Mixed Methods Research

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Mixed Methods Research

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Mixed Methods Research

Reference
Mixed Methods Research

• Definition
  – “as a method, it focuses on collecting, 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.”
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• Characteristics of mixed methods research
  – Collect and analyze both quantitative and qualitative data.
  – Mix two forms of data in different ways.
  – Give priority to one or both forms of data.
  – Can be in a single study or in multiple phases of a study.
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- Strength and weakness of quantitative and qualitative methods.

<table>
<thead>
<tr>
<th>Strength and weakness</th>
<th>Quantitative</th>
<th>Qualitative</th>
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<tbody>
<tr>
<td></td>
<td>Generalization</td>
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<td>Large sample</td>
<td>Small sample</td>
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<td>details, in depth</td>
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• Why use mixed methods
  – One data resource may not be enough;
  – Initial results need to be further explained;
  – A second method is needed to enhance a primary method;
  – The project has multi-phases.
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• How to choose an appropriate mixed methods design?
  – Level of interaction between two strands: independent or interactive.
  – Relative priority: equal/unequal priority
  – Timing: concurrent, sequential, or combination of those two
  – Where or how to mix the strands: point of interface and mixing strategies
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• Point of interface: is a point where the two strands are mixed: possible point of interfaces
  – Data collection: quan or qual results build to the subsequent collection of qual or quan data.
  – Data analysis: transform one type of data into other type of data and analyze combined data.
  – Interpretation: comparing or combining results from both methods.
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• Examples
  – Similar results from different perspectives: collect data on quantitative instrument and on qualitative data based on focus groups.
  – Collect quantitative data first and follow up with interviews to help explain their outcomes from quantitative data.
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• Examples
  – Use interviews to explore how individuals describe a topic and use the findings to develop quantitative data collection instrument.
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• Major designs
  – (1). Convergent parallel design: purpose of this design
    – to best understand or develop more complete understanding of the research problem by obtaining different but complementary data.
    – Validation purpose
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• Convergent parallel design (diagram)

Quantitative data collection and analysis

Qualitative data collection and analysis

Compare or relate

Point of interface

Interpretation
Convergent Parallel Design

• Three published papers
  
  http://www.dovepress.com/population-based-health-promotion-perspective-for-older-driver-safety--peer-reviewed-article-CIA
Convergent Parallel Design

• Three published papers
  – David F. Feldon and Yasmin B. Kafai. **Mixed methods for mixed reality: understanding users’ avatar activities in virtual worlds.** *Educational Technology Research and Development* 2008 56:575-593
    
    [http://www.springerlink.com/content/g66m160n75444mx7/fulltext.pdf](http://www.springerlink.com/content/g66m160n75444mx7/fulltext.pdf)
Convergent Parallel Design

• Three published papers
Convergent Parallel Design

• Convergent parallel design
  – Collect and analyze two independent strands of quantitative and qualitative data at the same time/in a single phase.
  – Prioritize the methods equally.
  – Keep the data analysis independent.
  – Mix the results during the overall interpretation.
  – Try to look for convergence, divergence, contradictions, or relationships of two sources of data.
Convergent Parallel Design

• Procedure (Flowchart)
  – Collect both types of data **concurrently**
  – Analyze two data sets **separately**
  – Merge the results
  – Interpret combined results
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- Convergent parallel design: flowchart

![Flowchart of the Basic Procedures in Implementing a Convergent Design](image-url)

**Figure 3.3** Flowchart of the Basic Procedures in Implementing a Convergent Design

**Design the Quantitative Strand:**
- State quantitative research questions and determine the quantitative approach.
- Collect the Quantitative Data:
  - Obtain permissions.
  - Identify the quantitative sample.
  - Collect closed-ended data with instruments.

**Design the Qualitative Strand:**
- State qualitative research questions and determine the qualitative approach.
- Collect the Qualitative Data:
  - Obtain permissions.
  - Identify the qualitative sample.
  - Collect open-ended data with protocols.

**Analyze the Quantitative Data:**
- Analyze the quantitative data using descriptive statistics, inferential statistics, and effect sizes.

**Analyze the Qualitative Data:**
- Analyze the qualitative data using procedures of theme development and those specific to the qualitative approach.

