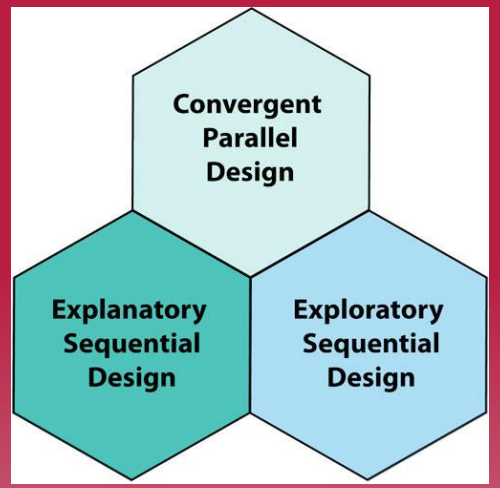
May 2021



MIXED METHODS RESEARCH

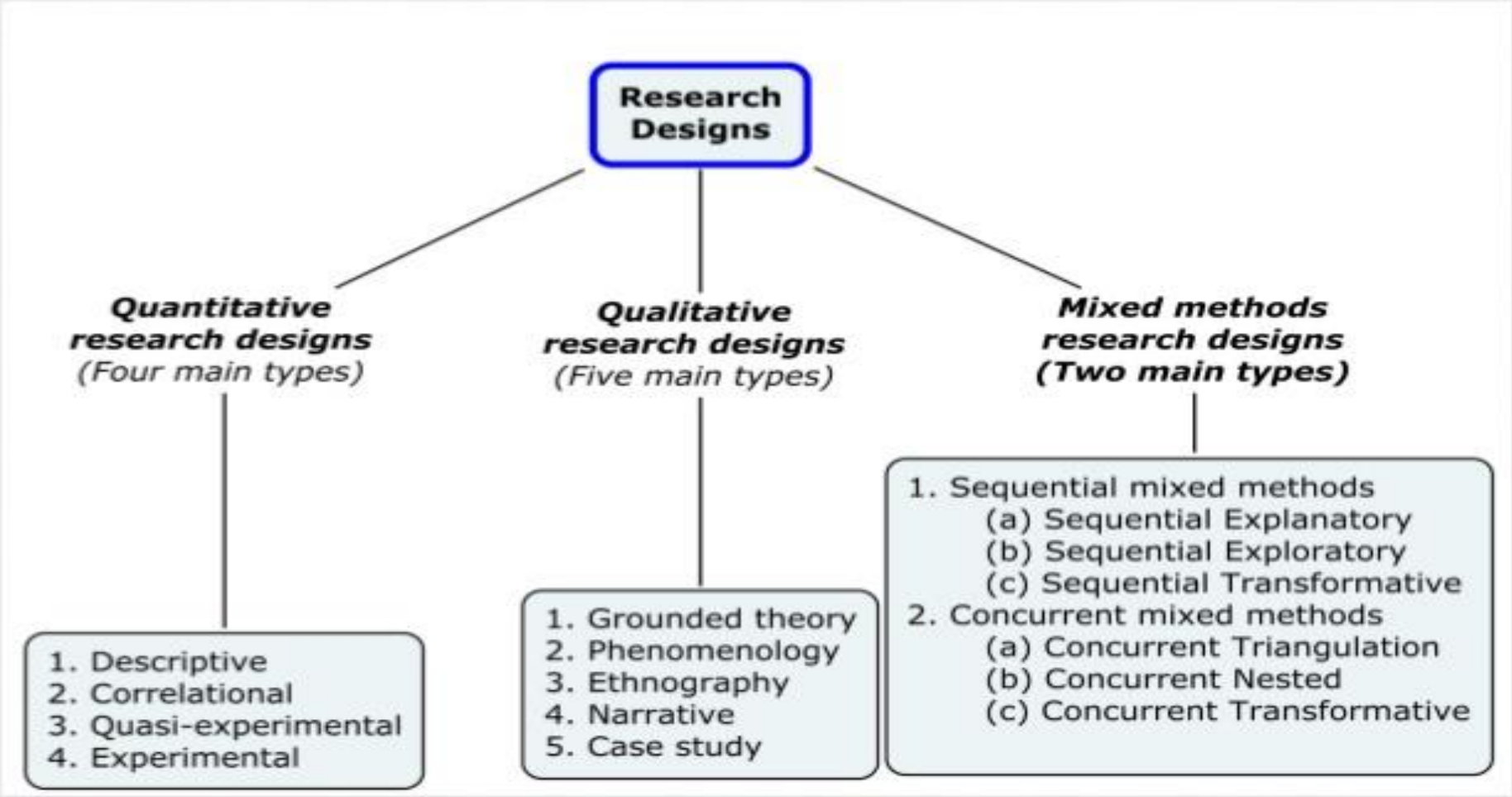
DR. RANIA ALBSOUL

INTENDED LEARNING OUTCOMES

- **After this lecture, you will be able to :**

1. Define mixed methods research
2. Identify the types of mixed methods designs.
3. Identify key characteristics of mixed methods research.
4. Describe steps in conducting a mixed methods study

Research designs



(Creswell, 2007; Creswell, Plano Clark, Gutmann, & Hanson, 2003; Keele, 2011)

4 MIXED METHODS RESEARCH (MMR)

- Frequently referred to as the ‘third methodological orientation’ (Teddlie & Tashakkori, 2009).

WHAT IS MIXED METHODS RESEARCH (MMR)?

A **Mixed methods research design** is a research approach whereby researchers collect and analyse both quantitative and qualitative data within the same study to understand a research problem (Bowers et al., 2013).

WHAT IS MIXED METHODS RESEARCH (MMR)?

