

# Sampling Design in Mixed Research (MR)

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Mixed Methods Webinar Series

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# Setting the Stage

- What is a methodology?
- What is a method?
- What steps comprise the planning & design stage of the MR process?

# Methodology

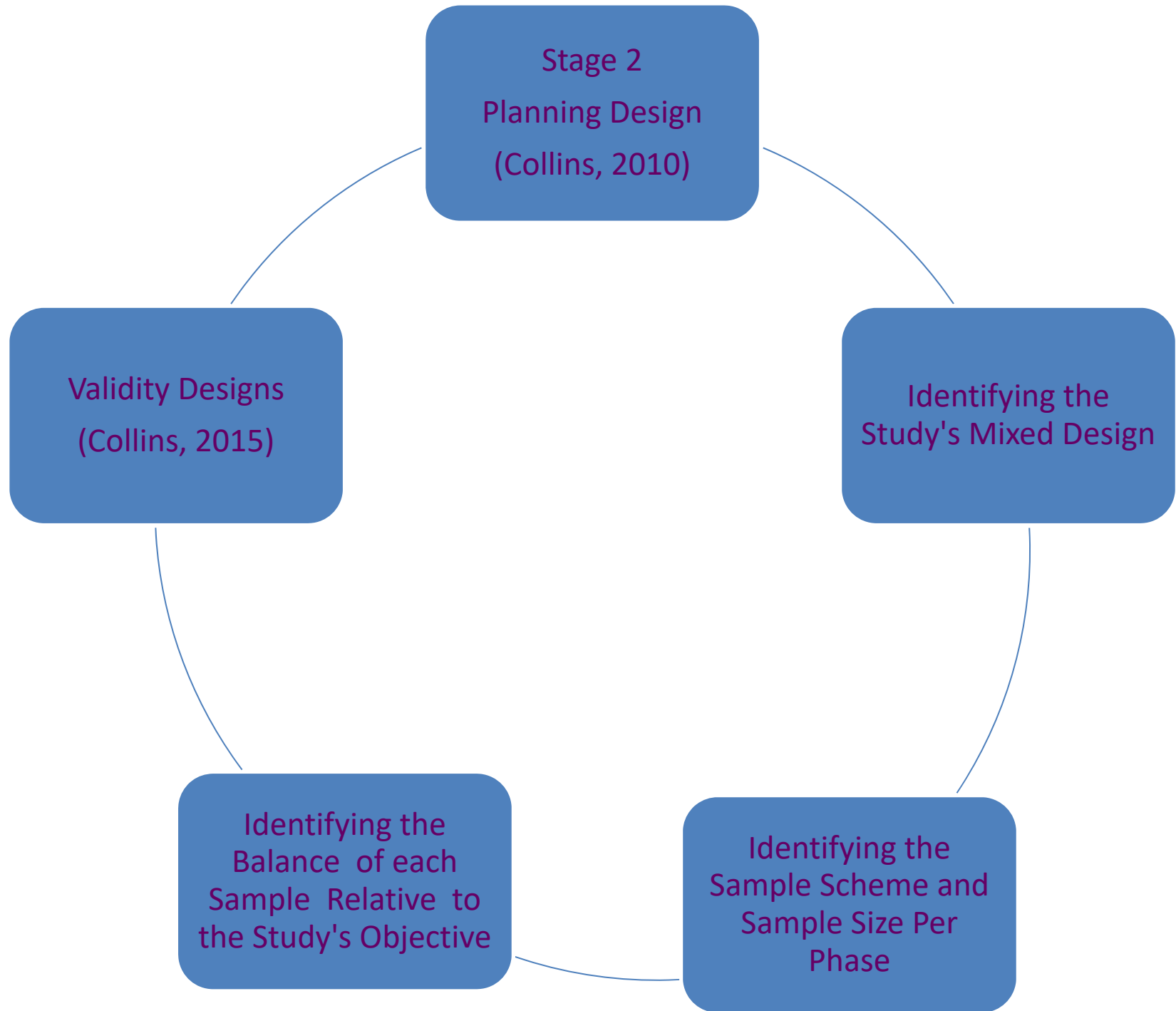
- Teddlie and Tashakkori (2009) interpret methodology as comprising a "broad approach to scientific inquiry specifying how research questions should be asked and answered" (Teddlie & Tashakkori, [T&T] 2009, p. 21).
- Furthermore, they also state that a methodology encompasses the researcher's "world view considerations, general preferences for designs, sampling logic, data collection and analytical strategies" and includes "guidelines for making inferences, and the criteria for assessing improving quality." (T&T, 2009, p. 21)
- T&T (2009) also specify that the researcher's selections of methods are predicated by the researcher's "overall methodological orientation." (p. 21)
- Subsequently, the planning & design stage is impacted by your interpretation about what are credible data, and what is the approach to collect and analyze these data relative to addressing your research question (Collins, 2010)

