

Snapshots of Integrated Analyses in Mixed Methods Evaluation

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Purposes of presentation

- Provide conceptual framework for integrated analyses in mixed methods inquiry
- Illustrate types of mixed methods integrated analyses with specific examples
- Critically discuss both 'theory' and practice of mixed methods integrated data analysis

Overview

- A brief statement about mixed methods inquiry and the location of integrated analyses therein
- Integrated analyses – conceptual framework and empirical examples

Throughout ... Comments, questions, challenges, discussion

A view of mixed methods inquiry

- The intentional, and connected or linked, use of more than one social science tradition, methodology, and/or method in service of *better understanding*
 - Tradition = philosophical paradigms and assumptions, logics of justification, privileged questions, ways of knowing
 - Examples: postpositivism, interpretivism, constructivism, feminisms, critical social science

A view of MM, continued

- Methodology = inquiry logic, including questions, design, sampling, method choice, analysis, quality criteria, and defensible forms of writing
 - Examples: experimentation, survey research, ethnography, case study, narrative inquiry
- Method = a technique or tool for data gathering
 - Examples:
 - Ask ~ questionnaire, interview, assessment
 - Watch ~ observation
 - Find traces ~ unobtrusive measures

A view of MM, continued

- The intentional, and **connected or linked**, use of more than one social science tradition, methodology, and/or method in service of *better understanding*
- A study is a mixed methods study when there is some connection or linkage among the various methods and data sets at one or more stages of inquiry.

Situating integrated analyses

- Various forms of connection or linkage in MM
 - In instrument *development*
 - For better understanding of a given construct (*triangulation, complementarity, initiation*)
- Connection in MM can be at any stage in the inquiry, but is generally most common in the interpretation stage

Situating integrated analyses, con't

- Integrated MM data analyses
 - For better understanding a given constructs
 - Represents connecting or linking at the analysis stage

Integrated analyses – conceptual framework and empirical examples

General stages of data analysis

- Data cleaning
- Data reduction and description
- Data transformation
- Data correlation and comparison
- Analyses for inquiry conclusions and inferences

Integrated analyses – conceptual framework and empirical examples

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Integrated analyses – a few principles

- Decisions about analytic strategies and procedures in a mixed methods study are importantly connected to, but not dictated by prior methodological decisions.
- Interactive mixed methods analyses are highly iterative and are best undertaken with a spirit of adventure.
- Not every creative idea for interactive analyses will generate sensible or meaningful results.

A few principles, continued

- “Mixing” is a cognitive, analytic activity (as are all inferences and interpretations in social inquiry)
- Interactive analyses should include planned stopping points (or decision points) at which the inquirer intentionally looks for ways in which one analysis could inform another. These stopping points are best planned during the analytic phases that are most opportune for mixed analysis work.

A few principles, continued

- Convergence, consistency, and corroboration are overrated in social inquiry. The interactive mixed methods analyst looks just as keenly for instances of divergence and dissonance, as these may represent important nodes for further and highly generative analytic work.
- Challenges to data quality and integrity can arise in interactive mixed methods data analysis, as the data themselves become changed, even transformed into other forms and frames.

Integrated analysis, conceptual framework

Data transformation, enabling joint analyses	Data transformation, one form to another (conversion) Data consolidation or merging, multiple data sets into one
Data comparison and correlation, looking for patterns	Data importation Extreme case analysis Integrated data display
Major analyses, leading to inferences and conclusions	Warranted assertion analysis Pattern matching Integrated data display

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Data transformation

- To enable joint analyses of data
- To discern multidimensional patterns in qualitative data

- Two main types (so far):
 - Conversion
 - Consolidation

Data transformation, continued

- Cautions:
 - Sampling considerations
 - Assumptions of analyses (Sandelowski et al., 2009, *JMMR*, "On quantizing")

Data transformation, consolidation example

Louis, K.S. (1982). Sociologist as sleuth: Integrating methods in the RDU study. *American Behavioral Scientist*, 26(1), 101-120.

