Mixed Methods Research

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Take Home Points

By the end of this presentation, we will have discussed:

- A review of the basics of qualitative research
  - What it is, types of problems it addresses, purpose statements, sources of data, analysis, rigor

- The basics of mixed methods research
  - Essential characteristics
  - Designs including examples in delirium research
  - NIH Best Practices
Review of Qualitative research

An approach wherein the inquirer:

- aims to gain insight
- asks participants broad, general questions, primarily inductive reasoning
- collects detailed views of participants in the form of words or images
- . . . in an effort to explore a central phenomenon (one key concept)

**QUANTITATIVE**

explaining or predicting variables

\[ X \rightarrow Y \]

The independent variable (X) influences a dependent variable (Y)

**QUALITATIVE**

understanding or exploring a central phenomenon

In-depth understanding of Y; external forces shape and are shaped by Y
Qualitative vs Quantitative

<table>
<thead>
<tr>
<th>Type of questions</th>
<th>Sample Size</th>
<th>Info per respondent</th>
<th>Administration</th>
<th>Type of analysis</th>
<th>Type of research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probing</td>
<td>Small</td>
<td>Much</td>
<td>Requires skilled researcher</td>
<td>Subjective/Interpretative</td>
<td>Exploratory</td>
</tr>
<tr>
<td>Limited probing</td>
<td>Large</td>
<td>Varies</td>
<td>Fewer specialist skills required</td>
<td>Statistical</td>
<td>Descriptive or casual</td>
</tr>
</tbody>
</table>
What types of problems are suited for qualitative research?

- when you are exploring a subject about which you don't know much in advance
- when you want to grasp the meanings, motives, reasons, patterns, etc., usually unnoticed in standardized approaches.

A good qualitative purpose statement will include:

- Single sentence “The purpose of this study . . .”
- Central phenomena
- Qualitative words (e.g. “explore,” “understand,” “discover”)

“The purpose of the current exploratory study was to describe examples and qualitatively derived themes of nurse-facilitated PCC for hospitalized older adults with dementia and delirium.” Yevchak, A. et al. *J Gerontol Nurs.* 2017;26:1-8.
What types of problems ... related to delirium research are suited to qualitative inquiry?
Qualitative Approaches

**DESCRIPTIVE**
- Discovers/describes the who, what, and where of events or experiences through interviews (individual or group) or open-ended questions on surveys

**NARRATIVE**
- Explores the life of an individual using interviews and primary documents

**PHENOMENOLOGY**
- Explores the unique perspective, lived experience in long interviews in up to 10 participants

**GROUNDED THEORY**
- Investigates how inductively-derived theory about a phenomenon is grounded in the data of a particular setting through Interviews with 20-30 individuals to “saturate” categories and detail a theory

**ETHNOGRAPHY**
- Studies cultural patterns and perspectives of participants in their natural settings through observations, interviews, and possibly artifacts

**CASE STUDY**
- Examines the characteristics of a particular entity, phenomenon, or person through documents, archival records, interviews, observations, and physical artifacts
Qualitative coding process involves several steps

1. Transcribe the interview - set up is important
2. Read through data
3. Determine what the person is saying
   In coding frame (sentence, para, phrase) - the meaning unit of information
4. Look for overlap among codes

THEMES CAN:
- Describe a setting or what occurred
- Be what you would expect
- Be what you would not expect
- Also be related
- Create a conceptual map

MANY PAGES OF TEXT
MANY SEGMENTS OF TEXT
30-40 CODES
CODES REDUCED TO 20
REDUCE CODES TO 5-7 THEMES

Codes in left column

Adapted from Cresswell, 2016
Qualitative rigor

- **TRUSTWORTHINESS**
  - Member checks: recycling interpretation back to the key informants
  - Searching for disconfirming evidence
  - Triangulation: multiple data sources
  - Thick description: a thorough description of the context of the study

- **CONFIRMABILITY**
  - Collection of data in ways that allow for audits: audio recordings, full transcripts of interviews
  - Engaging a team approach
  - Audit trail

- **REFLEXIVITY**
  - Document beliefs, framework, theories underlying approach to the problem before beginning the data collection.
  - Reflections
  - Engage other perspectives in team analysis.
HOW WE MAKE SENSE

A Mixed Methods Approach

Numbers

Personal Experiences
Mixed Methods

Design for collecting, analyzing, and mixing both quantitative and qualitative research (or data) in a single study or sustained series of studies to understand a research problem.