# Mixed Research Design Logic

- “A set of decisions about timing, integration, and priority of quantitative and qualitative methods that researchers have to make when designing a mixed methods study.” (T & T, 2009, p. 107)

# Mixed Designs

- A strand (T&T, 2009) refers to the activities occurring at the conceptual (i.e., forming the research purpose/question),
- methodological/analytical (i.e., implementation of methods/ analysis),
- and inferential (i.e., conclusions, explanations) stages of a mixed research study. A study can have one or more strands dependent upon the complexity of the research question.



# Focus and Goal

- The term **sampling design** refers to two distinct decisions yet interrelated decisions: decide on the **strategy** to select the sample (i.e., scheme) and decide on the **sample size per strand** of the study.
  - **Inclusive Sampling Model (Collins, 2010)**
- The goal of this webinar is to introduce an inclusive sampling model comprising three components: discussion of selective **sampling typologies**, presentation of the steps in the mixed **sampling process**, and **recommendations** to address sampling issues related to four criteria impacting sampling designs: representation, legitimation, integration, and politics.

- :

# Sample Design

- Sample schemes and sample size
- Information on the following slides is based on the following chapter:
- Collins, K. M. T. (2017). Sampling designs in educational research. In D. Wyse, E. Smith, L. Suter, & N. Selwyn (Eds.), *British Educational Research Association (BERA)/ SAGE Handbook of Educational Research* (Vol,1, pp. 280-292). London, England, Sage.



# Sampling Decisions

- Identify your perspective: My perspective these decisions are influenced by the researcher's interpretations (i.e., philosophical assumptions) about what constitutes credible data, and that data are created by the researcher – not simply collected.
- Rather, data construction is filtered by the researcher's experiences, qualifications, beliefs, and motivations for exploring the research topic, all of which are influenced by the context surrounding the inquiry (Maxwell, 2010).

# Examples of Decisions & Criteria- Quantitative

- Goal: Aim of the study and the sample characteristics are identified
- Quantitative Sampling The goal is to select a representative sample. The process begins by defining the target population, and identifying the accessible population, which the researcher has reasonable access. The sampling frame is then delineated to list all elements in the selected population. Probability sample scheme and sample size determined by a power analysis (gpower software or tables)

# Goal Qualitative

- Based on the concept of sampling for meaning
- Individual's perspective (IP) is context-specific and is based experientially, not fixed
- Relationship between researcher and participant can shape collected data, and
- Sociocultural standards (culture and community) shape the IP
- Information-rich data and achieving saturation

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# Data Saturation

- To achieve data saturation is influenced by a number of factors:
- Data quality - amount & complexity of data collected
- Sample heterogeneity
- Researchers' resources
- Number of individuals who are analyzing and interpreting the data (Guest, Bunce, & Johnson, 2006)
- The larger the degree of sample heterogeneity, the larger the number of cases recommended to achieve saturation (Guest et al., 2006)

# Objective - Generalization

- Probability sampling – external generalizations selection of a representative sample generalized to the population
- Purposive sampling- internal generalizations, analyses of data obtained form a subset of elite informants who are representative of the sample from which they have been selected and the generalizations are applied to that sample
- Analytic –evidential quality of the data, generalize a particular set [case study] to some broader theory (Miles, Huberman, & Saldaña 2014)
- Case-to-case transfer –generalize across cases and the transfer is supported by theory (Firestone, 1993)
- Naturalistic – perceptions of the consumers of the research who reflect on the applicability of the conclusions to their experiences (Stake, 2005)

