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Getting started: Building blocks for designing a rigorous mixed methods research study

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What is Mixed Methods (MM)?

Mixed methods (MM) is a research methodology that integrates the elements of both qualitative and quantitative approaches within a single study to enhance understanding of research phenomena (Greene, 2007; Johnson et al, 2007; Tashakkori & Teddlie, 2010).

✓Mixed methods

✓Mixed methodology

X multiple methods/multi-method

X mixed-method

Various typologies of MMR Designs

- Teddlie & Tashakkori (2006; 2009): MM monostrand designs vs. MM multistrand designs → concurrent, sequential, conversion, multilevel, and fully integration designs

- Leech & Onwuegbuzie, (2009): A three-dimensional typology: partially mixed vs. fully mixed; concurrent vs. sequential; equal status vs. dominant status (e.g. partially concurrent equal status design)

- Creswell & Plano Clarks (2003; 2011; 2018) & Guest (2012) → MM designs based on timing and purpose of integration [other elements: priority, mixing point of integration, and level of integration].

Basic MMR Designs based on Research Questions

Timing

Purpose of integration

Three basic designs (Creswell & Plano Clark, 2018):

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- Explanatory sequential design: → to explain Quantitative results

Basic MMR Designs based on Research Questions

Timing

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Three basic designs (Creswell & Plano Clark, 2018):

- Convergent parallel design: → to converge results for a complete understanding
- Explanatory sequential design: → to explain Quantitative results
- Exploratory sequential design: → to generalize Qualitative results

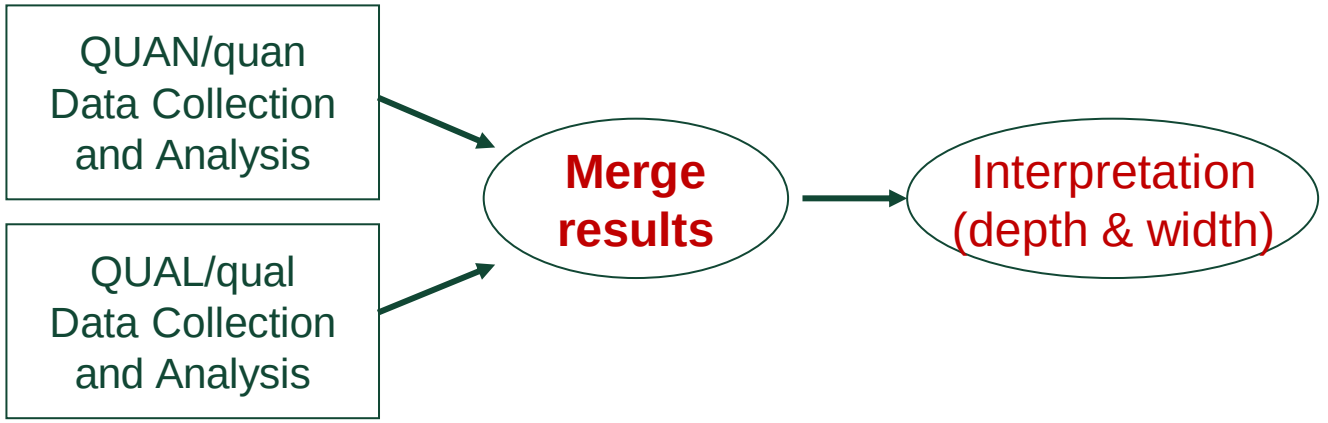
Advanced MMR Designs

Advanced designs in practice = **at least one basic design** + **other layers** to guide the whole research process

- a research design→ experiment/intervention/case study/phenomenology/survey, etc.; [embedded MMR]
- a paradigm → transformative/social justice/participatory/critical theory/culture, etc.;
- a multiphase project →program evaluation.