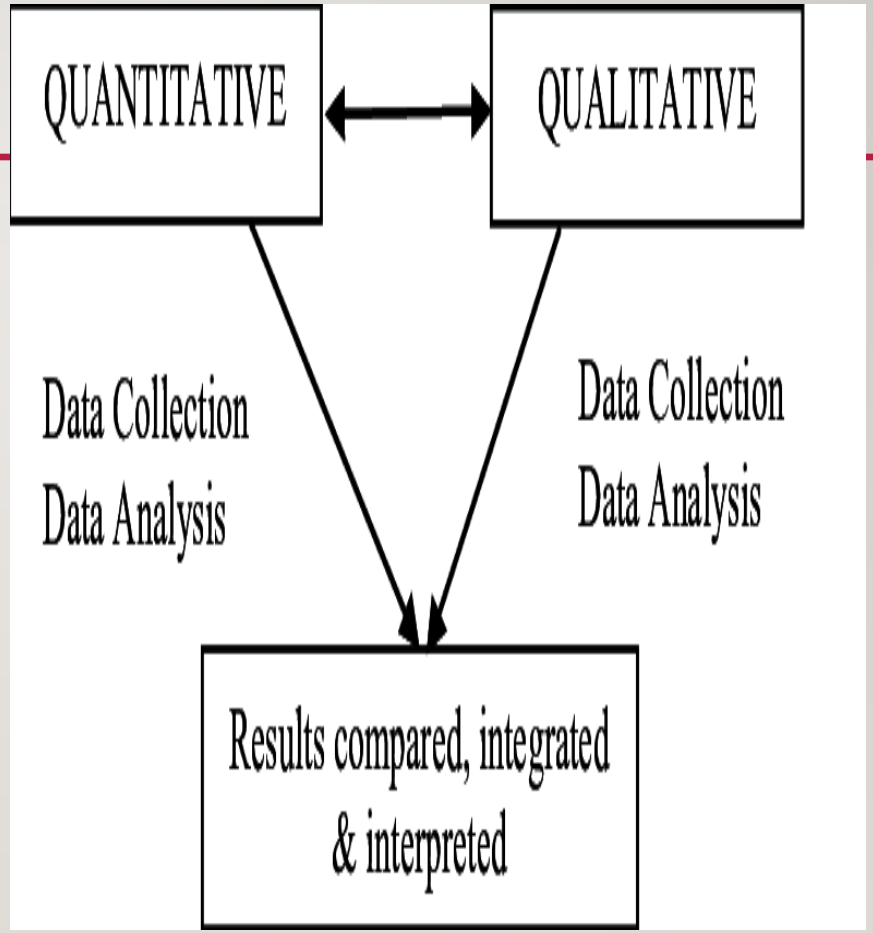
- Johnson et al. (2007, p. 123) defined “mixed method research” as: *“… the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration.”*

WHAT IS MIXED METHODS RESEARCH (CONTINUED)

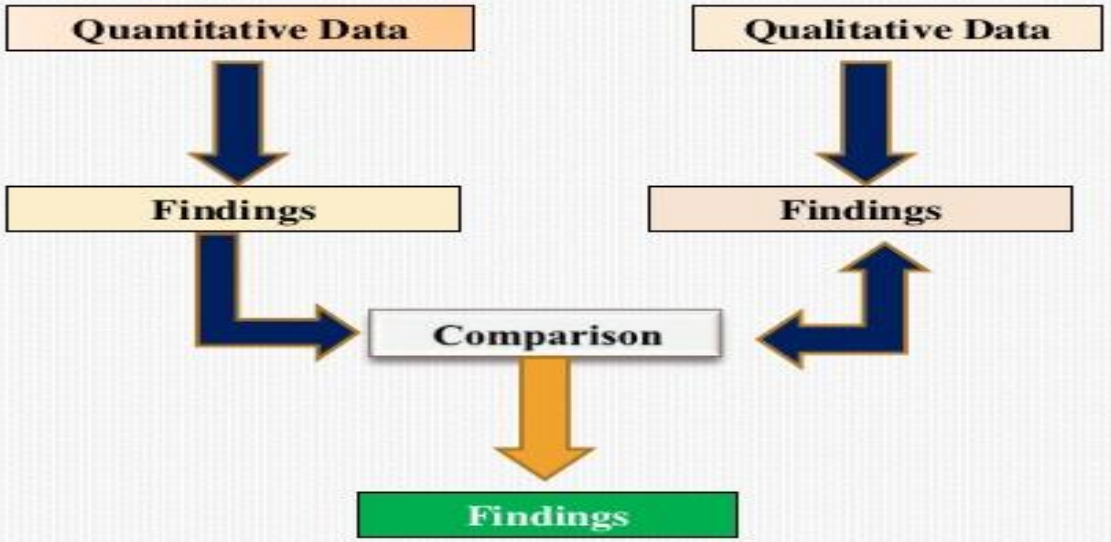
The key word is ‘mixed’, as an essential step in the mixed methods approach is data linkage or integration (Ivankova, Creswell, & Stick, 2006).

- The researcher Mixes qualitative and quantitative data at the same time (concurrently) or one after the other (sequentially).
- This is beyond simply the inclusion of open-ended questions in a survey tool or the collection of demographic data from interview participants, but rather involves the explicit integration of qualitative and quantitative elements in a single study (Halcomb, 2018).


Mixed Methods Research Design
Qualitative & Quantitative Approaches
Qualitative & Quantitative sampling techniques
Mixed Methods Design
Qualitative & Quantitative Data Collection Strategies
Qualitative & Quantitative Data Analysis
Research Plan - logical description of how data would be collected, and analyzed to address the research question(s)
(Yilmaz, 2013)


QUANTITATIVE
QUALITATIVE
Data Collection
Data Analysis
Data Collection
Data Analysis
Results compared, integrated & interpreted

