Mixed Methods Research Designs

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Overview: The basics of mixed methods research
  - Methodology
  - Paradigm
  - Benefits
  - When to use mixed methods research

Overview of the primary mixed methods research designs

Recommendations for forming groups and partnerships to carry out projects utilizing mixed methods designs
What is mixed methods research (MMR)?

- As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of quantitative and qualitative approaches in many phases of the research process.

- As a method, it focuses on collection, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies.

- Its central premise is that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone (Creswell & Plano-Clark, 2008; Creswell, 2012).
What is Mixed Methods Research?

- Involves collection and analyzing both qualitative and quantitative data

- **Mixing of data**
  - Merging
  - Connecting
  - Embedding

- **Central premise of MMR:**
  - Combination of quantitative and qualitative approaches provides a better understanding than either approach alone
What is the value that MMR adds that quantitative or qualitative, each by themselves, do not provide?

- Strengths that offset weaknesses of quan/qual research
  - Quan (context, setting, voice, indirect)
  - Qual (bias, generalizability)
- Comprehensiveness
  - Tools in the toolbox
- Answers questions that cannot be answered by qual/quan approaches alone
  - “Do participant views from interviews and from standardized instruments surrounding end of life care converge or depart?”
  - “What explains extreme initial BSN nursing competence scores?” (uses qual to explain quan)
  - “Will a psychological skills training program be effective for Ph.D. nursing students experiencing statistics anxiety?” (exploring qualitatively before implementing an experiment)
What is the Value of Mixed Methods Research?

What is the value that MMR adds that quantitative or qualitative, each by themselves, do not provide (cont.)?

- Encourages collaboration across sometimes adversarial relationships between qualitative and quantitative researchers
  - Paradigm wars
    - Philosophical underpinnings
      - Postpositivism (objective reality) – top down, theory
      - Constructivism (subjective reality)
    - Orientations
      - Purists
      - Situationalists
      - Pragmatists
  - Encourages the use of multiple worldviews or paradigms (pragmatism)
  - Comprehensive
    - Example: News stories – images and statistics are used to convey deeper meaning
When the combination of both quantitative and qualitative data provide a better understanding of a research problem than either type by itself

When one type of research is not enough to address the research problem or answer the research questions.
  - Question driven (MM) vs. Method driven (quan or qual)

Pragmatism
  - When a practical view is needed that considers multiple views that are both subjective and objective
To incorporate a qualitative component into an otherwise quantitative study

To build from one phase of a study to another
  - Explore qualitatively then develop an instrument
  - Follow-up a quantitative study qualitatively to obtain more detailed information
Utilizes both quantitative and qualitative data collection methodologies

<table>
<thead>
<tr>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surveys (closed-ended)</td>
<td>Interviews</td>
</tr>
<tr>
<td>Performance Assessments</td>
<td>Observations</td>
</tr>
<tr>
<td>Personality Inventories</td>
<td>Focus Groups</td>
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<tr>
<td>Experimental (T and F tests)</td>
<td>Ethnographies</td>
</tr>
<tr>
<td>Frequency (descriptive, chi square)</td>
<td>Open-Ended Questionnaires</td>
</tr>
<tr>
<td>Relationships (regression and correlation)</td>
<td>Content Analysis, member checks, and triangulation</td>
</tr>
</tbody>
</table>
## Mixed Method Terminology

<table>
<thead>
<tr>
<th>Notation</th>
<th>Defined</th>
</tr>
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<tbody>
<tr>
<td>QUAN</td>
<td>Quantitatively driven study</td>
</tr>
<tr>
<td>QUAL</td>
<td>Qualitatively driven study</td>
</tr>
<tr>
<td>quan</td>
<td>Quantitative data is secondary to qualitative data</td>
</tr>
<tr>
<td>qual</td>
<td>Qualitative data is secondary to quantitative data</td>
</tr>
<tr>
<td>+</td>
<td>Quantitative and qualitative data are collected concurrently</td>
</tr>
<tr>
<td>→</td>
<td>Quantitative and qualitative data are collected sequentially</td>
</tr>
<tr>
<td>QUAL(quan)</td>
<td>Quantitative methods are embedded within a qualitative design</td>
</tr>
<tr>
<td>QUAN(qual)</td>
<td>Qualitative methods are embedded within a quantitative design</td>
</tr>
</tbody>
</table>

### Examples
- QUAN + QUAL
- QUAL → quan
- QUAN(qual)
The Explanatory Design

- Two phased MMRD
- Purpose: Qualitative data is used to explain or build upon initial quantitative results
- Used to explain significant (or non-significant) results, outliers, or surprising results
- Mixing Decisions:
  - **Timing**: Sequential (Quan followed by Qual)
  - **Weighting**: Usually Quantitative
  - **Mixing**: Connect the data between the two phases

Interpretation based on QUAN → qual results
Example Explanatory Design MM Research Question: What Explains Extremely High Nursing Competence Scores?

