Mixed Methods: Myths, Traditions & Strategies

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Topics

1. Defining features of mixed methods research
2. Current techniques to integrate qualitative and quantitative research
3. Value of using qualitative approaches in intervention studies
4. Key challenges in using qualitative research alongside RCTs
1. Defining Features of Mixed Methods Research
Defining Feature #1: Controversy
Creswell’s 11 Key Controversies

1. How should mixed methods be defined?
2. Does the use of “quantitative” and “qualitative” in mixed methods create an artificial and unnecessary binary distinction?
3. Should there be a bilingual nomenclature for mixed methods?
4. Have we arrived at an understanding of the types of research designs in mixed methods?
5. Can we “mix” paradigms in mixed methods?
6. What is the value added by mixed methods beyond conducting a quantitative or a qualitative study?
7. What is driving the interest in mixed methods?
8. Is mixed methods a “new” approach?
9. Does mixed methods privilege post-positivism?
10. Is there a dominant, meta-narrative discourse emerging in mixed methods?
11. Is mixed methods claiming other designs as “their own”?
fundamental questions continue to be debated:

- What is mixed methods?
- Can we do it?
- How do we do it?
- Why do it?
- Does it really exist?

Despite these debates, we observe...
Controversy - Continued

- long tradition of mixed methods in sociological research (since 1800’s)²,³

- qualitative methods now common in⁴,⁵:
  - clinical trials
  - surveys of attitudes/beliefs
  - epidemiological studies

- Guidelines and operating procedures now exist – examples:
  - Best Practice Guidelines for Mixed Methods Research in the Health Sciences (U.S., 2011)⁶
  - Standard Operating Procedures for Qualitative Methods in Clinical Trials (U.K., 2013)⁷
Defining Feature #2: Qualitative + Quantitative

- Most researchers use the term mixed methods to refer to the use of qualitative and quantitative research methods to investigate a topic\(^8\text{-}^{11}\).

- Some researchers consider multiple methods, even within the same tradition, as mixed methods, particularly if they have a core & supplementary component\(^12\text{-}^{13}\).
Defining Feature #3: Integration

Most researchers claim that mixed methods requires:

1. Deliberate integration.
2. Sum greater than the parts.

Some researchers claim that mixed methods can be:

1. Mere use of qualitative and quantitative methods in same study.
2. Comparing qualitative and quantitative results.
3. Actual integration/merging of the two data types.
Defining Feature #4: Pragmatism

- “Paradigm Wars” of 80’s & 90’s have ended and methodological focus is now on integration

- Pragmatism now the dominant epistemology

- At philosophical level: accept that scientific truths are both constructed and grounded in the world

- At practical level: choose design assemblages (methods) that best address research aim(s)
Defining Feature #5: Complementarity

- main goal of mixed methods:
  - to gain a more complete picture (complementarity)
  - not “triangulating” in traditional sense (one method validating the other, >1 method addressing same research question)

- Why validation not the goal:
  - Defy direct comparison: qualitative and quantitative methods address different questions & differ in what they look at, how they see it, & how they describe it\textsuperscript{42-44}
  - Similar findings: comforting/reassuring but not validating
Defining Feature #6: Prototypical Designs

- 15+ mixed methods design typologies published\textsuperscript{14}

- Current view:
  - the research question(s) determine the method(s)\textsuperscript{15}
  - use existing typologies as guide to tailor-make design that answers your research question(s)\textsuperscript{16}

- Design typologies differ on 2 dimensions:
  - Timing
  - Emphasis
Prototypical Designs - Continued

- most typologies recognize 2 major designs originally proposed by Cresswell & Plano Clark⁹,¹⁶:

1. Concurrent Designs:
   - Timing: qualitative and quantitative components undertaken simultaneously
   - Emphasis: varies (equal if done in parallel, if embedded less emphasis on nested method)

2. Sequential Designs:
   - Timing: qualitative completed before quantitative component or vice versa
   - Emphasis: on method that comes first
2. Integrating Qualitative and Quantitative Findings
Options for integration span 2 dimensions:

- How to integrate
- Where to integrate
  - Sampling
  - Data collection
  - Data analysis
  - Interpretation
Mixed Methods Matrix, Triangulation Protocols:
- Qualitative & quantitative findings displayed on same page
- Identify patterns, cross-cutting ("meta") themes, paradoxes

Following a thread:
- Theme from one component followed up with the other
- Example: hypothesis from qualitative findings tested by survey

Data transformation:
- "Quantitizing" qualitative data
- "Qualitizing" quantitative data
- Example: cross-tab qualitative themes against quantitative data
Where to Integrate

- often conceptualized by linking methods of data collection and analysis (methods level integration)\textsuperscript{14}

- Methods level integration relates to the study design\textsuperscript{14,32}

- We will discuss:
  - Methods level integration paths for main study designs
  - Examples from intervention studies (or study protocols)
1. Convergent Parallel Design

- Most common design used in healthcare research
- Timing:
  - concurrent data collection
  - data may or may not be collected from same study sample
- Emphasis: equal for qualitative and quantitative components
- Integration ("Merging", "Triangulating"):
  - two databases merged for analysis &/or interpretation
  - identify convergence, divergence or complementarity
Example 1: Group Cohesion in Patients Participating in Physical Exercise Intervention

**Purpose:** explore cohesion and quality of life (QoL) in cancer patients participating in a 6 week physical exercise intervention.

**Methods:**
- QUAN: validated survey administered at baseline and 6 weeks used to determine changes in QoL and health status
- QUAL: focus groups conducted post intervention to explore group cohesion.

**Results:**
- QUAN: showed significant improvements in emotional functioning, social functioning and mental health
- QUAL: showed that group setting motivated patients by developing a sense of obligation to train and do their best, thereby improving their social and emotional functioning and mental health

**Discussion:** the results converge to support the theory that group cohesion and sense of belonging facilitates achievement of social and emotional functioning.
Example 1: Caregiver Outcomes & Experiences of a Respite Care Intervention

Purpose: explore caregivers’ stress and perceptions of respite services provided by an independent hospice.

Methods:
- QUAN: validated Relative Stress Scale Inventory (RSSI) was used to measure stress & was completed (pre & post) by 12 caregivers
- QUAL: 12 caregivers also completed interviews about views of respite care

Results:
- QUAN: showed no significance difference between pre & post stress levels
- QUAL: findings supportive of the intervention, showing that most caregivers saw respite care as important as it gave them a break/rest from caregiving

Discussion: researchers concluded that divergent results indicated an inadequate questionnaire (RSSI), others suggest that theory underpinning the research should be changed to suggest that respite care may relieve instrumental caregiving responsibilities, but that other support is needed to relieve caregiving distress.

Concurrent Mixed Methods Designs

1. Convergent Parallel Design (Example – Divergent Results)
Example 2: Palliative Care Practices & Meanings in End of Life Nursing Home Residents

**Purpose:** explore palliative care practices in nursing home residents with dementia at end of life (EOL) and perceptions (of residents, family, nursing home staff) of EOL care.

**Methods:**
- **QUAN:** independent strand (n=30) with its own questions, samples, data collection, and analysis techniques. Used a retrospective chart review to assess (a) symptoms, (b) interventions, (c) decisions to limit curative care, and (d) death cause/location.
- **QUAL:** independent strand (n=30) that used an ethnographic field study to examine views about what was good/not good and what could be done differently.

**Results:**
- **QUAN:** life-prolonging measures rare, symptom management less conservative and symptoms increased dramatically in the last month of life.
- **QUAL:** challenges in gauging decline, determining when to intervene & how, & how to maintain normalcy & dignity.

**Discussion:** QUAL and QUAN results were complementary, indicating that palliative care can be appropriate in nursing homes, but should begin earlier to help residents/families understand the condition & treatment options, and adjust to changes over time.