- Multisite, longitudinal study of the Research and Development Utilization Program (RDU), a demonstration project funded by the National Institute of Education, 1976-79
- Focus – promote adoption and implementation of new curricula and staff development materials in 300 local schools
- Variety of methods of multiple types, from records to onsite observations

- No more than 20% of the sites had a complete data set – “seriously constrained cross-site analysis”
- Used “consolidated coding form” to create a consolidated data set for each, representing inquirer *ratings* on 240 items. Many items more complex and higher level than survey items, e.g., “quality of decision making.” Common interpretations for items reached through intensive 2-day session.
- Ratings made consensually by senior staff.

- Challenges:
 - “Can a data base composed of numbers that is entirely dependent on the iterative, holistic judgments of experienced site field teams be described as only quantitative?”
 - Process requires inquirers highly skilled in both quantitative and qualitative methods and who are “relatively free of paradigmatic preferences.”

Integrated analysis, conceptual framework

Data transformation, enabling joint analyses

Data transformation, one form to another (conversion)
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Data comparison and correlation, looking for patterns

Data importation
Extreme case analysis
Integrated data display

Major analyses, leading to inferences and conclusions

Warranted assertion analysis
Pattern matching
Integrated data display

Data comparison and correlation

- Mid-stream analyses
- Often exploratory, experimental, undertaken with a spirit of adventure
- Basic idea is to take the “relational structure of meaning” from one data set and apply it to another → see what is learned
 - Example: cluster qualitative interview data by quantitative survey factors and then examine clusters for internal-external similarities and differences

Data comparison, continued

- Three main types (so far):
 - Data importation
 - Extreme case analysis
 - Integrated data display

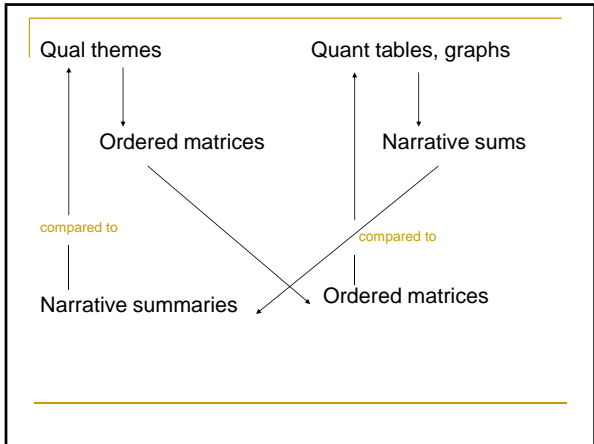
Data comparison, continued

- Cautions:
 - Sampling considerations
 - Assumptions of analyses
 - Possible risks to methodological quality and rigor for each data set
 - Example: What happens to an estimated standard error for survey responses when these responses get reconfigured?

Data comparison, data (transformation and) importation example

Li, S., Marquart, J.M., & Zercher, C. (2000). Conceptual issues and analytic strategies in mixed-method studies of preschool inclusion. *Journal of Early Intervention*, 23, 116-132.

- National study of preschool inclusion, 16 sites
- Key questions involved meanings and manifestations of 'inclusion'
- Multiple measures:
 - Structured and unstructured *observations* of classroom interactions, *interviews/questionnaires* assessing parent perceptions and understandings, *interviews/questionnaires* measuring teacher philosophies and perceptions, *sociograms* of children's social relations



■ Important insight → different inclusion philosophies for classroom teacher and special education teacher in that site.

Data comparison, data importation *and* extreme case analysis example

Jang, E.E., McDougall, D.E., Pollon, D., Herbert, M., & Russell, P. (2008). Integrative mixed methods data analytic strategies in research on school success in challenging circumstances. *Journal of Mixed Methods Research*, 2(3), 221-247.

- Focus – developing a multidimensional understanding of school success for schools serving low-income immigrant families and children (Ontario, Canada)
- Concurrent MM design, n=20 schools (purposefully selected)
 - Interviews and surveys with teachers, principals
 - Focus groups with students and parents
 - Purpose of complementarity

- Descriptive and reductive analyses
 - Interview data analyzed → 11 themes associated with school improvement
 - Survey data analyzed → 9 factors associated with school improvement
- Integrative analyses
 - **Transformed** survey results to narrative form
 - **Compared** to qualitative themes

- Created new survey 'scales' from interview themes
 - Of 75 survey items, 63 were judged to relate to the interview themes
 - 3 interview themes not present in survey items
 - Assigned the 63 items to one of the remaining 8 themes
 - **That is, used the structure of meaning in the interview data to 'rescale' and then reanalyze the survey data**
- New 'blended' scales showed more variation than original survey factors