(Adapted from Creswell and Plano Clark, 2007)
Mixed methods developed in the social sciences and health/behavioral sciences (1985-1990)

- Jennifer Greene
  University of Illinois
  - EVALUATION

- John Hunter & Allen Brewer
  Northwestern and Boston College
  - SOCIOLOGY

- John Creswell
  - EDUCATION

- Alan Bryman
  - MANAGEMENT

- Nigel & Jane Fieldin
  - SOCIOLOGY

- Jan Morse
  - NURSING
## Mixed Methods Popularity

### Number of Dissertations and Theses with "Mixed Methods" in the Title

<table>
<thead>
<tr>
<th>Year Range</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-2015</td>
<td>3034</td>
</tr>
<tr>
<td>2005-2009</td>
<td>2524</td>
</tr>
<tr>
<td>2000-2004</td>
<td>532</td>
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<tr>
<td>1995-1999</td>
<td>100</td>
</tr>
<tr>
<td>1990-1994</td>
<td>26</td>
</tr>
<tr>
<td>1985-1989</td>
<td>17</td>
</tr>
<tr>
<td>1980-1984</td>
<td>3</td>
</tr>
</tbody>
</table>

Proquest Search Engine
Typical situations in which mixed methods is used...

- To compare results from quantitative and qualitative research
- To use qualitative research to help explain quantitative findings
  - Including adding stakeholder perspectives into our measured results
- To explore using qualitative research and then to generalize findings to a large population using quantitative research
- To develop an instrument because none are available or useful
- To inform intervention development/refinement
- To support implementation and dissemination research

M. Fetters, University of Michigan, 2014
Five Essential Characteristics of Mixed Methods Research

- The collection and analysis of BOTH quantitative and qualitative data to address to questions/hypotheses
- The use of rigorous procedures in conducting quantitative and qualitative research
- The integration (or combination) of the findings from the quantitative results and the qualitative findings
- The development of procedures in which this data collection, analysis, and integration occurs: mixed methods designs
- The use of theory (and philosophy) as it relates to these procedures

Creswell, 2016
When Will You Use Mixed Methods?

- When qualitative research or quantitative research is insufficient to fully understand the problem

- When it is feasible and realistic:
  - Time
  - Economics
  - Skills available
  - Useful for stakeholders?
# Data Sources and Analysis

<table>
<thead>
<tr>
<th>QUANTITATIVE</th>
<th>QUALITATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data collection</strong> (CLOSED-ended)</td>
<td><strong>Data collection</strong> (OPEN-ended)</td>
</tr>
<tr>
<td>- Instruments</td>
<td>- Interviews</td>
</tr>
<tr>
<td>- Behavioral checklists</td>
<td>- Observations</td>
</tr>
<tr>
<td>- Records</td>
<td>- Documents</td>
</tr>
<tr>
<td>- Audio-visual materials</td>
<td>- Audio-visual materials</td>
</tr>
<tr>
<td><strong>Data analysis</strong>: numeric data</td>
<td><strong>Data analysis</strong>: text and image data</td>
</tr>
<tr>
<td>- For description</td>
<td>- For coding</td>
</tr>
<tr>
<td>- For comparing groups</td>
<td>- For theme development</td>
</tr>
<tr>
<td>- For relating variables</td>
<td>- For relating themes</td>
</tr>
</tbody>
</table>
Integration (point of interface) can occur during:

- **Data collection**
  (e.g., collecting quant and qual items on the same survey)

- **Data analysis**
  (e.g., qual data are converted into quant scores or when themes are analyzed based on quant dataset)

- **Data interpretation**
  (e.g., when results of quantitative analyses are compared with themes that emerge from the qualitative data)
Validity/Methodological Issues

DESCRIBE:

- Rigorous and systematic sampling, recruitment, data sources and collection and analysis
- Validation strategies for both qualitative (trustworthiness, credibility, transferability) and quantitative (including threats to internal and external validity) data
- How quantitative and qualitative components will be combined
  - Concurrent: comparing, relating and synthesizing (how will divergent findings be managed?)
  - Sequential: procedures for connecting
- Need a plan to resolve differences ...