**Use Strategies to Merge the Two Sets of Results:**
- Identify content areas represented in both data sets and compare, contrast, and/or synthesize the results in a discussion or table.
- Identify differences within one set of results based on dimensions within the other set and examine the differences within a display organized by the dimensions.
- Develop procedures to transform one type of result into the other type of data (e.g., turn themes into counts).
- Conduct further analyses to relate the transformed data to the other data (e.g., conduct statistical analyses that include the thematic counts).

**Interpret the Merged Results:**
- Summarize and interpret the separate results.
- Discuss to what extent and in what way results from the two types of data converge, diverge, relate to each other, and/or produce a more complete understanding.

**Point of Interface**
Convergent Parallel Design

• Design
  – Research questions: create parallel questions for the qual and quan studies.
  – Samples: different or same group of people in quantitative and qualitative studies?
  – Sample sizes: equal or unequal
Convergent Parallel Design

• Design:
  • Data will be collected from one source or different sources: survey/interview or only use survey.
  • Order of two types of data collections: survey first then focus group or one-on-one interview.
Convergent Parallel Design

• Merged data analysis strategies
  – Side-by-side comparison (in a results or discussion section or a summary table).
    • Present quantitative or qualitative results
    • Followed by qualitative or quantitative results
    • Followed by comments describe how qual/quan confirm or disconfirm quan/qual results.
Convergent Parallel Design

• Merged data analysis strategies
  – Joint display: using table or figure to show both quan and qual results
  – Data transformation merged analysis: transform one type of data (qual) into the other type of data (quan).
• Create a new variable based on presence of a theme
• Create a new variable based on number of times a theme appears.
Convergent Parallel Design

• Interpreting merged results
  – Look for similarity and convergence
  – How to handle discrepancy?
• State the limitations of the study
• Revisit two types of data
• Could collect additional data
Convergent Parallel Design

• Challenges
  – Needs both quantitative and qualitative expertise
  – Consequences of having different samples and different sample size when merging two data sets.
  – How to merge two types of data.
  – How to deal with the situation in which quantitative and qualitative results contradict each other.
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• Convergent parallel design variants
  – Parallel-databases variants: two sets of data merge at the final step.
  – Data-transformation variant
  – Data-validation variant: such as open-ended questions on a questionnaire.
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• Major designs
  – (2). Explanatory sequential design: purpose of this design is to use qualitative approach to explain quantitative results (significant, non-significant, outliers or surprising results) or to guide to form groups based on quantitative results.
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• Explanatory sequential design (diagram)

Quantitative data collection and analysis → Follow up with → Qualitative data collection and analysis → Interpretation

Point of interface
Explanatory Sequential Design

• Published paper
  http://www.jstor.org/stable/25704494
Explanatory Sequential Design

- Published paper
  
  [http://www.springerlink.com/content/l367l0l77r213712/fulltext.pdf](http://www.springerlink.com/content/l367l0l77r213712/fulltext.pdf)
Explanatory Sequential Design

• Mixed methods question
  “In what ways do the qualitative data help explain the quantitative results?”
Explanatory Sequential Design

• Key points
  – Typically it is a two-phase design.
  – Collect quantitative and qualitative data at different time.
  – Qualitative study depends on quantitative results.
  – Usually quantitative data collection is the priority.
Explanatory Sequential Design

• Procedure
  – First, collect and analyze quantitative data.
  – Identify specific quantitative results that need additional explanation.
  – Design qualitative study based on what learn from quantitative results.
Explanatory Sequential Design

• Procedure
  – Collect and analyze qualitative data.
  – Interpret combined results.
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• Explanatory sequential design: procedure
Explanatory Sequential Design

• Design
  – Samples: different or same group of people in both studies?
    • The participants in the qualitative study should be those who participated in the quantitative study.
  – Sample sizes: equal or unequal
    • Qualitative study uses smaller sample.
Explanatory Sequential Design

• Design
  – Decide what quantitative results to follow up.
    • Unclear
    • Unexpected
    • Significant/non-significant results
    • Outliers or extreme cases
Explanatory Sequential Design

- Design
  - How to select participants for qualitative study
    - Individuals who volunteer to participate in interviews (weaker connection between two phases).
    - Systematic approach: based on quantitative results and select participants best able to fit in qualitative study (IRB issue).
Explanatory Sequential Design