FRAMEWORK FOR VIEWING PERSPECTIVES ON MIXED METHODS



MULTI VERSUS MIXED METHODS

Multi Methods

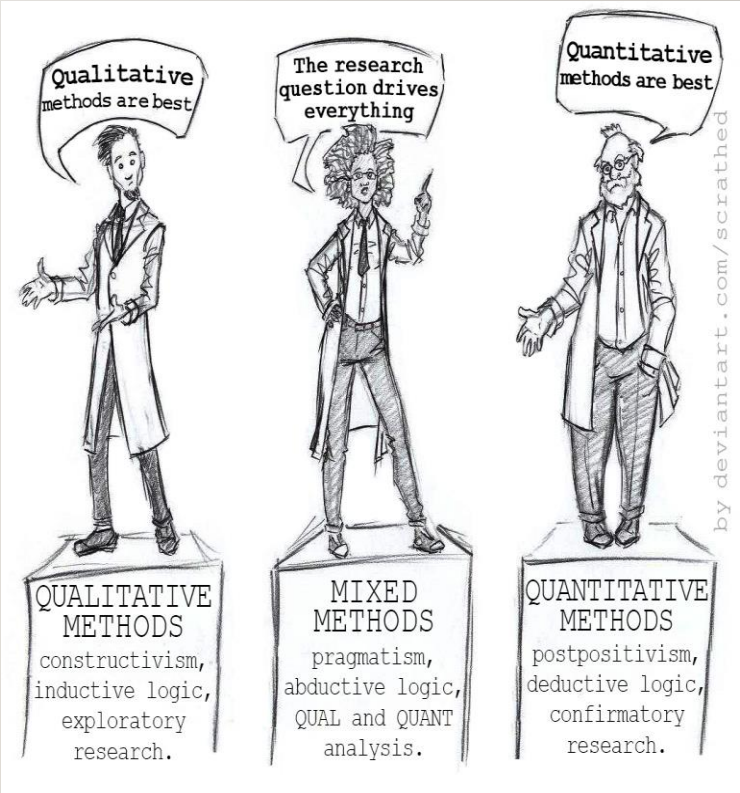
- Uses more than one method
- Can be two qualitative or two quantitative

Mixed Methods

- Uses both qualitative and quantitative
- Involves mixing and integration of the data so that one type of data informs another

THE RISE OF MMR

- Mixed method research has a short history as an identifiable methodological movement which can be traced to the early 1980s and has been described as a ‘quiet’ revolution due to its focus of resolving tensions between the qualitative and quantitative methodological movements (Teddlie & Tashakkori, 2003)



PHILOSOPHY IN MIXED METHODS RESEARCH

- Mixed methods research represents an opportunity to transform these tensions into new knowledge through a dialectical discovery.

- A pragmatic perspective draws on employing “what works,” using diverse approaches, giving primacy to the importance of the research problem and question, and valuing both objective and subjective knowledge

MMR INVOLVES COLLECTING BOTH QUANTITATIVE AND QUALITATIVE DATA

- Quantitative data
  - Instruments
  - Checklists
  - Records

- Qualitative data
  - Interviews
  - Observations
  - Documents
  - Audio-visual materials

QUALITATIVE VERSUS QUANTITATIVE RESEARCH

Criteria	Qualitative research	Quantitative research
Purpose	To understand and interpret social interactions	To test hypotheses, look at cause and effect and make predictions.
Group studied	Smaller	Larger
Variables	Study of the whole (not variables).	Specific variables studied.
Form of data collected	Qualitative data, such as open ended responses, interviews, participant observation, and field notes.	Quantitative data based on precise measurement using structured and validated data collection instruments.

QUALITATIVE VERSUS QUANTITATIVE RESEARCH (CONTINUED)

Criteria	Qualitative research	Quantitative research
Type of data analysis	Identify patterns, features and themes	Identify statistical relationships
Results	Particular or specialised findings that are less generalizable.	Generalised findings that can be applied to other populations.
Scientific method	Bottom- up- the researcher generates a new theory from the collected data.	Top- down- the researcher tests the theory with the data.

WHEN DO YOU USE MIXED METHODS RESEARCH?

- You have a sense that scores are not telling you the entire story. If you just asked a few people about the concept you might obtain a better understanding…mixed methods research provides a more complete understanding of the research problem than either quantitative or qualitative alone.

- Interpretation of data from one design only might be misleading, for example, a structured questionnaire about teachers' emotions regarding teaching practices may only show negative or positive emotion without adequately explain the event that triggered the emotions (Scott & Sutton, 2009).

RATIONALES FOR MIXED METHODS RESEARCH ADOPTED FROM (DOYLE, BRADY, & BYRNE, 2016)

Rationale	Explanation
Triangulation (convergence)	Using quantitative and qualitative methods so that findings may be mutually corroborated (Quantitative analyses employ descriptive and inferential statistics, whereas qualitative analyses produce expressive data that provide descriptive details (often in narrative form) to examine the study's research objectives)
Expansion	• The first phase has findings that require explanation qualitatively (to explain results or how mechanisms work) in causation models. • Unexpected findings that need to be explained
Exploration	An initial phase is required to develop an instrument, identify variables to study or develop a hypothesis that requires testing (Explore qualitatively then develop an instrument)
Complementarity	Using different methods to address different parts of the phenomenon. to integrate two different but connected answers to a research question: one reached via a quantitative approach and the other by means of a qualitative one.
Offset weaknesses (compensation)	Ensures that weaknesses of each method are minimised.

Reasons for Conducting a Mixed Methods Evaluation

(Bryman, *Qualitative Research*, 2006)

- Validity – to corroborate quantitative and qualitative data
- Offset – offset weaknesses of quantitative and qualitative and draw on strengths
- Completeness – more comprehensive account than quantitative/qualitative alone
- Process – quantitative provides outcomes; qualitative, the processes
- Different question – quantitative and qualitative answer different questions
- Explanation – qualitative can explain quantitative results or vice-versa
- Unexpected results – surprising results from one, other explains
- Instrument development – qualitative employed to design instrument, then it is tested
- Sampling – one approach facilitates sampling from other approach
- Credibility – both approaches enhance integrity of findings
- Context – qualitative provides context; quantitative provides general.
- Illustration – qualitative data helps develop "depth" for quantitative data
- Utility – more useful to practitioners
- Confirm – quantitative tests qualitative generated hypotheses
- Diversity of views – relationship and meaning; researcher/participant views
- Enhancement – augmenting or building on one form of data with the other

PLANNING OF MMR

- Four questions must be addressed by the researcher during the planning stage of mixed methods research:

1. In what *sequence* will the qualitative and quantitative data collection

be implemented?

2. What relative *priority* will be given to the qualitative and quantitative data collection and analysis?

3. At what stage of the project will the qualitative and quantitative

data be *integrated*?

4. Will an overall *theoretical perspective* be used to guide the study?

PLANNING OF MMR (CONTINUED)

- Priority in mixed methods design is the relative weight assigned to the qualitative and quantitative research components.

- Sometimes priority is referred to as dominance.