Concurrent Mixed Methods Designs

1. **Convergent Parallel Design** (Example – Complementary Results)
Concurrent Mixed Methods Designs

2. Embedded Design (AKA “Basic Intervention Mixed Methods Design”^{9,32})

- Qualitative data collected mainly to support development of intervention, understand contextual factors, and/or explain results^{5,9}
- Timing: two data collection methods, one embedded in the other, embedded one can occur before, during or after intervention
- Emphasis: priority given to method addressing primary question (QUAN)^{9}
- Integration (“Embedding”): results often embedded at multiple points, data integrated for analysis and interpretation
2. Embedded Design (Example)

**Example**: Study Protocol for Pilot RCT of Stepped Care Treatment of Depression (STEPS)\(^\text{33}\)

**Purpose**: determine feasibility and acceptability of STEPS intervention; results to inform design of a fully-powered RCT on the effectiveness & efficiency of stepped care.

**Methods**:
- **QUAN**: obtain pilot data on recruitment, retention and the pathway of patients through treatment to assess feasibility. Outcome data (depressive symptoms, worry, anxiety, QoL) collected at baseline and 6 months on the effects of stepped care compared with high-intensity therapy. A minimum of 60 patients with Major Depressive Disorder will be recruited from an Improving Access to Psychological Therapies service and randomly allocated to each group.
- **QUAL**: interviews will obtain data on acceptability. Pilot trial and interviews will be undertaken concurrently. Quantitative and qualitative data will be analysed separately and then integrated.
1. Explanatory Design

- Usually used when quantitative results are unexpected, or measures known to be insufficient to address research question,
- Timing: collection and analysis of quantitative data followed by the collection and analysis of qualitative data.
- Emphasis: priority may be with quantitative method, or can be equal
- Integration ("Connecting"): qualitative database links to the quantitative database through sampling (e.g., subset of survey respondents selected based on survey scores)
**Example:** Prevalence and predictors of premature discontinuation of antiplatelet drug therapy after stent placement\textsuperscript{36,37}

**Purpose:** determine the prevalence and predictors of discontinuing antiplatelet drugs before the recommended duration.

**Methods:**
- QUAN: patients with acute myocardial infarction (AMI) (n=500) followed to see if they took the recommended antiplatelet drug for the recommended duration.
- Qual: AMI patients who discontinued either clopidogrel (n=11) or cholesterol-lowering therapy (n=29) interviewed to determine reasons for discontinuation.

**Results:**
- QUAN: 14% of patients with AFI discontinued drugs despite potentially fatal consequences for early termination
- Qual: patients cited a number of reasons for discontinuing the drugs, many related to poor communication between physician and patient.

**Discussion:** the reasons for discontinuing the drugs informed the development of a guide to support patient-clinician communication about heart medications.\textsuperscript{38}
2. Exploratory Design

- Often used in instrument development
- Timing: collection and analysis of qualitative data followed by the collection and analysis of quantitative data
- Emphasis: priority may be with qualitative method or equal
- Integration (“Building”): qualitative results inform data collection approach used in quantitative component (e.g., items in survey built from previously collected qualitative data)
2. Exploratory Design (Example)

**Example**: Use and Perceptions of Electronic Dietary Assessment (e-DA) Tools by Health Care Professionals\(^{39}\)

**Purpose**: explore provider use & perspectives on e-DA tools in mobile apps & websites.

**Methods**:
- QUAL: 11 interdisciplinary focus groups with 50 providers to obtain perspectives on use of e-DA. Focus group transcripts used to develop web-survey, interpretive themes added depth/context.
- Quan: web-based survey sent to Family Health Teams throughout Ontario, descriptive and bivariate analyses completed.

**Results**:
- QUAL: suggested barriers to using e-DA include: patients’ lack of comfort with using technology, patient misinterpretation of e-DA results, time and education for providers to interpret results & train/educate patients.
- QUAN: indicated e-DA used to improve: 1) patients’ eating habits; 2) quality of dietary assessment; and, 3) care process. Dietitians used e-DA more than other providers. Strong interest across disciplines in using e-DA tools for managing obesity, diabetes and heart disease, especially for patient self-monitoring.
3. Value of Using Qualitative Approaches in Intervention Studies
Value of Qualitative Approaches in Intervention Studies

- we focus on:
  1. how qualitative research is used in RCTs
  2. the value, or potential value, of qualitative results in generating evidence for the effectiveness of interventions.