# Rationale & Purpose

- The **rationale** for developing the sample design is filtered by the research question, type of generalization, available resources.
- **Purpose:**
  - Quantitative approach: Attain adequate power, population characteristics are represented in the sample,
  - Qualitative approach: Represents the characteristics of interest, attain quality data to reach saturation and theory development, as in the case of grounded theory, or theory confirmation
- **Strategy:** Prebriefing interviews to guide sample selection, if appropriate given the design parameters

# Mixed Research Design

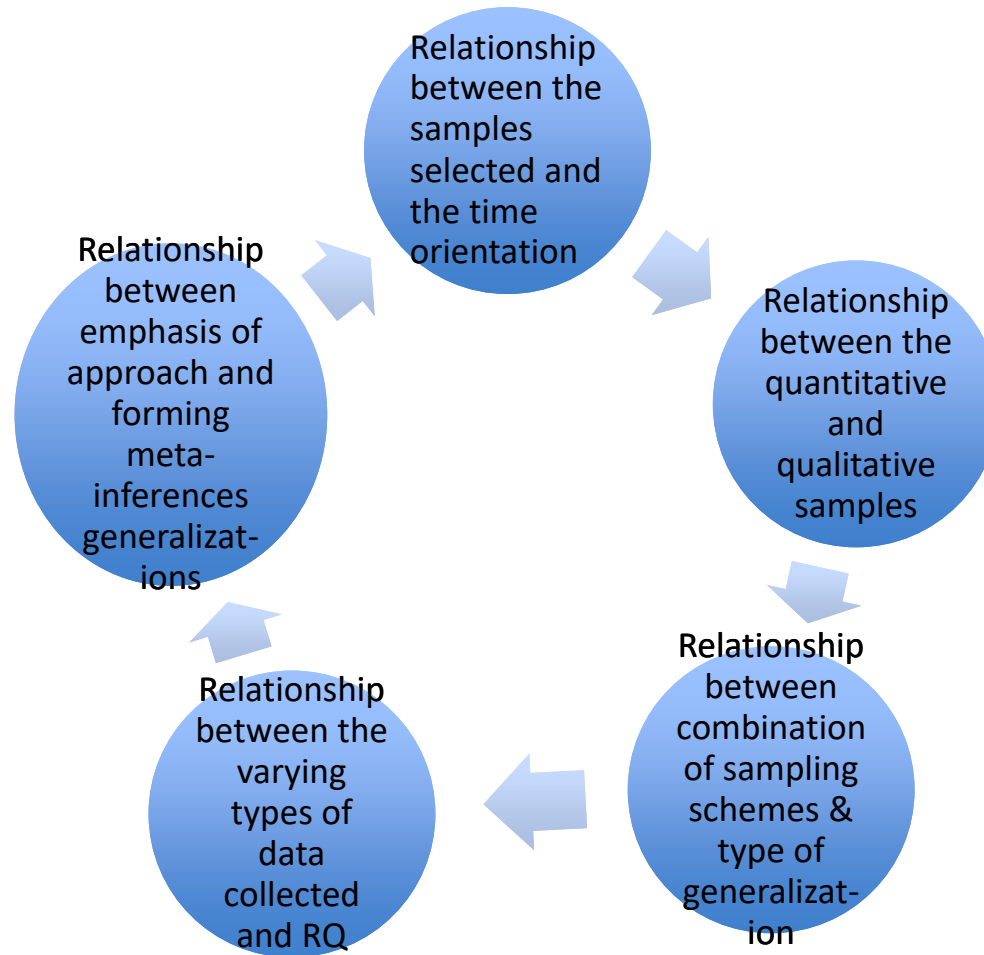
- In mixed research, the sample design per phase can facilitate or can limit the
- degree that inferences can be made approximately equally from results generated in the quantitative and qualitative phases.
- **GOAL: Interpretive consistency** is the consistency between the sampling design and the credibility of
- the researcher's inferences and chosen generalizations (Collins, 2015; Collins, Onwuegbuzie, & Jiao, 2006).



