



# GETTING STARTED WITH RESEARCH

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# RESEARCH STUDY

- Primary research: the focus of this presentation
- Secondary research: somebody else already collected data for you. Usually data are from organizations and government (e.g. CDC).

# STEPS OF CONDUCTING A RESEARCH

- State the problem
- Conduct literature review
- Shape research questions
- Choose research design
- Choose data collection tools
- Conduct data collection (IRB must approve your study before data collection)
- Clean data
- Perform data analyses
- Report results (write-up)

# RESEARCH QUESTION

- At the beginning, you need to
  - Have your research interests
  - Conduct literature review
  - Try to get some research questions
  - Decide whom you are going to study: what is your study unit? People or something else?
  - Finalize your research questions

# RESEARCH DESIGN

- Then, start to think about research design
  - Choose your own design
    - A quantitative design?
    - A qualitative design?
    - Or a mixed research design (has both quantitative and qualitative components)?

# RESEARCH DESIGN

- Quantitative research designs (mostly used designs and they are not exclusive):
  - Survey research/cross sectional study: not very challenging
  - Intervention research: challenging
  - Experimental design: challenging, but strong design
  - Quasi experimental design: easy, but weak design

# RESEARCH DESIGN

- Intervention research
  - Pre-intervention-post without a control group: weak design
  - Pre-intervention-post with a control group: strong design
  - Collect at least two-time-point data

# RESEARCH DESIGN

- Experimental design
  - In intervention research you can have this design. You need to **randomly** assign participants to either group (e.g. intervention or control group).
- Quasi experimental design
  - You can have this design in intervention research. No random assignment for this design.



# RESEARCH DESIGN

- Internal validity of your study design
  - It refers to the truthfulness of the claim that one variable causes another.
  - In intervention research, it refers to the truthfulness of the claim that the intervention had effects on the targeted variables.

# RESEARCH DESIGN

- Threats to internal validity
  - Reverse causation: in survey research, measure all variables at the same time.
  - Time threat: history, reactivity, maturation, and instrumentation. Use control group can protect against this threat.



# RESEARCH DESIGN

- Threats to internal validity
  - Group threats: the groups are different in the beginning. Randomization can protect against this threat.
  - Mortality: attrition. Loss of subjects.

# RESEARCH DESIGNS

- Qualitative research designs (five approaches):
  - Narrative research
  - Phenomenology: popular
  - Grounded theory: popular
  - Ethnography
  - Case study

# RESEARCH DESIGNS

- Mixed research designs
  - Convergent parallel design: basic design
  - Explanatory sequential design: basic design
  - Exploratory sequential design: basic design
  - Embedded design: basic design
  - Transformative design: special design and seldom used
  - Multiphase design: time consuming and needs more resources.

# QUANTITATIVE RESEARCH

- Before get yourself in a quantitative research, you need to ask some questions:
  - **Is my research doable?** Because quantitative research requires **big sample size**.
    - for example, your research question is about leadership among chancellors from the universities in East Carolina: you might not be able to do quantitative research because the pool of participants is too small.

# QUANTITATIVE RESEARCH

- Questions you need to ask yourself
  - If you want to do an intervention research (collect data at least twice), **do I have enough time** to do so.
  - Where and how am I going to get my participants?
  - Do I have resources to get enough participants?
    - Do you need any help from other people?

# RECRUITMENT FOR QUANTITATIVE RESEARCH

- Recruitment is very challenging:
  - Primary research: you need to collect data by yourself.
  - You need to think about the following questions
    - How many participants do I need? (power analysis)
    - What is the **response rate** based upon other people's similar research? (about 20%).
    - Do I have strategies to recruit participants?



# RECRUITMENT

- Recruitment
  - Do I have back-up plans if cannot get enough people at the first round of data collection?
  - How many rounds of data collections do I need? (at least 2 rounds).
  - How to get balanced sample size for intervention and control group?

