the words you've used.

Are you looking to explore something that is not well understood? Do your questions seek understanding of *kinds*, *ways in which*, *processes*, *stages*, *distinctions*, *classes*, *forms*, and the like? Are these things you can average? (No?) Do you seek understanding of the mental *models*, *theories*, *understandings*, and the like, of how someone in your setting of interest perceives something, or understands what they're doing? Do you want their own words? Are you interested in the "theory of action" behind a program or organization? Are you interested in *identities* and *self-understandings*? Are people's own *metaphors* interesting to you? Do you

want to deal primarily with "words" data? If yes, then you may be primarily interested in qualitative methods.

Do you have a good enough understanding of your topic that you know what the *important factors* or *variables* are? Is one variable more important than another? Do you want a sense of *scope*, *estimate*, *size*, *frequency*, *magnitude*, *intensity*, *extent*, *prevalence*, *risk*, *predictability*, *regularity*, or *relationship*? Do you want to deal with primarily with "numbers" and "scale" data? If yes, then you may be primarily interested in quantitative methods.

A final word, for now, about mixed methods:

There are good reasons to use mixed methods. You may want to collect some qualitative data (from interviews, observations) from a few cases to more deeply understand something. With better firsthand understanding you can then develop more accurate survey items, frame more relevant questions and hypotheses, and test competing explanations of something.

My doctoral dissertation was *de facto* mixed methods. It began with qualitative work. From my role in the central office I knew a lot about my topic from a global perspective and from the professional literature, but I did not understand teacher work life very deeply. Interviewing a small sample of them helped me better understand my topic from their perspective. But I didn't stop there; I wanted to make generalizations to a population of teachers. Based on this more sophisticated understanding I was able to frame smarter research questions and better survey items and to specify and estimate more grounded statistical models. My quantitative dissertation study proper owes its quality to the preliminary qualitative work that informed it.

Mixed methods are possible, and may appeal to you philosophically: "Why choose between the two if I can do both? Wouldn't mixed methods make the most sense and do the most justice to the topic?" True enough. And what more appropriate laboratory for learning different research methods than your doctoral program? But to do any research method well is to negotiate a learning curve, and your time and energy are limited in this fast-paced doctoral program. Do factor that into your discernment of methods. Whatever you decide, I will help you as best I can.

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Surveys

Required reading:

- Chapter 4 (pp. 62-63 in Burkholder et al. (2020))
- Chapter 11 in Burkholder et al. (2020)

Why do a survey?

A survey is an efficient way to collect a large quantity of data on a large number of people in a relatively short amount of time. Then one can use these data to:

- "Explore a topic that has not been previously examined" (Burkholder et al. (2020), p. 163)
- "Explain a relationship between two or more variables of interest" (Burkholder et al. (2020), p. 163)
- "Describe the characteristics or attributes of a population" (Burkholder et al. (2020), p. 163)
- Make generalizations about a population of people
- Get a sense of the scope, extent, magnitude, or prevalence of something
- Measure a construct, such as psychological well-being

Depending on your guiding questions, a survey may be the appropriate method to collect the data you need for your capstone. And at some point in your time in education, you may want or need to conduct a survey. Now is a great time to gain understanding and skill.

Some key terms

Survey methods have their own vocabulary. Following is a list of key terms you should know when reading about and use when undertaking surveys:

Survey	the "method of collecting data from and about people" (Fink, 2009, quoted in Burkholder et al. (2020), p. 161)
Survey instrument	"the tool used to gather data–this term is typically used to differentiate the tool from the survey research it supports" (Burkholder et al. (2020), p. 161)
Questionnaire	"a survey instrument that contains items that the respondent is expected to read and then report his or her own answers" (Burkholder et al. (2020), p. 161)
Form	The body of the survey or test instrument where all of the items are assembled. A survey may use two different forms, such as Form A and Form B, each of which contains the same items in different orders, to examine the effects of item order on responses Item a question on a survey or test that gathers responses from a respondent and creates variation
Response categories	Categories, such as those found on a Likert scale (1=Strongly Agree, 2=Agree, etc.), that a respondent may use to respond to a survey item
Descriptor	A descriptive label, such as "Strongly Agree", that one applies to a response category to make it the response meaningful to the respondent
Respondent	an individual who responds to an item and/or survey instrument
Pilot	a phase of the survey project when an investigator uses instrument to collect sample data for the purpose of improving the instrument and/or data collection procedures
Operational	he final phase of the survey project in which the instrument collects data of sufficient quality to collect "real" data for the purpose of supporting high stakes decisions

Properties of a poor quality survey

We've all seen and/or taken poor quality surveys. Here are a few characteristics of poor quality surveys:

- **The items are too long**. The survey writer is wordy and/or has too much "voice." It's difficult to tell what the respondent is thinking and/or what the respondent is responding to.