- Key reviews: O’Cathain et al. (2013)\textsuperscript{45}, Lewin et al. (2011)\textsuperscript{5}
Q1: How is Qualitative Research Actually Used?

- **Before a trial:**
  - Explore research question, health condition & context
  - Identify ethical issues
  - Explore issues relating to recruitment, retention, diversity
  - Identify models, mechanisms, theory & hypotheses for RCT
  - Develop or refine intervention content & delivery
  - Explore feasibility & acceptability of intervention & trial
  - Develop or select outcome measures

- **During a trial:**
  - Determine Intervention actually delivered & fidelity
  - “Unpack” processes of implementation and change
  - Explore feasibility & acceptability of intervention & trial

- **After a trial:**
  - Explain findings
  - Explain variation in effectiveness of intervention
  - Assess appropriateness of theory, modify accordingly
  - Generate further questions, hypotheses, future studies
Q2: What is the Value of Qualitative Research in RCTs?

<table>
<thead>
<tr>
<th>Item</th>
<th>Potential Value</th>
<th>Examples</th>
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</thead>
<tbody>
<tr>
<td>1. Bias</td>
<td>Avoids measurement bias</td>
<td>- Helps test face and content validity of instruments with patients/providers</td>
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<tr>
<td>2. Efficiency</td>
<td>Increases recruitment rate</td>
<td>- Use of observation and interviews to identify problems with recruitment</td>
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|          | Saves money                                 | - Stops attempts to undertake full trials of poor/unacceptable interventions or weak trial designs  
|          |                                              | - Ensures full trials are only undertaken on promising/optimized interventions |
| 3. Ethics| Determine sensitivities of providers & patients | - Design recruitment and communication strategies to ensure positive experience |
|          | Improves informed consent                    | - Communication valued as much as information (“gold standard” of informed consent) |
Q2: What is the Value of Qualitative Research in RCTs?

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<td>4. Implementation</td>
<td>Replication in real world</td>
<td>-describes components and essential elements of intervention to enable replication</td>
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<td></td>
<td>Transferability</td>
<td>-identifies mechanisms or action or contextual issues needed for success</td>
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<td>5. Interpretation</td>
<td>Explain findings</td>
<td>-explains null findings</td>
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<td></td>
<td></td>
<td>-contextualizes successful interventions to disseminate &amp; transfer to real world</td>
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<td></td>
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<td>-explains variation in outcomes</td>
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<td>6. Relevance</td>
<td>Ensures intervention meets needs of providers and patients</td>
<td>-identifies benefits/values as seen by providers &amp; patients</td>
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<td></td>
<td></td>
<td>-ensures appropriate (culture, context)</td>
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<td>7. Success</td>
<td>Makes trial viable, feasible, successful</td>
<td>-engenders stakeholder support</td>
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<tr>
<td></td>
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<td>-ensures trial appropriate (culture, context)</td>
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Q2: What is the Value of Qualitative Research in RCTs?

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<td>8. Validity</td>
<td>Internal Validity</td>
<td>- Ensures right outcomes &amp; measures used</td>
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<td></td>
<td>External Validity</td>
<td>- Identifies and addresses recruitment issues to obtain hard to reach groups</td>
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Q2: What is the Value of Qualitative Research in RCTs?

- O’Cathain et al. (2013) & Lewin et al. (2011) both found little evidence of integration and few discussions of how qualitative methods were used to explain trial findings.

