QUALITATIVE RESEARCH FOR ENGINEERING EDUCATORS

INTRODUCTION

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B.S. in Bioengineering – George Mason University
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OVERVIEW

What is Qualitative Research?

Why do we do Qualitative Research?

How do we do Qualitative Research?

How do we know we're doing Qualitative Research well?

Where can I get more information?

WHAT IS QUALITATIVE RESEARCH?

- According to Creswell:

  "***Qualitative research is inquiry process of understanding a social or human problem based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting***"

- Qualitative Research generally investigates the "what", "why", and the "how" questions

  "How do minoritized students experience engineering identity development in their first-year BME introductory course? "

- How can we investigate these types of questions?

  interviews, focus groups, reflections, and several other data sources

QUANT VS. QUAL

Category	Quantitative Research	Qualitative Research
Question	Close-ended	Open-ended (How, what, and why)
Population	Many	Few
Data Collection	Surveys, experiments, and observations	Interviews, focus groups, artifacts
Data Analysis	Numbers	Synthesis
When	Confirm	Understand

WHY DO WE DO QUALITATIVE RESEARCH?

Why do we do it?	***We can go beyond numerical data and look at the whole picture!***
What value does it add?	**Understanding (1) person/group (2) new areas of understanding (3) details**
We know why, now where do we start?	***Think of good (1) Research questions (2) Research Design (3) Data collection and Analysis***

HOW DO WE DO QUALITATIVE RESEARCH?: RESEARCH QUESTION

Sample Population

Data Collection

Methodology

Research Question

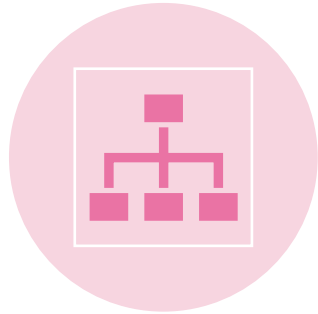
Theory

HOW DO WE COLLECT DATA ?

OBSERVATIONS

INTERVIEWS

DOCUMENT REVIEW



ARTIFACTS

ETHICS IN DATA COLLECTION

- IRB
- Consent
- Deidentification
- Reciprocity & Relationship Building

HOW DO WE ANALYZE DATA?

Managing and organizing our qualitative data

Qualitative Coding

Reading and memoing emerging ideas

Analyzing Data

Representing qualitative data and visualizing the data

WHAT IS CODING AND HOW DO WE DO IT?

CODING IS A SYSTEMATIC WAY TO LABEL AND ENGAGE WITH YOUR DATA

THEY CAN BE A PRIORI OR IN-VIVO CODING

IT'S NOT A ONE AND DONE PROCESS

CODE BOOK

A priori Code	Definition
Performance/ Competence (Engineering Identity)	Belief in their ability to perform well and understand engineering concepts
Recognition (Engineering Identity)	beliefs that they are seen as a good student in the subject by peers, parents, and teachers
Interest (Engineering Identity)	Student shows interest in engineering topics in a positive way

CODE BOOK

In-vivo Code	Definition
Rigor	When a student discusses engineering experiences as harsh and demanding.
Peer-Peer Relationships	The connections and interactions that students have with their friends and peers
Imposter Syndrome	When a student doubts their own skills or success

WHAT IS MEMOING?

Theme	Quote/Notes
Rigor	" The professors say to study 3 hours for every credit. That is 45 hours in a week, but also do 20 hours of research, participate in department events, on top of my jobs, and family. It is expected that you will get it done with no excuses."
Peer-Peer Relationships	" Working with my lab mates helped me gain confidence in my understanding of the content"
Imposter Syndrome	" I work hard and get good grades, but I do not feel like an engineer"