# Sampling Typologies

- Kemper, Stringfield, & Teddlie, 2003
- Teddlie & Yu, 2007
- Onwuegbuzie & Collins, 2007
- (See Collins [2010] for references)
- Sampling typologies formed the basis for the Integrative typology developed by Collins (2010) as presented in the following slides.

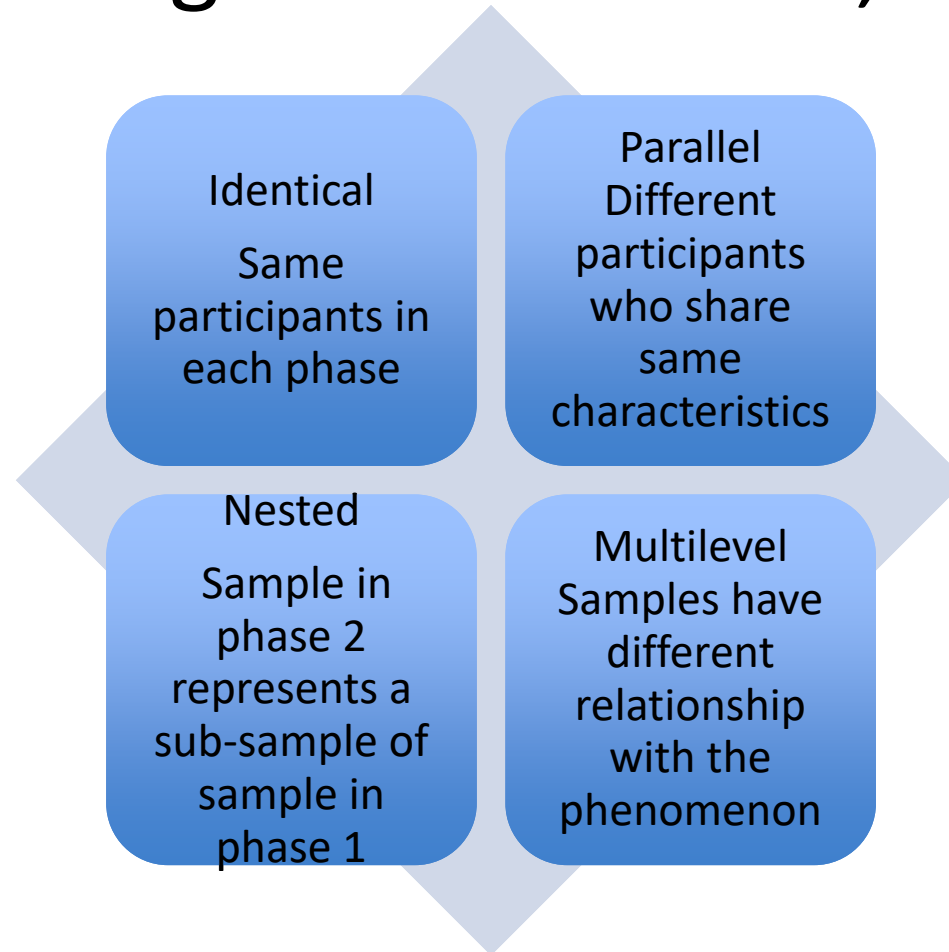
# Integrative typology (Collins, 2010)



# 1. Samples Selected & Time Orientation

- Concurrent approach: independent relationship between the data collection and analysis per strand, and integration occurs at the study's conclusion
- Sequential approach: Dependent relationship between the data collection and or analysis. Analysis of data in strand 1 informs decisions regarding data collected in strand 2. Data analysis **always begins before all the data** are collected.