Mixed Methods Designs

**BASIC DESIGNS**
- Convergent Design
- Explanatory Sequential Design
- Exploratory Sequential Design

**ADVANCED DESIGNS**
- Intervention Design
- Transformative Design
- Multiphase Design
Examples of Mixed Methods Designs / Studies
Aim: assessed the experience of informal caregiver and staff (staff nurses, nurse aides, physical therapists) caring for patients with delirium superimposed on dementia

A CONVERGENT DESIGN

Merge results

Aim: assessed the experience of informal caregiver and staff (staff nurses, nurse aides, physical therapists) caring for patients with delirium superimposed on dementia

A CONVERGENT DESIGN

Quantitative

Qualitative

Three days after resolution of delirium: informal caregivers and staff rated level of distress (0-4) to each item on the delirium-o-meter. Mean informal caregiver stress was moderate (2.3, SD1.1), higher than one month follow-up and higher stress as compared to staff.

Interpretation

Three days after resolution of delirium, interviews of informal caregivers and staff to describe experience and worries.

The qual component converged on categories of informal caregivers’ and staff feelings related to the delirium experience, with implications for training and support. Specific symptoms cited by informal caregivers. Physical therapy had highest distress among staff.
Aim: Describe family carers’ experiences, understanding of delirium and delirium care, and support needs.

**Core Design**

**PHASE 1**

**QUANTITATIVE Data Collection and Analysis**

Survey (Likert) - highest rated items: distress about the patient’s condition, worries about future care, need for information

**PHASE 2**

**QUALITATIVE Data Collection and Analysis**

Interpretation

Interviews: Themes included: 1) admission experience, 2) worries/ concerns (? dementia, emotional response of patient), 3) feeling supported
Rate of agreement when nurses’ CAM ratings were compared with those of the researchers was poor, $\kappa = 0.34$ (95% CI [0.05, 0.64], $p< 0.05$). Nurses recognized delirium 23% (3 of 13) of the time.

**PHASE 1**

**QUANTITATIVE**
rate of agreement between nurses and expert diagnosticians in detecting delirium. *(Kappa statistic)*

**PHASE 2**

**QUALITATIVE**
semistructured Interviews of nurses (n=16) explored reasoning
Analyzed using grounded theory (open, axial, selective coding)

**Interpretation**
Core Design

**PHASE 1**

**QUALITATIVE Data Collection and Analysis**

Recorded interviews with caregivers of persons admitted to hospice (with delirium) about symptom development and progression of delirium.

**PHASE 2**

Builds into **QUANTITATIVE Phase**

Qual data was sorted and followed concept mapping procedures. Multidimensional scaling (MDS) of the aggregated sort items, hierarchal cluster analysis (cluster similarities) of the MDS coordinates yielded a 3–factor delirium precursor model (sleep and rest, cognition, and physical, psychological, and caregiver distress.) Sleep disturbance was most prevalent and intense precursor.
Use an Explanatory Sequential Design, and Exploratory Sequential Design, or a Convergent Design in an Intervention Trial

INTERVENTION MIXED METHODS DESIGN

- **Experiment with an Intervention and Pre- and Post-Test Measures**
  - Qualitative Interviews **BEFORE** Experiment (Exploratory Sequential Design)
    - Recruit participants
    - Develop workable interventions
    - Develop good pre-post-test measures
  - Qualitative Interviews **DURING** Experiment (Convergent Design)
    - Examine participants’ experiences
    - Modify treatment
  - Qualitative Interviews **AFTER** Experiment (Explanatory Sequential Design)
    - Explain outcomes
    - Modify experiment

Established feasibility in diverse facilities
Intervention modified: training, use of champions
Important outcome: hospitalizations
Other Advanced Designs

Social Justice Design (using an Explanatory Sequential Design example)

Theory  Research Questions  Quantitative Data Collection e.g., survey  Quantitative Results  Qualitative Data Collection and Analysis  Qualitative Results

Promote Social Justice

Multistage Evaluation Design (using an Exploratory Sequential Design example)

Single Program Objective

Formative Needs Assessment (qualitative data collection)  Theory/Conceptual Framework (based on qualitative results)  Instrument Development (based on quantitative tests)  Formative Program Assessment (qualitative data collection)  Summative Program Evaluation (pre-post quantitative tests)  Program Revision

Interpret How Qualitative Data Explains Quantitative Results And Calls for Action
Mixed Methods Integration Statements