• Design
  – IRB issues: suggestions
    • Separate IRB for each phase.
    • One IRB, state the follow up phase as tentative.
    • From the start, inform participants the possibility of second data collection.
Explanatory Sequential Design

• Select qualitative sample
  – Participants who are representative of different groups.
  – Participants with extreme scores.
  – Participants differed in their scores on significant predictors.
Explanatory Sequential Design

• Interpreting connected results
  – Conclusion is about whether the follow up qualitative data provide a better understanding of the research problem than simply the quantitative results.
Explanatory Sequential Design

• Explanatory sequential design variants
  – Follow-up explanation variant
  – Participation-selection variant: it needs quantitative results to help select best participants. It places priority on the second, qualitative phase.
Explanatory Sequential Design

• Challenges
  – Time consuming
  – IRB issue
  – Decisions about which quantitative results need further explanation.
  – Decisions about who to sample and what criteria used for sample selection for qualitative study.
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• Major designs
  – (3). Exploratory sequential design: also referred to as instrument development design. The purpose of this design is to generalize qualitative findings to a larger sample.
Exploratory Sequential Design

Reference for instrument design


Exploratory Sequential Design

• Published paper
  
  http://ehis.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=3&hid=2&sid=2339ee9b-08f8-45b1-babf-b7e2c0d193ef%40sessionmgr12
Exploratory Sequential Design

• Design diagram

Qualitative data collection and analysis

Builds to

Quantitative data collection and analysis

Point of interface

Interpretation
Exploratory Sequential Design

• Purpose of this design:
  • The qualitative phase is used to help develop or inform the quantitative study.
    – Instrument design (explore)
    – Grounded theory (generalize qualitative results)
Exploratory Sequential Design

- Reasons for using this design
  - Instruments are not available
  - The variables are not known
  - There is no theory or model as a guide
Exploratory Sequential Design

• Key points
  – Typically it is a **two-phase** design.
    • Three phases for instrument development (instrument development phase, a phase testing, and apply the instrument).
  – Collect quantitative and qualitative data at **different** time.
  – Qualitative results can help and inform the second quantitative method.
Exploratory Sequential Design

• Mixed design research question
  – In what ways do the quantitative results generalize the qualitative findings?
Exploratory Sequential Design

• Procedure
  – First, collect and analyze qualitative data.
  – Develop quantitative study based on what you learn from qualitative results.
  – Collect and analyze quantitative data.
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- Exploratory sequential design: flowchart

Figure 3.5: Flowchart of the Basic Procedures in Implementing an Exploratory Design

Design and Implement the Qualitative Strand:
- State qualitative research questions and determine the
  qualitative approach.
- Obtain permissions.
- Identify the qualitative sample.
- Collect open-ended data with protocols.
- Analyze the qualitative data using procedures of theme
devolution and those specific to the qualitative approach to
answer the qualitative research questions and identify the
information needed to inform the second phase.

Use Strategies to Build on the Qualitative Results:
- Refine quantitative research questions or hypotheses and the
  mixed methods question.
- Determine how participants will be selected for the quantitative sample.
- Design and pilot test a quantitative data collection instrument
  based on the qualitative results.

Design and Implement the Quantitative Strand:
- State quantitative research questions or hypotheses that build
  on the qualitative results, and determine the quantitative approach.
- Obtain permissions.
- Select a quantitative sample that will generalize or test the
  qualitative results.
- Collect closed-ended data with the instrument designed from
  quantitative results.
- Analyze the quantitative data using descriptive statistics,
  inferential statistics, and effect sizes to answer the quantitative
  and mixed methods research questions.