TRUST WORTHINESS

Peer review/debriefing

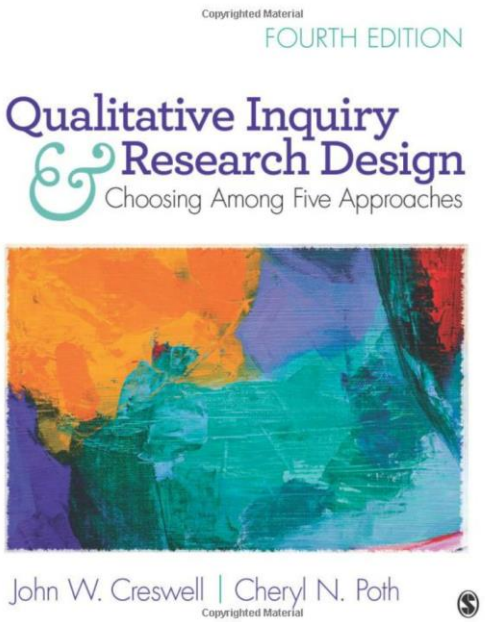
Triangulation

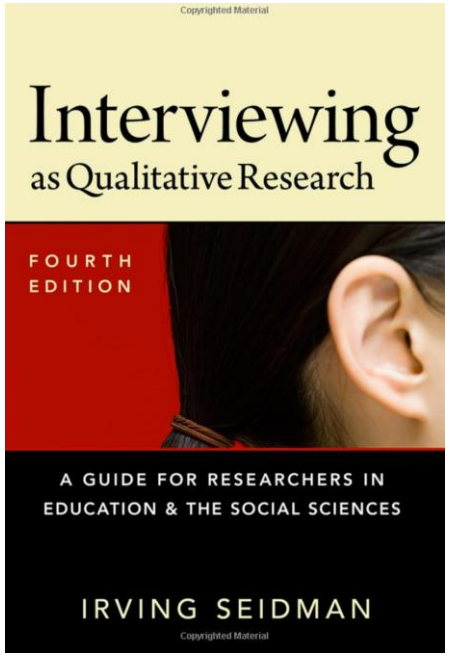
Researcher Bias/reflexivity

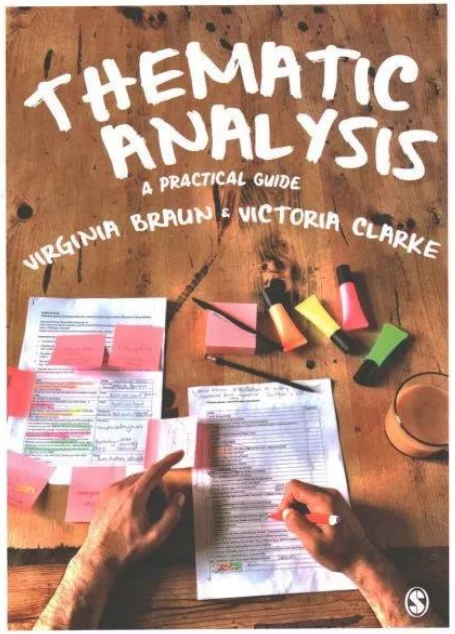
Prolonged Engagement

Member Checking

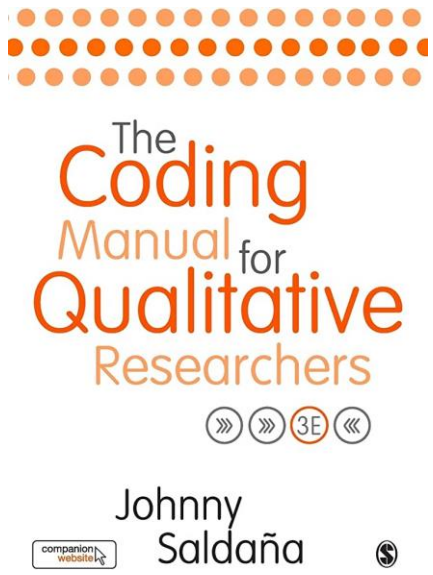
GENERAL RESOURCES: BEGINNER

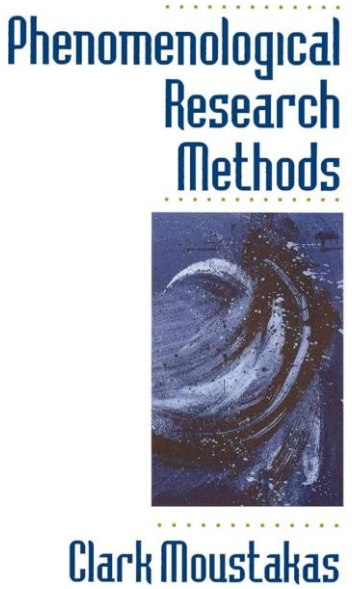






GENERAL RESOURCES: ADVANCED





TAKEAWAYS

Qualitative research is to answer the what how and why questions

We need to pick a good RQ, a theory, a method, and think about the data collection, storage, and analysis process

We need to have a way to arrange and engage with our data to organize and understand it before analyzing and synthesizing

THANK YOU

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- LINKEDIN QR CODE ABOVE