# RECRUITMENT

- Based upon your research questions, can you get enough people for **certain category**? For example, you want to compare females and males in self-esteem among students from nursing school at ECU.
  - Maybe it is difficult to get enough males from nursing school.

# RECRUITMENT

- You also can pay company to collect data for you. For example: Amazon Mechanical Turk (mturk) and Qualtrics. But:
  - Expensive: pay by subject
  - No control of data collection: quality of data is a concern.

# DATA COLLECTION

- **Important**

- Before collect any data, make sure that your study has been approved by IRB!

# DATA COLLECTION TOOL

- What is your data collection tool?
  - Survey: is it available from the literature? Do you need to design a new one?
    - How many questions does your survey have?
    - What measures are included in your survey?
    - Which measures will answer which research questions.

# DATA COLLECTION TOOL

- Survey (instrument)
  - Are you going to collect data online?
    - Do you need to use online data collection software (e.g. Qualtrics)?
  - Are you going to collect data using paper survey?
    - Save your survey as a PDF file before print it.

# DATA COLLECTION TOOL

- Survey
  - Has the available survey been validated?
    - If not, what kind of solution do you have?
  - I don't recommend graduate students design your own survey except your study is about survey design.
  - You always can borrow somebody else's survey. But need to get a permission for using it.

# DATA COLLECTION

- How to collect your data
  - Quality control: the quality of your data is very crucial for the whole study.
  - Process evaluation: for intervention research, you need to know how the intervention is implemented (treatment fidelity).
  - Protocol for data collection: where, when, how.



# QUALITATIVE RESEARCH

- What is your qualitative research design?
- How to get your participants?
- How many participants do you need?  
(saturation)
- How to conduct individual interview or group interview (focus group)?
- Do you need any training of interview skills?

# QUALITATIVE RESEARCH

- You need to create an interview guide
  - The guide includes several key questions to guide you to conduct individual or group interview.
- Where to do, when to do, and who will do the interview
  - Location is important. It should be a place which both interviewer and interviewee feel comfortable with.

# QUALITATIVE RESEARCH

- You need to **record** the interview
  - Try to get at least two devices to record your interview (e.g. recorder, computer, cell phone, etc.)
- Transcribe recordings
- Normally use Word to document transcripts by participants

# MIXED RESEARCH

- If you have a mixed research design, you need to think about the following questions
  - Which mixed design do I want to use?
  - What is the purpose of quantitative research and what is the purpose of qualitative research?
  - Do they share same research questions or have different research questions?
  - What is the connection between qualitative research and quantitative research?

# DATA ANALYSIS

- You need to learn at least one statistical package for data analyses
  - SPSS: very good for beginners, menu driven software
  - SAS: code-driven software
  - R/Python: open source and code-driven software
  - JMP: fine for beginners, menu driven software
  - AMOS: structural equation modeling software
  - Mplus: structural equation modeling software (ECU doesn't support it)
  - Stata: ECU doesn't support it, also code-driven
  - NVivo: for qualitative data analysis
  - Qualtrics: for designing online survey

# DATA ANALYSIS

- You should start to learn how to use statistical software as earlier as possible.
- You can learn software through courses and our workshops.

# DATA ANALYSIS

- Data analyses are based upon your research questions.
- We use data analysis to answer research questions.

# DATA ANALYSIS

- Types of measurement: different types of measurement use different data analyses.
  - Nominal
  - Ordinal
  - Scale: interval and ratio



# DATA ANALYSIS

- For example, we look at relationships of two variables.
  - Two nominal or ordinal variables: Chi-square test, logistic regression.
  - One nominal/ordinal variable and one scale variable: Independent sample T test, ANOVA, linear regression, logistic regression.

# DATA ANALYSIS

- For example, we look at relationships of two variables.
  - Two scale variables: correlation, linear regression.
- For survey development: exploratory factor analysis, confirmatory factor analysis
- For more complicated studies: structural equation modeling: path analysis or SEM.



ANY QUESTIONS?



THANK YOU