NOTATIONS OF MMR

- The use of upper case refers to emphasis (i.e. the primary or dominant method), whereas the use of lower case refers to lower emphasis, priority or dominance (Morse, 1991).

- QUAN or quan refers to quantitative data.
- QUAL or qual refers to qualitative data.
- MM refers to mixed-methods.
- → data collected sequentially.
- + data collected simultaneously.
- = converged data collection.
- ( ) one method embedded in the other.

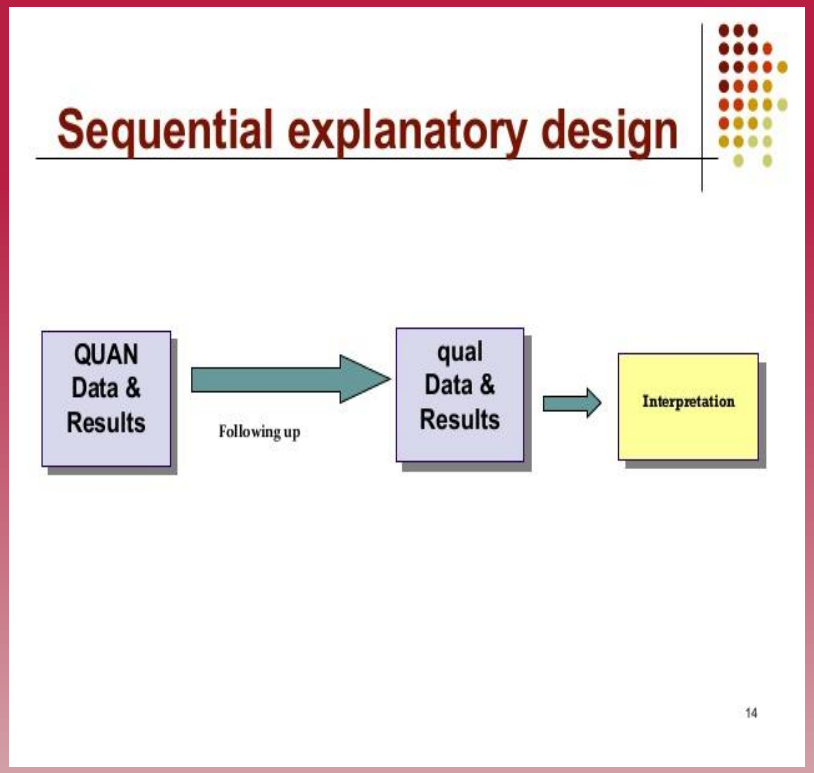
MIXED METHODS DESIGNS (ACCORDING TO THE ORDER OR TIMING OF IMPLEMENTATION OF THE DATA COLLECTION)

- Sequential Explanatory Design
- Sequential Exploratory Design
- Sequential Transformative Design
- Concurrent Triangulation Design
- Concurrent Embedded/Nested Design
- Concurrent Transformative Design

(Creswell & Creswell, 2003)

Criteria						
Timing	Designs	Weighting	Mixing/ stage of integration	Notation	Theoretical perspective	Description
Sequential	Explanatory	Usually quantitative	Interpretation phase	QUAN→qual	May be present	The researcher seeks to elaborate on or expand the findings of one method with another method
	Exploratory	Usually qualitative	Interpretation phase	QUAL→quan		
	Transformative	Qualitative, quantitative or equal	Interpretation phase	qual→quan or quan→qual	Use of theoretical perspective (e.g. advocacy)	
Concurrent	Triangulation	Preferably equal; can be quant or qual	Interpretation or analysis phase	QUAN + QUAL	May be present	The researcher converges two types of data at same time to provide an inclusive analysis of the research
	Embedded	Qualitative or quantitative	Analysis phase	QUAN(qual) or QUAL(quan)		
	Transformative	Qualitative, quantitative or equal	Usually analysis phase, can be interpretation phase too	qual + quan or quan + qual	Use of theoretical perspective (e.g. advocacy)	

SEQUENTIAL EXPLANATORY DESIGN ‘QUAN → qual’



Alternatively, we can refer to it as explanatory design.

- The most frequently applied mixed methods design in both health and social sciences literature (Ivankova, Creswell, & Stick, 2006).
- The reason for favouring sequential explanatory design is that quantitative design in the first stage will portray the objective statistical findings from the group in general. Afterwards, a qualitative approach can be used to discover subjective nuances from participants as individuals and explain the phenomenon behind the numbers that cannot be described merely by the quantitative data (Fries, 2009).
- Viewing the study as a two-phase project.
- It is denoted by ‘QUAN → qual’ which represents the quantitative study occurs first and has greater weight in addressing the study’s aims, and the qualitative study follows to explain quantitative results.

SEQUENTIAL EXPLANATORY DESIGN

- Used when you want to explain the initial quantitative results in more depth with qualitative data (e.g. statistical differences among groups).
- The rationale for this approach is that the quantitative data and their subsequent analysis provide a general understanding of the research problem. The qualitative data and their analysis refine and explain those statistical results by exploring participants' views in more depth.
- This design can be especially useful when unexpected results arise from a quantitative study.

SEQUENTIAL EXPLANATORY DESIGN

- Data analysis is usually connected, and integration usually occurs at the data interpretation stage.

- To reiterate, key characteristics:

➢ Data collection priority (Quantitative data).

➢ Sequence (First quantitative data then qual).

➢ Use of data (to refine, elaborate).

SEQUENTIAL EXPLANATORY DESIGN

- Questions to consider when collecting the qualitative data:
  - What results need further explanation?
  - What qualitative questions arose from the quantitative results?

- Interview schedule questions depend on and are developed based on the quantitative findings (Liem, 2018).

- In explanatory research where qualitative research is mostly used to substantiate findings generated in a population-level survey, priority is mostly assigned to the quantitative component.

EXAMPLE ON SEQUENTIAL EXPLANATORY STUDY

- Researchers may ask persons with hearing loss to rate their conversational abilities before and after an aural rehabilitation program (QUAN) and then have the same participants take part in one-on-one clinician-led follow-up interviews to discuss reasons for specific ratings (qual).