- \( \mu = 100 \)
- \( \sigma_m = 15 \)
- \( z \geq 1.96 \) or \( X \geq 129.4 \)
- Reject \( H_0 \)
The Exploratory Design
- Two phased MMRD
- Purpose: The results of first method (qual) can help develop or inform the second (quan) methods
- Used for instrument development, when variables are unknown, or when there is no guiding framework or theory
- Mixing Decisions:
  - **Timing:** Sequential (Qual followed by Quan)
  - **Weighting:** Usually Qualitative
  - **Mixing:** Connect the data between the two phases

Mixed Methods Designs: Connecting Data

QUAL → quan → Interpretation based on QUAL → quan results
Exploratory Design Example:
- “Will a psychological skills training program be effective for Ph.D. nursing students experiencing statistics anxiety?”
  - To answer this question, the researcher would first collect and analyze qualitative data to understand the dimensions of statistics anxiety and student perspectives. (focus groups)
  - These data would be used to develop a psychological skills training program with to reduce stats anxiety.
  - Next, repeated measures designs could be implemented to assess the effectiveness in reducing anxiety. (RM-ANOVA)
The Convergent Parallel Design

- Most common MM approach
- Purpose: Obtain different but complimentary data on the same topic to best understand the research problem
- Directly contrasts quan/qual results
- Expand quantitative findings with qualitative data
- Mixing Decisions:
  - **Timing:** Concurrent
  - **Weighting:** Usually Equal
  - **Mixing:** Merge data during the interpretation or analysis

QUAN  

Interpretation based on QUAN + QUAL results  

QUAL
Convergent Design Example:

- “Do participant views from interviews and from standardized instruments surrounding end of life care converge or depart?”
- In this case, two forms of data would be collected and analyzed:
  - Descriptive data from a quantitative instrument to assess end of life caregiving self-efficacy
  - Content analysis from caregiver interviews
- Data would then directly be compared for interpretation
The Embedded Design

- One data set provides a secondary, supportive role in a study based primarily on the other data type
- Premise: Different types of questions require different types of data
- Mixing Decisions:
  - **Timing**: Concurrent or Sequential
  - **Weighting**: Unequal
  - **Mixing**: Embed one type of data within a larger design using the other type of data
- Example: *Come Together* by The Beatles
  - What is the meaning of *Come Together*?
  - What are the musical properties of *Come Together*?

QUAL

quan

Interpretation based on QUAL(quan) results
Written by: John Lennon

Musicians and Instruments: John Lennon: lead vocals, rhythm guitar (1965 Epiphone E230TD(V) Casino)
Paul McCartney: backing vocals, bass guitar (1964 Rickenbacker 400IS), electric piano (Fender Rhodes)
George Harrison: lead guitar (1966 Gibson Les Paul Standard SG)
Ringo Starr: drums (1968 Ludwig Hollywood Maple), maracas


Mixed: August 7, 1969

Takes: 9

Melodic Organization:
Key: D minor
Rhythmic Properties: Short, staccato, notes; equal note length, metrically recurring pattern of “AAAA”
Structure: A, B, A, B, C, A, B, C, A, B, C (intro, verse, bridge, verse, chorus, bridge, verse, chorus)
Tempo: 82 beats per minute
Texture: Monophonic and polyphonic melodic line in verses; heterophonic chorus
Tone: Driving, underlying drone feel
Length: 4:16

First released: October 6, 1969, double a-side with "Something"

Perfect fourth interval on verses

Rhythmic variation (“AAAA”)

Analysis of chord structure and statistics to explain musical complexity

- Beethoven’s 9th (high entropy) and Pachelbel’s Canon in D (low entropy)

\[
H(X) := \sum_{i=1}^{|E|} P(E_i) \cdot \log_2 \left( \frac{1}{P(E_i)} \right) \\
= - \sum_{i=1}^{|E|} P(E_i) \cdot \log_2 (P(E_i))
\]
<table>
<thead>
<tr>
<th>Verse</th>
<th>Singer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Here come old flattop he come grooving up slowly</td>
<td>Ringo Starr</td>
</tr>
<tr>
<td>He got joo-joo eyeball he one holy roller</td>
<td>George Harrison</td>
</tr>
<tr>
<td>He got hair down to his knee</td>
<td>John Lennon</td>
</tr>
<tr>
<td>Got to be a joker he just do what he please</td>
<td>Paul McCartney</td>
</tr>
<tr>
<td>He wear no shoeshine he got toe-jam football</td>
<td></td>
</tr>
<tr>
<td>He got monkey finger he shoot coca-cola</td>
<td></td>
</tr>
<tr>
<td>He say &quot;I know you, you know me&quot;</td>
<td></td>
</tr>
<tr>
<td>One thing I can tell you is you got to be free</td>
<td></td>
</tr>
<tr>
<td>Come together right now over me</td>
<td></td>
</tr>
<tr>
<td>He bad production he got walrus gumboot</td>
<td></td>
</tr>
<tr>
<td>He got Ono sideboard he one spinal cracker</td>
<td></td>
</tr>
<tr>
<td>He got feet down below his knee</td>
<td></td>
</tr>
<tr>
<td>Hold you in his arms yeah you can feel his disease</td>
<td></td>
</tr>
<tr>
<td>Come together right now over me</td>
<td></td>
</tr>
<tr>
<td>He roller-coaster he got early warning</td>
<td></td>
</tr>
<tr>
<td>He got muddy water he one mojo filter</td>
<td></td>
</tr>
<tr>
<td>He say &quot;One and one and one is three&quot;</td>
<td></td>
</tr>
<tr>
<td>Got to be good-looking 'cause he's so hard to see</td>
<td></td>
</tr>
<tr>
<td>Come together right now over me</td>
<td></td>
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</tbody>
</table>
Results:

- The key of d minor may have been selected to reflect the ominous theme that permeates the lyrics.
- The chorus changes to a major modality to reflect catharsis and coming together as a group.
- The monophonic structure of verses and heterophonic structure of choruses converges upon the idea of unity.
- John Lennon’s Life at the time:
  - Accident
  - Drug use
- Harrison’s influence:
  - Maharishi Mahesh Yogi, Indian Mysticism, Hinduism
    - Themes of unity
    - Covered by many other groups with tumultuous relationships among members.
Must consider the following elements:

- The nature of the research questions that need to be assessed
- Depth and breadth of expertise
- Openness to integration of methodological applications
- Leadership that is capable of integrating disciplinary boundaries of a diverse research team
- Resources
  - Software
  - Experts
  - Training workshops
- Communication