- Further analyzed blended themes
- For each theme, identified schools with a mean score significantly different from overall mean (extreme cases)
- Returned to qualitative data to provide contextually rich narrative of the nature and contours of the theme at the selected schools
- Wrote narrative case profiles by theme → understanding the contextual meanings of 'high' and 'low' for that theme

- Example for 'parent involvement' theme
 - 'High' school
 - Community with 25 different languages
 - School active in multiple parent programs, some in partnership with local service agencies
 - One teacher serves as community liaison with parents and families
 - Principal walks around community getting to know families
 - Principal personally visits parents of children placed 'at risk' and generates with them a 'game plan for their child'
 - Parents perceived school as welcoming and 'on their side'

- 'Low' school
 - Similar demographics as 'high' school, more central city
 - Same recent history of academic success
 - Recently, principal and teachers have concentrated on school safety
 - Principals recognizes importance of strong parental involvement; school needs to turn energies to this domain

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Major analyses

- Primary focus is the generation of defensible inferences from joint (terminal) 'review and analysis' of data from diverse sources
- Some of these analyses follow other MM analyses; others could be pursued on their own
- Three types (so far):
 - Warranted assertion analysis
 - Pattern matching
 - Integrated data display

Major analyses, continued

- Cautions:
 - Hmm...

Major analyses, warranted assertion analysis example

Smith, M.L. (1997). Mixing and matching: Methods and models. In J.C. Greene and V.J. Caracelli (eds.), *Advances in mixed-method evaluation: The challenges and benefits of integrating diverse paradigms. New Directions for Evaluation no. 74* (pp. 73-85). San Francisco: Jossey-Bass.

- Large-scale, longitudinal policy study of the (then-new) Arizona Student Assessment Program, 1990-95 (an early turn to standards-based accountability in education)
- Focus on understanding educators' (teachers and principals) responses to this "sweeping mandate, in particular ...influences on curriculum, pedagogy, school organization, and teachers' meanings and actions"

- Multi-phase study (purposes of development and complementarity)
 - Initial case studies of 4 schools
 - Use of case study data → develop survey assessing testing program principles, characteristics (validity and fairness), and effects on teaching and learning; survey administered to samples of teachers and principals
 - Survey accompanied by teacher focus groups in 4 selected schools

- Study yielded “a massive amount of data” of considerable unevenness and dissimilarity
- Even so, “power of the study must lie in the integration of data”
- Applied modified version of Fred Erickson's analytic induction method of qualitative analysis to this whole data set

- Analytic process:
 - Assemble data in their rawest form
 - Set aside your own prejudices regarding different data types' “potential to inform”
 - Repeatedly reread data sets as a whole, working inductively toward “warranted assertions” = claims grounded in all the data
 - Assemble evidence for each claim
 - Iteratively refine claims through vigorous searches for disconfirming evidence

- Example of Smith's final assertions:
 - State inattention to the technical and administrative adequacy of the assessment and accountability system impeded coherent responses to the testing program's intentions.

Major analyses, pattern matching example

- Hypothetical example:
 - Evaluation of a professional development program for social scientists
 - Focus on learning applications of new spatial technologies, like GIS and social network analysis
 - Assessments of quality of program experience:
 - Questionnaire ratings on intended components of program design
 - Interviews with purposeful sample regarding dimensions of meaningfulness in program experience

- Array two data sets side by side and look for matching patterns
- First example – Match of congruence and confirmation (perhaps triangulation)

Quest items, ranked by means, highest to lowest

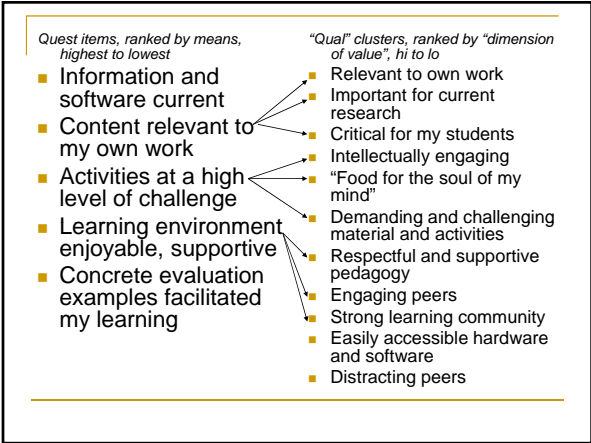
- Information and software current
- Content relevant to my own work
- Activities at a high level of challenge
- Learning environment enjoyable, supportive
- Concrete evaluation examples facilitated my learning