ANOTHER EXAMPLE ON SEQUENTIAL EXPLANATORY DESIGN

- A study aimed to : 1) to identify the proportion of individuals with cerebral palsy, spinal cord injury, multiple sclerosis, or arthritis who report difficulties with accessing and/or utilising needed health care services; 2) to identify reasons for access or utilisation difficulties and the consequences that these may produce.
- The quantitative component involved a survey that identified a group of ‘access-stressed’ individuals who reported substantial problems in accessing and/or using health care services.
- The qualitative study component focused on this group to examine what specific barriers made access problematic and what consequences resulted from not receiving care when needed (Neri & Kroll, 2003).

DRAWBACKS OF SEQUENTIAL EXPLANATORY DESIGN

- It is more time-consuming when compared to concurrent designs (Ivankova, Creswell, & Stick, 2006).
- Potential for loss of participants.
- Can be difficult to fully plan the qualitative arm since it will be dependent on the results of the quantitative results.

DATA INTEGRATION IN MMR

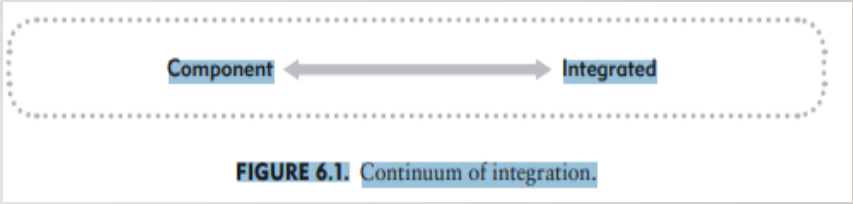


FIGURE 6.1. Continuum of integration.

- Integration refers to how the researcher relates the quantitative and qualitative datasets.
- There is a continuum of integration. That is, the extent to which the two methods and datasets are related to each other varies.
- At one end of the continuum there are “component designs” (in which integration occurs only during data analysis and interpretation).
- Component designs offer minimal integration.
- At the other end of the continuum there are “integrated designs” (in which integration is built into the entire design structure)
- Integrated designs offer maximum integration.

DATA INTEGRATION IN MMR

- John Creswell (2015, p. 83) identifies four types of integration:

1. Merging the data: The quantitative and qualitative results are brought together and compared.

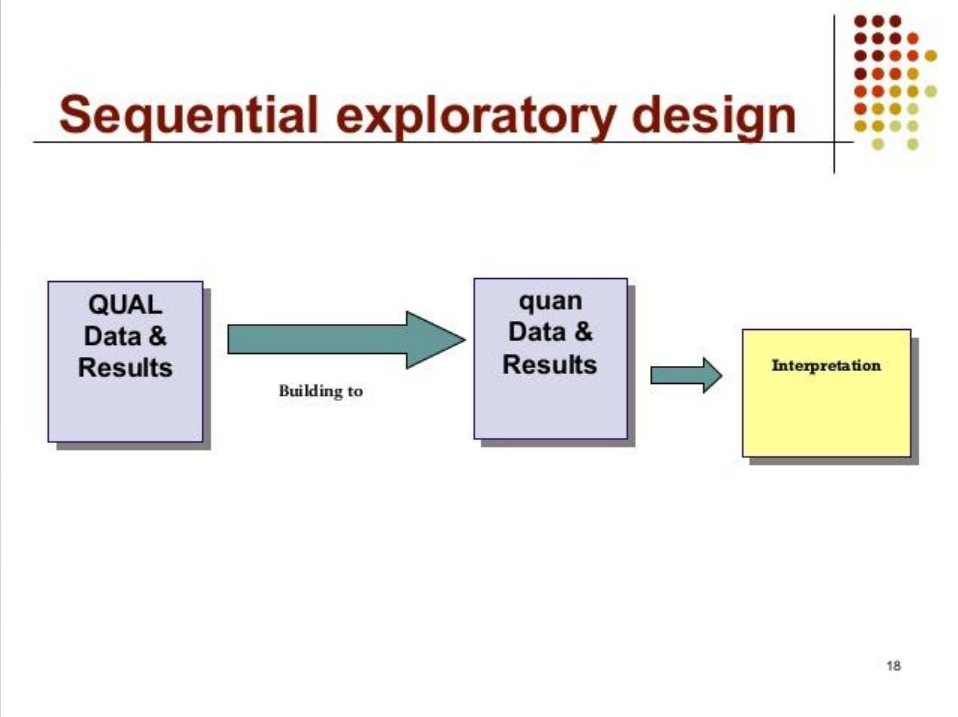
2. Explaining the data: The qualitative data are used to explain the results of the quantitative data.

3. Building the data: The qualitative findings are used to build the quantitative phase of the study.

4. Embedding the data: One set of data is used to augment or support the other set of data

SEQUENTIAL EXPLORATORY DESIGN

QUAL→quan



- Alternatively, we can refer to it as exploratory design.
- Viewing the study as a two phase project.
- Used often to explore a phenomenon, identify themes, and or design an instrument.
- In an exploratory design, qualitative data is first collected and analyzed, and themes are used to drive the development of a quantitative instrument to further explore the research problem (Teddlie & Tashakkori, 2009).
- Typically, greater emphasis is placed on the qualitative data in the study.
- Data analysis is usually connected, and integration usually occurs at the data interpretation stage

SEQUENTIAL EXPLORATORY DESIGN

- In exploratory studies, where the concepts, variables and relationships among them are mostly unclear, greater priority is often assigned to qualitative elements that uncover the ‘pool’ of variables and relationships among them that may be subsequently studied quantitatively

SEQUENTIAL EXPLORATORY DESIGN- DATA COLLECTION

- In this strategy, the data collection would occur in two phases with the initial qualitative data collection followed by the second quantitative data collection. The challenge is how to use the information from the initial phase in the second phase.
- The qualitative data analysis can be used to develop an instrument with good psychometric properties (i.e., validity, reliability).
- The qualitative data analysis will yield quotes, codes, and themes.
- The development of an instrument can proceed by using the quotes to write items for an instrument, the codes to develop variables that group the items, and themes that that group the codes into scales.
- A researcher can analyse the qualitative data to develop new variables, that will be explored further in a quantitative phase.
- The question arises if the sample for the qualitative phase is the same for the quantitative phase. This cannot be, because the qualitative sample is typically much smaller than a quantitative sample needed to generalize from a sample to a population. Sometimes mixed methods researchers will use entirely different samples for the qualitative and quantitative components of the study.