- **The items lead the respondent**. The items are trying to "educate" or push the respondent toward something. The survey has an agenda.

- **The items and/or response categories are limited in scope**, and thus they exclude some respondents. A good example is the "Neutral/No Opinion" category.

- **The survey is too long**. By the end of the instrument, respondents will tire and stop responding to items.

- **The survey uses so many open-ended items that it is collecting primarily qualitative data and is essentially an interview project**. It will yield a wealth of comments, many of which say very similar things, and may be laborious to read and code.

Please consider using these as litmus tests for the quality of your own future survey work.

How to design a high quality survey

Use these steps, selected from the literature and my own professional experience doing dozens of surveys over the years, to design a high quality survey:

1. Clarify the purpose of your survey.

Begin by considering why choose a survey instead of another method to answer your question. Why is a survey appropriate for your question?

What is the time frame for your survey? Will it be a timely, issue-specific "fact-finding" survey that reveals "How many people think X?" about a specific issue (such as a curriculum adoption, or a bond election)? Will the survey lose its relevance after the moment has passed? Or does your survey aim to measure something ongoing in the culture (like a school climate survey) and thus be used multiple times to build trend data?

Will the data be used to quantify the magnitude of sentiment, attitude, opinion, or behavior? Will the data be used to describe a population? Will the data be used to compare groups on a sentiment, attitude, opinion, or behavior? Or could your data be used to explain which variables are stronger predictors of an outcome than others?

2. Draft a map of the survey.

Designing a good survey is much like designing a good student achievement test. The starting point for a student achievement test is not test questions, it is a map of the different learning objectives. The same goes with a survey. A survey project should begin with a high level list of the overall questions one wants answered.

3. Sample carefully.

What is the sampling method? Is it a convenience sample of people available? If so, what are some sources of sampling bias? What relevant respondents might be left out? What profit might you gain from select a probability sample?

4. Use validated items from other established survey instruments, or write your own high quality items.

Learn from the experts, when possible:

- [Writing Survey Questions (The Pew Research Center)](#)
- [Best Practices (Washington State University)](#)

Keep survey items short and simple. Avoid long, wordy items that could confuse the respondent.

Avoid double-barreled items. Keep survey items focused on <u>one dimension</u> at a time. (I saw this in education over and over and over again.)

Don't lead or force data from the respondent. Example: Many times I have heard people intentionally withhold a "Neutral/No Opinion" category in order to "force" the respondent to take a stand on an issue. I don't like that practice. If a respondent truly does not understand or have an opinion about a topic, I would rather know that than force the respondent to yield an artificial (and, in my mind, invalid) response.

Allow response categories that span the range of all possible responses. Response categories on a survey item should be **exhaustive** and **mutually exclusive**. This assumes you know the full range of possible responses. If you don't, consider asking this item first as an open-ended item on a pilot survey. Then you can ask it as a closed item on your operational survey.

Be judicious in your use of open-ended items. Allowing respondents to respond in their own words will create a large volume of comments that will take time to read, and many of the comments say similar things. Use open-ended items on a pilot instrument when you don't fully understand an issue and want to see the full range of possible types of responses to it. These types of responses can then become response categories on a closed item on an operational version of the survey.

5. Pilot the questionnaire before going live.

Show the questionnaire to a small sample of intended respondents. Ask them to take the survey, noting the following:

Confusion. Is the purpose of the survey clear to the respondent? Is any part of it confusing to the respondent in any way? Are any items confusing as worded?

Bias. Does the survey truly capture the full scope of respondent experience on the issue? Are some options left out? Do some items lead or force the respondent?

Length. Is the survey an appropriate length? Does the survey tire out respondent? Aim for no longer than 15 minutes.

Validity. Does the survey capture the thinking, (mis)conceptions, ideas, beliefs, sentiments, attitudes, opinions, and/or behaviors you designed it to capture? Or does it also capture extraneous information? Use a "think aloud" method of asking the respondent to verbalize their responses as they take the survey.

There is not always time to pilot a survey. But in my experience, piloting has always improved the quality of my surveys.

References

Burkholder, G. J., K. A. Cox, L. M. Crawford, and Hitchcock. 2020. *Research Design and Methods: An Applied Guide for the Scholar-Practitioner*. Sage.