Interpret the Connected Results:
- Summarize and interpret the qualitative results.
- Summarize and interpret the quantitative results.
- Discuss to what extent and in what ways the quantitative
  results generalize or test the qualitative results.
Exploratory Sequential Design

• Design
  – Samples: different or same group of people in both studies?
    • The participants in the quantitative study are NOT same individuals who provided qualitative data.
  – Sample sizes: equal or unequal
    • Quantitative study uses larger sample.
Exploratory Sequential Design

• Design
  – IRB issues for emerging follow-up phase:
    • Separate IRB for each phase.
    • One IRB, state the follow up phase as tentative.
Exploratory Sequential Design

• Design
  – Decide what qualitative results to use.
    • Useful quotes
    • Codes > variables
    • Themes > constructs
Exploratory Sequential Design

• Design
  – How to develop a good instrument: scale development.
  • Steps for instrument development
Exploratory Sequential Design

Step 1: Determine what you want to measure
Step 2: Generating an item pool
Step 3: Determine the format for items
Step 4: Expert review of initial item pool
Step 5: Add social desirability items
Step 6: Pilot testing and item analysis
Step 7: Administer instrument to a larger sample
Step 8: Evaluate the items
Step 9: Revise instrument

DeVellis (2003); Fishman & Galguera (2003); Pett, Lackey, & Sullivan (2003)
Exploratory Sequential Design

• Exploratory sequential design variants
  – Theory-development variant: test emergent theory
  – Instrument development variant: initial qualitative phase plays a secondary role.
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• Major designs
  – (4). Embedded design: purpose of this design is to answer different questions that requires different types of data.
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• Embedded designs

Quantitative or qualitative design

Quantitative or Qualitative data collection and analysis

Qualitative or quantitative data collection and analysis

Interpretation
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• Embedded design
  – A quantitative or qualitative data collection is within a quantitative or qualitative procedure.
  – A single data set is not enough.
  – Two types of data answer different research questions.
  – The collection and analysis of the second data set may occur before, during, and/or after the first data collection.
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• Examples of embedded design: Qualitative data in quantitative study:
  – Develop an instrument in an intervention trial.
  – Try to understand the impact of the intervention on participants.
  – Test long term effects of an intervention after a trial.
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- Embedded design: procedure

**Figure 3.6 Flowchart of the Basic Procedures in Implementing an Embedded Design**

- **Implement the Qualitative Strand Before the Experiment:**
  - Decide the reason for the qualitative strand.
  - State qualitative research questions, and determine the qualitative approach.
  - Obtain permissions.
  - Identify the qualitative sample.
  - Collect open-ended data.
  - Analyze the qualitative data using procedures of theme development and those specific to the qualitative approach.

- **Use the Qualitative Strand to Plan the Experiment, Such as:**
  - Refine recruitment procedures.
  - Develop outcome measures.
  - Develop interventions.

- **Implement the Qualitative Strand During the Experiment:**
  - Decide the reason for the qualitative strand.
  - State qualitative research questions, and determine the qualitative approach.
  - Obtain permissions.
  - Identify the qualitative sample.
  - Collect open-ended data.
  - Analyze the qualitative data using procedures of theme development and those specific to the qualitative approach.

- **Use the Qualitative Strand to Understand the Experiment, Such as:**
  - Describe participants’ experiences with the intervention.
  - Describe the process.
  - Describe treatment fidelity.

- **Implement the Qualitative Strand After the Experiment:**
  - Decide the reason for the qualitative strand.
  - State qualitative research questions, and determine the qualitative approach.
  - Obtain permissions.
  - Identify the qualitative sample.
  - Collect open-ended data.
  - Analyze the qualitative data using procedures of theme development and those specific to the qualitative approach.

- **Use the Qualitative Strand to Explain the Experiment, Such as:**
  - Describe why outcomes occurred.
  - Describe how participants respond to the results.
  - Describe what long-term effects are experienced.
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• Embedded design variants
  – Embedded-experiment variant: qualitative data within an experiment trial.
  – Embedded instrument development and validation variant.
  – Mixed methods case studies
  – Mixed methods narrative research
  – Mixed methods ethnography

Embed both quantitative and qualitative data within traditional qualitative designs.
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• Published paper
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• Major designs
  – (5). Transformative design: the purpose of this design is to address issues of social justice and call for change for underrepresented or marginalized populations.
    • This design more relates to the content than to the methodology.
    • Is beyond first four basic mixed methods designs mentioned before.
Mixed Methods Research