SEQUENTIAL EXPLORATORY DESIGN- DATA ANALYSIS

- In this strategy the researcher analyses the two databases separately and uses the findings from the initial exploratory database to build into quantitative measures.

SEQUENTIAL EXPLORATORY DESIGN-INTERPRETATION

- Researchers interpret the mixed methods results in a discussion section of a study.

- The order of interpretation is to first report the qualitative findings, the use of the qualitative results (e.g., the development of an instrument). and then the quantitative results of the final phase of the study.

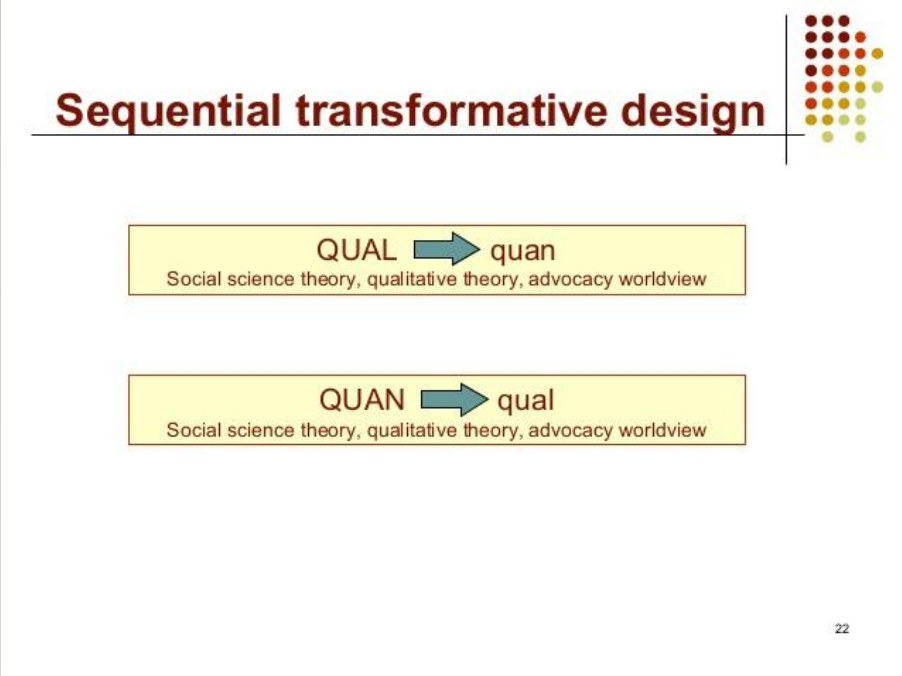
AN EXAMPLE ON SEQUENTIAL EXPLORATORY DESIGN

- A researcher may conduct a focus group of special education teachers to generate discussion of perceived barriers to implementing speech and language services in the schools (QUAL). Then, using the ideas generated in the focus group, a large-scale survey might be sent to all the teachers in a district asking them to rate the impact of predetermined barriers (quan).

ANOTHER EXAMPLE ON SEQUENTIAL EXPLORATORY STUDY

- A study sought to: 1) understand the motivating and inhibiting factors to physical activity and exercise in people after spinal cord injury (SCI), and 2) develop, test and implement a survey tool that examines self reported physical activity after SCI and its relationship with secondary conditions.
- Qualitative (exploratory) data collection preceded the quantitative study component.
- The focus groups specifically explored barriers and facilitators of exercise. Understanding these factors was critical to inform development of the survey tool, which included items on ‘chronic and secondary conditions’, ‘health risk behaviours’, ‘hospital and health care utilisation’, ‘physical functioning’, ‘exercise activities and patterns’, ‘rehabilitative therapy’, ‘wheelchair use’, ‘community integration’ (Neri, Kroll, & Groah, 2005).

SEQUENTIAL TRANSFORMATIVE DESIGN



- Has two distinct data collection phases.
- Both types of methods are combined in this design, but the research is also explicitly driven by a transformative theoretical perspective.
- In this method either type of data can be collected first
- A theoretical perspective (lens) is used to guide the study (transformative framework).
- Purpose is to use the methods that will best serve the theoretical perspective of the researcher.
- After separate analysis of qualitative and quantitative data, integration of outcomes will take place during the interpretation phase (Alavi & Hąbek, 2016).

41 SEQUENTIAL TRANSFORMATIVE DESIGN

- The researcher uses a theoretical based framework to advance needs of underrepresented or marginalised population (women, people with disabilities, racial and ethnic minorities, religious minorities).

- Seeks to address issues of social justice and call for change.

