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SoTL Study Design and Data Collection

SoTL study designs can vary, and your research question directs your study design. Consider who you want to study and what kind of data would answer your research question. Data sources may be assignments that students complete, such as exams, quizzes, essays, evaluations of presentations, labs, etc. These types of data tend to measure student knowledge and performance. Other data sources include questionnaires and interviews. These data tend to measure student attitudes and thought processes.

Another way to describe data is whether it is quantitative or qualitative. Each type of data and its subsequent methods of analysis has its own strengths and goals. Quantitative data can be reduced to numbers (e.g., tests, questionnaires) and tend to answer whether something changed. Qualitative data are generally words (e.g., open-ended responses, interviews, reflective responses) and tend to be better at answering how and why something changed. Mixed-method studies use both types of data.

Common SoTL Study Designs

- **Descriptive and Case Study**: A descriptive SoTL research design describes a current situation, and it does not test predictions or make any cause-and-effect relationships. The study describes a learning situation without attempting to influence it. A descriptive study is often a precursor to additional studies. A case study is a form of descriptive research focusing on a sample of one: a single person, classroom, assignment, etc.
- **Quasi-experimental**: A quasi-experimental design allows us to infer whether something we do causes a change. There are several quasi-experimental designs. Note how having pre-tests and comparison groups strengthens the conclusions.
    - Single-group, post-test only: One group is given a post-test. Although this is the simplest design, there is nothing with which to compare results, so it is difficult to draw convincing conclusions.
    - Single-group, pre- and post-test: One group is given a measure before instruction and the same measure after. This is a better design, but it might be difficult to know if there are other variables that affect students' scores.
    - Two-group, post-test only: One group is given a post-test, and a comparison group is also given the post-test as a comparison. However, it is difficult to know if a difference in results is because of the instruction or if the two groups were different at the beginning.
    - Two-group, pre-and post-test: Both groups are given pre- and post-tests, but only one group receives the instruction while the other group is a comparison. This design is the strongest quasi-experimental design. If students are randomly assigned—very uncommon in SoTL—then it would be an experimental design.

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Common Sources of SoTL Data

- **Questionnaire**: Questionnaires allow us to ask questions to a large number of students, generally without a large time commitment. Questionnaires can ask about knowledge and/or attitudes. The questions can be multiple choice, multiple answer, open-ended, and Likert rating scales. You want to ensure that your instrument measures the same thing each time it is used (it is reliable) and that you are measuring what you think you are measuring (it is valid). Ways to ensure this include using a pre-existing instrument, doing a pilot study, and asking colleagues for feedback.
- **Artifacts**: Students turn in assignments and generate activity in learning management systems, and these can be used as a source of data to answer a research question. Examples of student artifacts include quiz and exam scores, essays, responses to reflection questions, timing of assignment completion, etc.
- **Interviews**: Interviews are conversations that allow us to understand perspectives in more depth than a questionnaire can provide, but they generally get information from fewer individuals. Semi-structured interviews ask pre-written questions but allow for conversation and follow-up based on responses. Interviews can ask questions about knowledge, thought processes, attitudes, and opinions. Interviews can provide a wealth of data including answers to how and why questions, but analysis can be time-consuming.
- **Focus group**: A focus group is similar to an interview but involves a small number of participants who interact with each other and the moderator, who generally is not involved with the study. Focus groups generally ask about perceptions, beliefs, and attitudes. They can gather a lot of information in a short time, but they are greatly influenced by the moderator, can be dominated by individual personalities, and tend to result in data that is less rich than interviews.
- **Observations**: Observations in research are formal notes using predetermined criteria to gather information about instruction. Observers should not change the environment but instead record the setting, social environment, implementation of activities, and/or communications. Observers are generally not the instructor.

A pilot study is useful, since it can help you identify unforeseen challenges and opportunities. You may test a new questionnaire or try a small-scale version (fewer interventions or fewer students) of your larger study.

An important consideration for SoTL data collection is the ethical treatment of your participants. It is important to think about informed consent, data confidentiality, and potential risk. Research involving human subjects should be reviewed by the Institutional Review Board (IRB).

Much of this information is modified from and inspired by the book *Engaging in the Scholarship of Teaching and Learning* (2012) by Cathy Bishop-Clark and Beth Dietz-Uhler. The CCRI Library has multiple copies in the CTE collection. I encourage you to review the book for additional details, information, and examples, particularly Chapter 5 "Designing the Study" and Chapter 6 "Collecting the Data."

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SoTL Study Design and Data Collection Worksheet

Complete this worksheet to help you plan your study design and data collection. Much of this worksheet is modified from the book *Engaging in the Scholarship of Teaching and Learning* (2012) by Cathy Bishop-Clark and Beth Dietz-Uhler, available in the CTE Collection at the CCRI Library. I encourage you to review the book for additional details, information, and examples, particularly Chapter 5 "Designing the Study" and Chapter 6 "Collecting the Data."

What is your research question?

Will you do a pilot study?

Identify your time frame.

Who do you plan to study? (e.g. what courses, how many students, etc.)

Will you use a comparison group? If so, who?

Identify your study design:

- Descriptive and case study
- Quasi-experimental: Single-group, post-test only
- Quasi-experimental: Single-group, pre- and post-test
- Quasi-experimental: Two-group, post-test only
- Quasi-experimental: Two-group, pre- and post-test
- Other

Identify your source(s) of data:

- Questionnaire
- Artifacts (which ones?)
- Interviews
- Focus group
- Observations
- Other

Draw your study design. Many research designs can be illustrated with a picture, diagram, or flowchart. This will help clarify in your own mind the exact procedure you will follow to conduct your SoTL research.

Describe the study design you drew. Explain why you made the decisions you did.

Examine your research question again. What variables are you going to measure? (e.g. knowledge, critical thinking, motivation, ….)

How will you measure each variable? Include questions from your measurement instrument.

Provide detailed information about when, where, who, and how you will collect your data.

As you're thinking about your study more, do you want to change or adjust your research question?