GETTING STARTED WITH RESEARCH

By Hui Bian
Office for Faculty Excellence
• 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
• 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.
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
  • 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.
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!
• 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
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
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