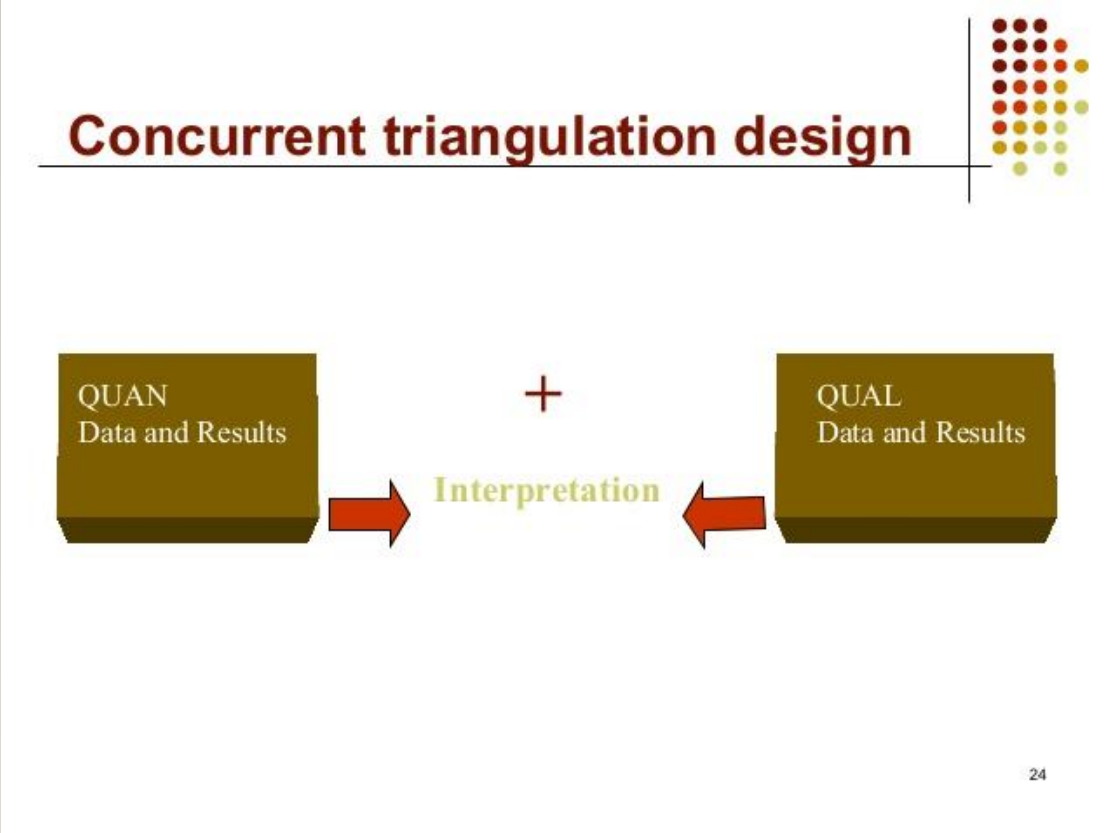
- Strength: very straight-forward in terms of implementation and reporting.
- Weakness: time consuming. Little guidance due to the relative lack of literature on the transformative nature of moving from the first phase of data collection to the second.

AN EXAMPLE OF SEQUENTIAL TRANSFORMATIVE DESIGN

- A sequential transformative study was conducted to examine the cultural influences on mental health problems.

- The study commenced with a quantitative telephone survey of the community which included the General Health Questionnaire.
- The quantitative phase of the study was followed by qualitative interviews which were theoretically driven. These interviews enabled the researchers to explore the cultural health experiences related to the non-use of mental health facilities by Vietnamese and West Indian participants living in an urban area of Montreal.

CONCURRENT TRIANGULATION DESIGN



- In this case, the qualitative and quantitative data are collected simultaneously.
- Priority is usually equal and given to both forms of data.
- The results are then integrated in the final interpretation.
- Merging of QUAN and QUAL results occurs during the analysis and interpretation to provide an integrated conclusion and involves comparing, contrasting and synthesising the two strands.

(Creswell, Klassen, Plano Clark, & Smith, 2011)

CONCURRENT TRIANGULATION DESIGN

- Used when the researcher wants to validate quantitative findings with qualitative data.
- Particularly useful for decreasing the implementation time.
- “Parallel” term can be used to define the concurrent approach (Bryman, 2006).

Parallel triangulation design

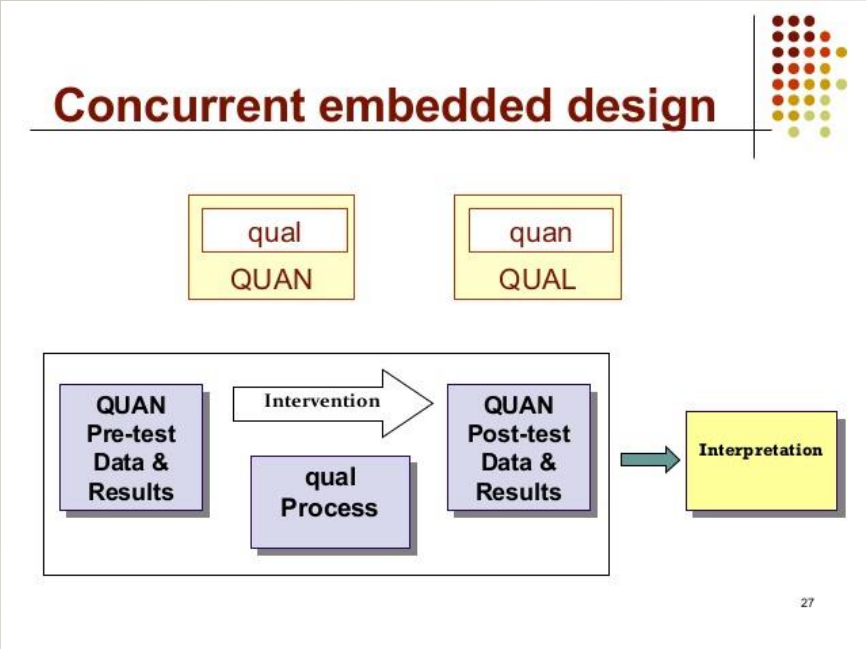
45 CONCURRENT TRIANGULATION DESIGN

- Data collection priority (equal).
- Sequence (concurrently)
- Use of data (To compare similar/dissimilar).

AN EXAMPLE ON CONCURRENT TRIANGULATION DESIGN

- In their longitudinal study of maternal and child well-being conducted semi structured in-depth interviews with mothers and collected quantitative data using several validated scales (e.g. Parenting Stress Index, Edinburgh Post-Natal Depression Scale (EPDS), Rosenberg Self-Esteem Scale) at the same home visit.
- The authors identified numerous family stressors in interviews, which were corroborated in the quantitative maternal stress index scales. Similarly, the objective measures (EPDS) addressing emotional well-being that indicated a high level of maternal depression were supported by findings from the interviews, in which mothers reported low energy levels, despondency and anxiety attacks.
- The authors note that concurrent use of qualitative and quantitative measures adds to the depth and scope of finding (McAuley, McCurry, Knapp, Beecham, & Sleed, 2006).

CONCURRENT EMBEDDED/NESTED DESIGN



- Quantitative and qualitative data are collected and analysed at the same time. However, priority is usually unequal and given to one of the two forms of data— either quantitative or qualitative data.
- In this case, both types of data are collected simultaneously, but one of the two methods is embedded in the other in a way that allows the researcher to address a question that is different from the one answered by the dominant method.
- The integration of data occurs in the analysis.