"Qual" clusters, ranked by "dimension of value", hi to lo

- Relevant to own work
- Demanding and challenging material and activities
- Respectful and supportive pedagogy
- Easily accessible hardware and software
- Distracting peers



■ Second example – Match of elaboration, greater richness (complementarity)



■ Third example – No match → empirical puzzle?

Quest items, ranked by means, highest to lowest

- Information and software current
- Content relevant to my own work
- Activities at a high level of challenge
- Learning environment enjoyable, supportive
- Concrete evaluation examples facilitated my learning

"Qual" clusters, ranked by "dimension of value", hi to lo

- Exciting, fun ideas
- Cool software
- Critical value of thinking spatially
- Useful for my students as well
- Wonder about the political valence of these analyses

- Fourth example – Incongruence, dissonance, contradiction (initiation)

Quest items, ranked by means, highest to lowest

- Information and software current
- Content relevant to my own work
- Activities at a high level of challenge
- Learning environment enjoyable, supportive
- Concrete evaluation examples facilitated my learning

"Qual" clusters, ranked by "dimension of value", hi to lo

- Strong learning community
- Respectful and supportive pedagogy
- Demanding and challenging material and activities
- Easily accessible hardware and software
- Relevant to own work
- Intellectually engaging

Major analyses, integrated data display, example 1

Lee, Y.-J., and Greene, J.C. (2007). Using mixed methods in a predictive validation study. *Journal of Mixed Methods Research*, 1(4), 366.-389.

- Predictor = scores on ESL placement test
- Criterion = academic performance in the first semester of graduate school, measured in three ways:
 - GPA, with range from 1.0 to 4.0
 - faculty evaluations of student performance in a content course, collected using questionnaires (n=27/55 returned) and interviews (n=10)
 - student self-assessments of performance in the same content course, collected using questionnaires (n=55/100 returned) and interviews (n=20)
- Additional information gathered

Data matrix:

Ordered display of multiple sources of data in one space, in a matrix

- ESL score – low, moderate, high
- GPA – satisfactory, poor
- Faculty and student assessments – congruent or discrepant

Major analyses, integrated data display, example 2

Lawrenz, F., & Huffman, D. (2002). The archipelago approach to mixed method evaluation. *American Journal of Evaluation*, 22, 331-338.

Evaluation of project on high school science teaching, involving 3 years of summer workshops for teachers + materials and follow-up during the year

- Quasi-experimental design – to assess student achievement
 - Mix of methods to assess achievement – written test, lab skills test, hands-on performance test
- “Social interactionist” approach – to assess program implementation
 - Site visits to schools with classroom observations; teacher and student interviews; teacher and student surveys
- “Phenomenological” approach
 - Multiple in-depth interviews with 6 teachers

- Arrayed data from the different components on different islands in the archipelago
- Three clusters of islands
 - Achievement: 3 student achievement islands
 - Implementation: Observation island, Student perception island, Teacher perception island
 - 6 islands for each of case study teachers

- Imagine analyzing characteristics of islands for similarities and differences, reconfiguring topography, plant life, shorelines ... to match the data more fully
- Imagine moving these islands around, moving those more strongly related closer to one another, and assessing resulting patterns – e.g., one underlying land mass or more than one?
- Imagine clever artistry that could render this display in visual

- Reprise
- Mixed methods inquiry = The intentional, and connected or linked, use of more than one social science tradition, methodology, and/or method in service of *better understanding*
 - Integrated mixed methods data analyses are most relevant for integrated designs
Integrated analyses can also provide insights into the linking task for component designs

- Integrative analyses best engaged with creativity and a spirit of adventure, seeking dissonance as much as confirmation
- Especially because our current conceptual framework for integrative mixed methods analysis is derived primarily from creative practice examples

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Discussion

- Time now for your further questions, comments, concerns, critiques ...

Thank you