## 2. Relationship between the samples (Onwuegbuzie & Collins, 2007)



# 4. Type of data collected

- A. Combination of both data types : Quantitative Data and Qualitative Data
- B. Transformed Data: Quantitized and Qualitized
- Also referred to as cross-over analysis (Onwuegbuzie & Combs, 2010) (cf: Onwuegbuzie, Frels, Leech, & Collins, 2011)
- Quantitized Process: Process of converting qualitative data to numerical codes that can be analyzed statistically (Miles et al. 2014) (e.g., descriptive data in terms of frequencies and factor analyzing themes)
- Qualitized Process: Process of converting quantitative data to into data that can be analyzed qualitatively (e.g., modals)

## 5. Emphasis of Approach

Placing emphasis on one approach (e.g., strand) in contrast to the other approach, when formulating meta-inferences and generalizations.

Placing approximately equal emphasis on both approaches, when formulating meta-inferences and generalizations.

- “Representativeness/saturation trade-off”
- Trade-off between meeting the requirement of external generalization versus meeting the requirement of transferability (Teddlie & Tashakkori, 2009, p. 184)

## 5. Mixed Research Emphasis

- The researcher may use the research question to determine the emphasis placed upon each strand in terms of formulating meta-inferences. Specifically, the researcher makes one of two decisions
- 1. to give one strand of the study (e.g., qualitative) more emphasis or a higher degree of status (i.e., dominant status) 2. to give all strands of the study (i.e., qualitative and quantitative) approximately equal status or emphasis in terms of formulating meta-inferences

# Goal of the Study (Collins, 2010)

- What is the goal or long-term aim of this study?
- Who are the stakeholders who will be impacted by this study?
- What sample characteristics (e.g., age, culture, gender, social class) do you perceive will enable you to address the goal of this study?



# Objective of the Study (Collins, 2010)

- What level of generalization do you intend to form based on the conclusions and interpretations derived from both phases of the study?
- What level of emphasis or weight do you intend to place on the findings of each phase of the study?
- In what ways do you think the level of emphasis will impact the type of generalization?

# Purpose of the Study (Collins, 2010)

- To what degree do you think that sample characteristics (e.g., age, culture, gender, social class) will impact the purpose of mixing?
- What sampling design addresses optimally the purpose of mixing within the study?

# Research Question (Collins, 2010)

- To what degree do the samples for the qualitative and quantitative phases of the study generate a credible and sufficient data source, thereby enabling you to address the research question?

# Design (Collins, 2010)

- Research design. To what degree do the sampling schemes address optimally the design parameters in terms of time order of the approaches and emphasis of approach?
- Sampling Design. To what degree have you provided rationales for your selections of
- scheme and sample size per phase of the study?

# Selections (Collins, 2010)

- To what degree have you combined both purposive and probability sampling schemes in your study?
- To what degree do the sample sizes per phase reflect adequate power (quantitative) and the generation of information-rich data (qualitative), thereby leading to formulation of quality inferences?

# Challenges Impacting Sampling Designs

- Representation
- Legitimation
- Integration
- Politics
- Ethics

# 1. Representative Sample

- A representative sample can be interpreted as ‘miniature or small replica of the population’, or ‘typical of the population’ and, typical could be further explained ‘in terms of the average, the mode, the ideal’, or ‘coverage of a population’. Interpretation of coverage could be further delineated as ‘heterogeneity’ or ‘inclusion of extreme cases’ or coverage could be interpreted as ‘partitioning a population into disjoint classes [that are] regarded as homogeneous but not necessarily represented proportionately (Kruskal & Mosteller, 1979, p. 14).

# 1.Representative

- Stating only the term representative sample in the narrative, could imply a 'seal of approval' that the sample is representative of the target population (Kruskal & Mosteller, 1979 , p. 14).



# 1. Challenge of Selection Bias

- Cultural values define researchers' perceptions of representation, and these perceptions impact the degree that proportional representation of all persons is addressed in sample selection. Selection bias also occurs using judgment samples. In this case, the researchers' judgment to select a specific sample can introduce selection bias. Problematic is a convenience sample (sample is readily available). In both cases, there is a lack of theoretical rationalization within a theoretical framework (Walford, 2001)

# 1. Selection bias

- Generalizing from events and activities that are observed by researchers **when they are present**, assuming their presence is not continuous, could lead to flawed conclusions because the selective viewing of events and activities might not be representative of the pattern of events or activities characterizing the topic of interest (Miles et al., 2014).