48 CONCURRENT EMBEDDED/NESTED DESIGN

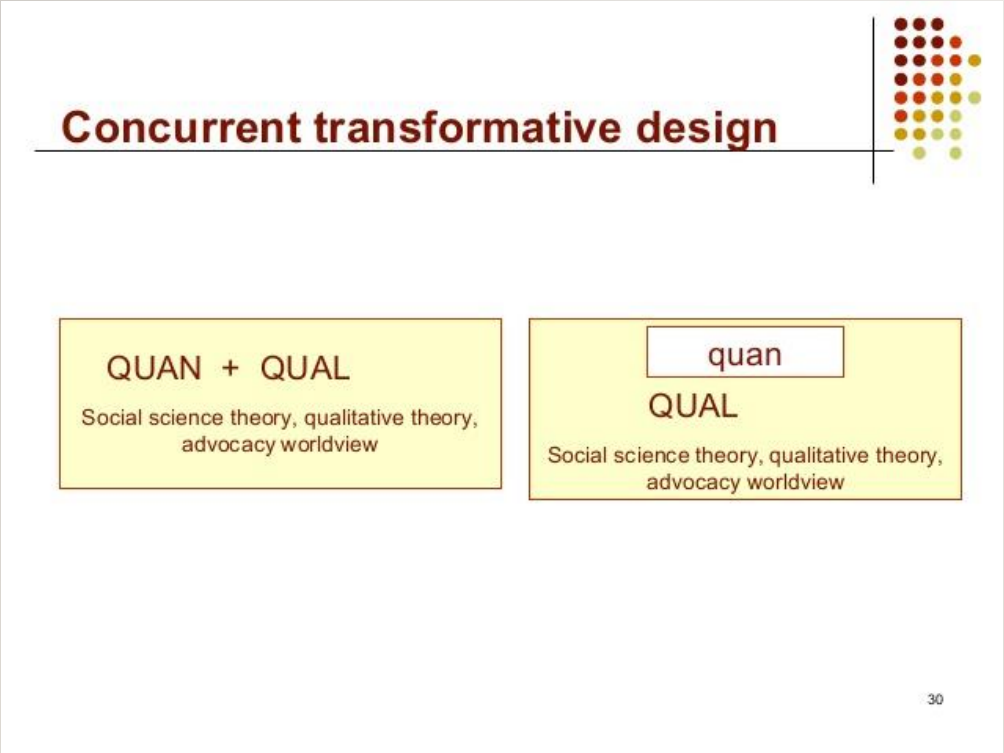
- Primarily purpose is for gaining a broader perspective than could be gained from using only the predominant data collection method.

- Secondary purpose is use of embedded method to address different research questions.

AN EXAMPLE OF CONCURRENT NESTED/EMBEDDED DESIGN

- Strasser et al. (2007) conducted a concurrent nested design to explore eating-related distress of advanced male cancer patients and their female partners.
- The primary method used in the study was focus groups which were attended by patients and their partners with the conduct of these groups and the analysis of the data based on grounded theory (qualitative) techniques.
- The secondary or nested focus of the study was the differences in patients' and their partners' assessment of the intensity and symptoms and degree of cachexia-related symptoms of eating-related disorders of patients. This secondary information was collected by a structured questionnaire which was completed at the time of the first focus group.
- The eating-related distress differed for patients and their partners as indicated in the qualitative findings, and this was complemented by the quantitative findings (Strasser, Binswanger, Cerny, & Kesselring, 2007).

CONCURRENT TRANSFORMATIVE DESIGN



- Guided by a theoretical perspective of change.
- Concurrent collection of both quantitative and qualitative data.
- Similar to sequential transformative designs, these designs are useful for giving voice to diverse or alternative perspectives, advocating for research participants, and better understanding a phenomenon that may be changing as a result of being studied.
- Aims to address social issues faced by the group of people.

Table 10.3 Choosing a Mixed Methods Project, Expected Outcomes, Type of Design

Reasons for Choosing Mixed Methods	Expected Outcomes	Recommended Mixed Methods Design
Comparing different perspectives drawn from quantitative and qualitative data	Merging the two databases to show how the data convergent or diverge	Convergent parallel mixed methods design
Explaining quantitative results with qualitative data	A more in-depth understanding of the quantitative results (often cultural relevance)	Explanatory sequential mixed methods design
Developing better measurement instruments	A test of better measures for a sample of a population	Exploratory sequential mixed methods design
Understanding experimental results by incorporating perspectives of individuals	An understanding of participant views within the context of an experimental intervention	Embedded mixed methods design
Developing an understanding of needed changes for a marginalized group	A call for action	Transformative mixed methods design

RESEARCH QUESTIONS IN MMR

- Think about order of data collection:

➢ If sequential, ask first question first, second second.

➢ If concurrent, ask questions based on weight or importance- if quan more heavily weighted , start with quan research hypothesis, if qual more heavily weighted, start with qual research questions.

53 DATA ANALYSIS IN MIXED METHODS

- It is unusual for qualitative and quantitative data to be analysed together.
- Typically, we use analytic methods appropriate to our data collection strategy
- Each of our analyses must, therefore, meet standards of rigor specific to the overall approach
- The key is actually how we:

- Use each form of analysis
- Integrate our INTERPRETATION of our analyses

ADVANTAGES OF MMR

- Compares quantitative and qualitative data.
- Reflects participants' point of view.
- Fosters scholarly interaction.
- Provides methodological flexibility.
- Collects rich, comprehensive data.

ADVANTAGES OF MMR (CONTINUED)

- Words, pictures, and narrative can be used to add meaning to numbers.

- Numbers can be used to add precision to words, pictures and narrative.

(Migiro & Magangi, 2011)

WEAKNESSES OF MMR

- A researcher has to learn about multiple methods and approaches and understand how to mix them appropriately.
- Methodological purists contend that one should always work within either a qualitative or a quantitative paradigm.
- Mixed method research can be difficult for a single researcher to carry out, especially if the two approaches are expected to be used concurrently.
- Mixed method research is more expensive and more time consuming.
- Little guidance on transformative methods in the literature.

(Migiro & Magangi, 2011)

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Thank you!