- Transformative designs

Transformative Framework

1. Quantitative data collection and analysis
2. Follow up with
3. Qualitative data collection and analysis
4. Interpretation
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• Transformative Framework
  – Is a framework for advancing the needs of underrepresented or marginalized populations.
  – Such as: Feminist theory, racial or ethnic theory, sexual orientation theory, and disability theory.
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• Transformative design
  – All decisions about interaction, priority, timing, and mixing are made within the context of the transformative framework.
  – Researchers can implement any of four basic mixed methods designs within the transformative framework.
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- Transformative design

**Figure 3.7** Flowchart of the Basic Considerations for Designing a Transformative Design

- **Defining the Problem and Searching the Literature:**
  - Deliberately search the literature for concerns of diverse groups and issues of discrimination and oppression.
  - Allow the definition of the problem to arise from the community of concern.
  - Build trust with community members.
  - Resist deficit-based theoretical frameworks.
  - Ask balanced—positive and negative—research questions.
  - Develop questions that lead to transformative answers, such as questions focused on authority and relations of power in institutions and communities.

- **Identifying the Research Design:**
  - Use mixed methodologies to capture the complexity of the problem and respond to different stakeholder needs.
  - Ensure that your research design respects ethical considerations of participants.
  - Do not deny treatment to any groups if incorporating experimental procedures.

- **Identifying Data Sources and Selecting Participants:**
  - Focus on participants of groups associated with discrimination and oppression.
  - Avoid stereotypical labels for participants.
  - Recognize the diversity within the target population.
  - Use sampling strategies that improve the inclusiveness of the sample to increase the probability that traditionally marginalized groups are adequately and accurately represented.

- **Identifying or Constructing Data Collection Instruments and Methods:**
  - Consider how the data collection process and outcomes will benefit the community being studied.
  - Use methods to ensure that the research findings will be credible to that community.
  - Design data collection to permit effective communication with community members.
  - Use collection methods that are sensitive to the community’s cultural contexts.
  - Design the data collection to open up avenues for participation in the social change process.

- **Analyzing, Interpreting, Reporting, and Using Results:**
  - Be open to the results raising new hypotheses.
  - Analyze subgroups (i.e., multilevel analyses) to examine the differential impact on diverse groups.
  - Frame the results to help understand and elucidate power relationships.
  - Report the results in ways to facilitate social change and action.
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• Challenges
  – Little guidance in the literature to assist researchers with implementing mixed methods in a transformative way.
  – Researchers need to have expertise in theoretical foundations of the study.
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• Transformative design variants
  – Feminist lens transformative variant
  – Disability lens transformative variant
  – Socioeconomic class lens
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• Major designs
  – (6). Multiphase: is an another example of a mixed methods design that goes beyond four basic designs.
    • It is a combination of sequential and concurrent aspects.
    • Most common in large funded or multiyear projects.
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- Multiphase design

Overall program objective
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• Multiphase design

**Figure 3.8** Flowchart of the Basic Procedures in Implementing a Multiphase Design

- Overall Program Objective → Study 1
  - State research questions that follow from the program's overall objective.
  - Design, conduct, and interpret a quantitative, qualitative, or mixed methods study to address the research questions.
  - Report the Study 1 results.

- Inform Overall Program Objective → Study 2
  - State research questions that follow from the program's overall objective and results from Study 1.
  - Design, conduct, and interpret a quantitative, qualitative, or mixed methods study to address the research questions.
  - Report the Study 2 results.

- Inform Overall Program Objective → Study 3
  - State research questions that follow from the program's overall objective and results from Studies 1 and 2.
  - Design, conduct, and interpret a quantitative, qualitative, or mixed methods study to address the research questions.
  - Report the Study 3 results.

Continue as Required

**SOURCE:** Figure based on Creswell and Plano Clark (2007) and Morse and Niehaus (2009)
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• Challenges
  – Challenges associated with individual concurrent and sequential designs.
  – Needs sufficient resources, time, and effort.
  – May need a research team to implement research.
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• Multiphase design variants
  – Large scale program development and evaluation
  – Multilevel statewide study
  – Single mixed methods studies that combine both concurrent and sequential phases
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• Resources
  – International Congress for Qualitative Inquiry Conference
  – Mixed methods international conference
  – Journal of Mixed Methods Research
  – OBSSR (Office of Behavioral and Social Sciences Research) from NIH: Scientific areas > Methodology > Mixed Methods Research
Thank You