- This may be why the previous list of values understates a significant contribution that qualitative methods can bring to RCTs:

  - **An enriched understanding of the research problem resulting from comparing qualitative and quantitative findings**

- This contribution may be significant particularly where findings conflict:

  - Next step: reciprocal interrogation of both sets of findings, which may
    - reveal deficiencies in quantitative instruments/measures\(^{29,47}\)
    - highlight methodological or design weaknesses\(^{47}\)
    - uncover a deviant or “off-quadrant” dimension of problem\(^{3,46}\)
    - modify existing theories or create new ones\(^{3,29}\)
4. Key Challenges in Using Qualitative Research Alongside RCTs
Challenges arise related to:

- Different mixed methods designs
- Broader Issues that impact all designs
<table>
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<tr>
<th>Issue</th>
<th>Sequential Designs</th>
<th>Concurrent Designs</th>
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<tr>
<td>Personnel</td>
<td>Can be done by a single or small group of researchers</td>
<td>- requires team of researchers (multiple activities occur in parallel)</td>
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<td>- team dynamics, power issues (can threaten quality of each component)</td>
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<td>Skills</td>
<td>Difficult for single or small group to acquire different skills to do both qualitative and quantitative research</td>
<td>- team members can be skilled in qualitative and quantitative research</td>
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<td></td>
<td></td>
<td>- may need mixed methods specialist</td>
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<tr>
<td>Duration</td>
<td>Longer than concurrent designs</td>
<td>Quicker but intensive in short term</td>
</tr>
<tr>
<td>Funding, Ethics</td>
<td>- Challenging to secure upfront if cannot specify subsequent component(s) before completing 1st one - Amendments required if cannot specify upfront</td>
<td>Easier to specify all components upfront in sufficient detail to secure funding &amp; ethics approval</td>
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<td>Publication</td>
<td>Lends itself to separate publications</td>
<td>Lends itself to joint publication (one component may make little sense without the other)</td>
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<tr>
<td>Issue</td>
<td>Sequential Designs</td>
<td>Concurrent Designs</td>
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<tr>
<td>Feedback of Interim or Final Qualitative</td>
<td>-feedback not problematic as one component is intended to inform the other</td>
<td>-knowledge of dissatisfaction with, or acceptability of, the intervention or research process may result in changes to intervention or recruitment/follow-up/outcome procedures, which can threaten scientific integrity</td>
</tr>
<tr>
<td>Findings</td>
<td></td>
<td>-knowledge that adherence to, or acceptability of, the intervention differs by sub-group may bias recruitment in favour or particular groups</td>
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<td>-feedback of participant views of the intervention can result in unblinding</td>
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need **guidelines & measures** for evaluating complex interventions\(^{18,19}\)

- **Pragmatic RCTs:**
  - CONSORT extension focuses on effects, not process or mixed methods\(^{20}\)
- **Complex interventions:**
  - CONSORT extension for complex interventions is being developed\(^{21}\)
  - UK’s MRC 2008 update\(^{22}\): called for evaluation of both effects and process but few details on how to evaluate process
- **Process evaluation** – useful frameworks:
  - Normalization Process Theory (NPT)\(^{23}\)
  - Implementation Fidelity\(^{24}\)
  - Program Theory\(^{25}\)
- **UK’s Standard Operating Procedures for Qualitative Research in Trials**\(^7\)
Integrating qualitative and quantitative findings remains a challenge in RCTs despite the many textbooks, journal articles and best practice guidelines now available.

Lewin et al.’s (2011) systematic review of RCTs of complex interventions\(^5\) found only 30% used qualitative approaches, and in these:
- little discussion of integration
- few discussed contributions of both methods to overall study interpretations

Other studies support Lewin et al.’s (2011) findings\(^{34,35,45}\)
integration challenges in RCTs may persist because the legacy of the epistemological divide lingers in\textsuperscript{16,28}:

- training researchers
- biases favouring one approach over the other
- imbalances in status and power between groups of researchers
Challenges Relating to all Designs

- the role of theory should be considered from the beginning
- theory emphasized in UK’s MRC 2008 guidelines for complex interventions and design of standard operating procedures for qualitative methods used in UK clinical trials
- theory may be important for integration of qualitative results:
  - Lewin et al.(2011) found that twice as many RCTs that included qualitative work had a clearly stated theoretical basis compared with RCTs without any qualitative work
  - Theory increases likelihood that the role of qualitative work is planned ahead of time and funded appropriately
References


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