# 1. Sampling bias

- Sampling bias also can occur when researchers select participants who are willing to participate, or who are perceived as ‘articulate, insightful, attractive, and intellectually responsive’ or who are selected because
- Bias: If participants’ perspectives are not
- representative of the actual variability occurring within the population of interest (e.g., key informants) Miles et al., 2014, p. 295).

# 1. Sampling Bias Solutions

- Miles et al. (2014) recommend increasing the number of cases and including cases that represent alternative perspectives, such as
- **negative cases**, for contrasting purposes. Other strategies are to select randomly individuals, events, and activities to observe and organize data based on these selections into a **matrix**. This matrix can be used to review the observed cases to detect a potential pattern of missing information (Miles et al., 2014).

## 2. Legitimation

- A term coined by Onwuegbuzie and Johnson (2006). A typology designed to assist researchers to specify criteria applicable for validating or legitimating the inferences drawn throughout stages of the study and at the conclusion.
- Nine criteria

## 2. Validity Design - Sampling

- Sampling integration. The extent to which the relationship between the quantitative and qualitative sampling designs (per strand) yields quality meta-inferences (Onwuegbuzie & Johnson, 2006)
- Interpretive Consistency. To denote the consistency between the inferences made by the researcher(s) and the sampling design (e.g., sampling scheme, sample size) used (Collins et al., 2006)

## 2. Design Fidelity (Teddlie & Tashakkori, 2009)

- Design fidelity (i.e., to what degree are the design components—for example sampling, data collection, data analysis techniques—executed with rigor and quality?)
- To what degree do these procedures encapsulate relationships, associations, or effects?).

# 3. Integration Defined

- **in this context, it is conceptualized as a continuum**, contrasting, modifying and linking sets of findings derived from the various phases or strands (Teddlie & Tashakkori, 2009).
- Researchers can integrate or **combine different multiple philosophical assumptions and different methods** of data collection and analyses, leading to meta-inferences
- In MR, **integration and the degree that it is successful is referred to as integrative efficacy**, whereby the **goal** of integration leads to the researcher formulating “**theoretically consistent meta-inference[s]**” based on integration of findings and conclusions obtained from each strand (Teddlie & Tashakkori, 2009, p. 305).



# 3. Triangulation

- Bazeley and Kemp (2012) point out that triangulation can serve the purpose of
- validation, which occurs when the results converge, or complementarity, which
- occurs when integration of results lead to broader insights and more complex
- interpretations of the topic of interest. Another purpose is divergence, which occurs when the researcher is looking for findings that contradict leading potentially to different types of research questions or topics to explore (Greene, 2007).

## 4. Politics

- Refers to any conflicts that occur when different investigators are used for the qualitative and quantitative components of an investigation, as well as the contradictions and paradoxes that come to the fore when qualitative and quantitative data are compared and contrasted. Also refers to stakeholders' perceptions of the value of the integrated findings (Collins, 2010)

# 4. Ethics

- Sample selection can present an ethical challenge as the researcher balances the responsibility of ensuring the participants' rights (for example, voluntary participation, informed consent, anonymity, confidentiality, risk minimization), and developing a sample design to achieve credible outcomes and generalizations (Dattalo, 2010).

# Final Thoughts

- Sampling design can make or break your study.
- It provides your data source(s).
- It reflects your interpretation about what are credible data, and what is the approach to collect and analyze these data relative to addressing your research question (Collins, 2010)
- Your Comments, Questions?

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# Workshop Slides

- Sources for the slides are a combination of slides selected from the the following:
  - Collins, K. M. T. (2018, July). *Introduction to mixed methods research*. A three-day professional development and training workshop. Presented at the ICPSR Summer Program in Quantitative Methods of Social Research. University of North Carolina, Chapel Hill, NC. Copyright 2016
  - Collins, K. M. T. (2018, Spring). *Mixed methods research: Graduate-level course*. Dept. of Curriculum & Instruction, University of Arkansas, Fayetteville, AR. Copyright 2017
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