Integration = INTERSECTION of qualitative and quantitative data (Plano Clark & Ivankova, 2016)

- “Integration will involve merging the results from the quantitative and qualitative data so that a comparison could be made and a more complete understanding emerge than what was provided by the quantitative or the qualitative results alone.” (Convergent Design)

- “Integration will involve connecting the results from the initial quantitative phase to help plan the follow up qualitative data collection phase. This plan would include what questions need to be further probed and what individuals can help best explain the quantitative results.” (Explanatory Sequential Design)

- “Integration will involve gathering initial qualitative data, analyzing it, and then using the qualitative results to build a new intervention (or measure or instrument) that will be tested quantitatively.” (Exploratory Sequential Design)

Writing an R Grant
NIH Best Practices for Mixed Methods Research in the Health Sciences

- The **theoretical and conceptual orientation** informs the design and is consistent across all phases of design
- **Explicit** quantitative aims, qualitative aims, and mixed methods aims
- Clearly identify **integration** (point of interface) in designs (Plano Clark & Ivankova, 2016)
- **Innovation**: why mixed methods?
- **Validation strategies** for each phase
  - Mixed methods – has its own validity, called “legitimation” (Onwuegbuzie & Johnson, 2006; Creswell & Plano Clark, 2011)
- Mixed methods **team** needs experience together and includes a researcher with qualitative experience/expertise
- **Publications**: Joint displays represent integration in a results or discussion


[https://obssr.od.nih.gov/training/mixed-methods-research/](https://obssr.od.nih.gov/training/mixed-methods-research/)
Theory Informing an Explanatory Sequential Design

Theory of Behavioral Change

Integration

Collect/analyze Quantitative Data
- Collect N=250 surveys
- Measure behaviors associated with delirium screening
- Analyze data descriptively and multivariately

Collect/analyze Qualitative Data
- Collect N=30 interviews with hospitalists based on surprising quantitative results
- Code data and identify themes

PHASE 1

PHASE 2

Interpret how qualitative results help explain quantitative results
**Mixed Methods Integration Statements**

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Innovation

• Has prior research in the area used a mixed method approach?
• Any new tools and products that will be part of the mixed method approach?
Research Strategy

- Introduce mixed method research and specific design
- Provide a definition and cite studies that have used from health/area of interest (Use search terms such as “mixed methods” or “quantitative and qualitative”)
- Name specific mixed methods design being used and cite studies (Search NIH RePORTER)
- Explain rationale: seeking a more comprehensive account of a phenomenon, examining structure and process, or generating and testing hypotheses
- Provide a diagram of overall quant and qual procedures: See Ivankova, Cressweel Stick (2006)
- Create a table outlining sampling, procedures, and analytic strategies utilized to address each of the study aims.
A few words about MM publications
The Flow of Components in a Mixed Methods Publication

**INTRODUCTION**
- Justify the need for quantitative and qualitative data and their integration
- Create quantitative, qualitative and mixed methods study aims
- Identify type of mixed methods design
- Provide diagram of design procedures
- Present quantitative and qualitative data collection and analysis separately
- Address research integrity of procedures

**METHODS**
- Report quantitative and qualitative results
- Report mixed methods results (e.g., joint display)

**RESULTS**
- Match interpretation to quantitative, qualitative, and mixed methods results

**DISCUSSION**
- Quantitative instruments/qualitative protocols
Publishing a Mixed Methods Project

<table>
<thead>
<tr>
<th>TYPE OF DESIGN</th>
<th>TEMPLATE FOR METHODS SECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONVERGENT Design</td>
<td>Methods – separate quan and qual</td>
</tr>
<tr>
<td></td>
<td>Results – separate quan and qual</td>
</tr>
<tr>
<td></td>
<td>Discussion – integration</td>
</tr>
<tr>
<td>EXPLANATORY Sequential Design</td>
<td>Methods – quan first, then qual</td>
</tr>
<tr>
<td></td>
<td>Results and Discussion – quan, results to be explained, qual</td>
</tr>
<tr>
<td>EXPLORATORY Sequential Design</td>
<td>Methods – qual then quan</td>
</tr>
<tr>
<td></td>
<td>Results and Discussion – qual, use of qual, quan</td>
</tr>
</tbody>
</table>

Questions?
Resources

• John Creswell Mixed Methods Site  http://johnwcreswell.com/ (includes books and trainings)