Diagrams of the three basic designs

Convergent parallel design

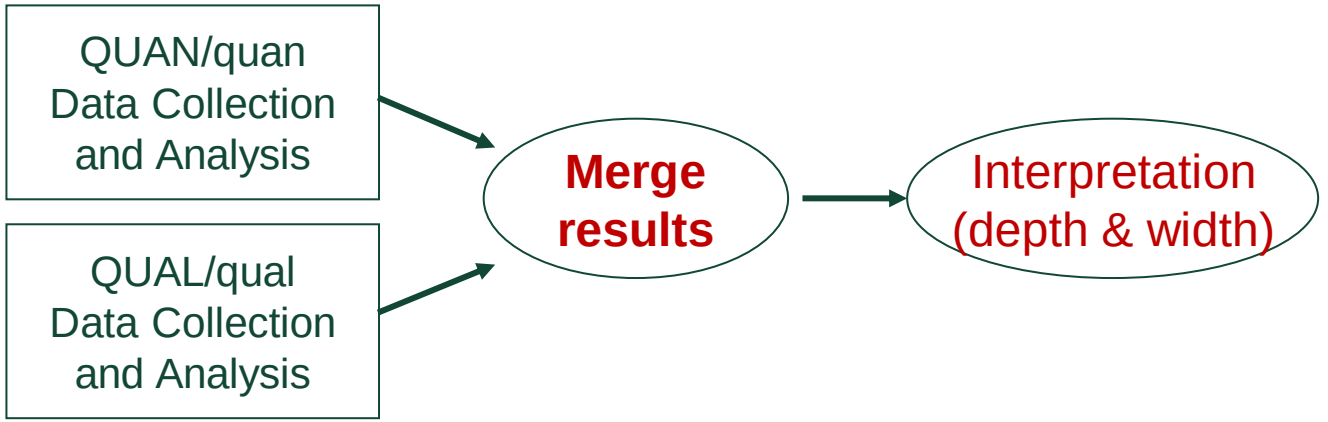


If you add a priority, you can use capital letters.

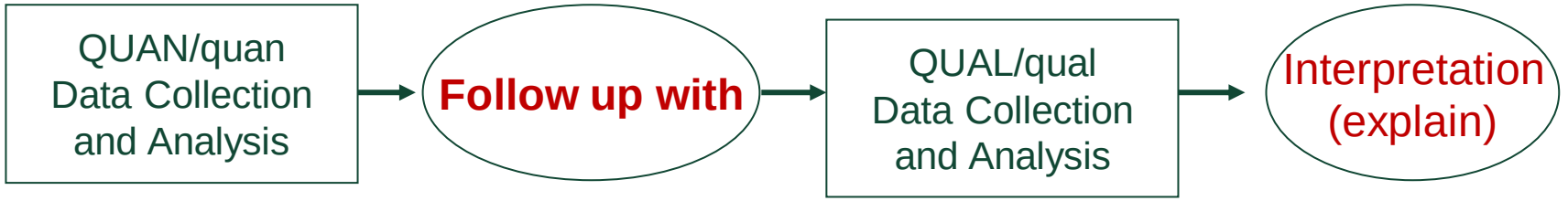
Diagrams of the three basic designs

If you add a priority, you can use capital letters.

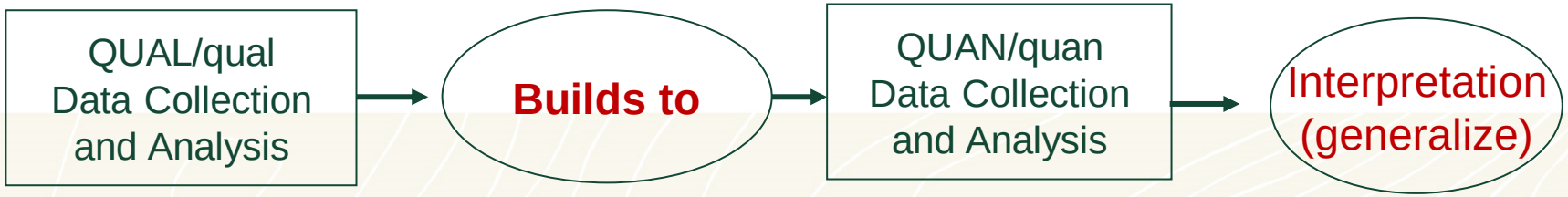
Convergent parallel design



Explanatory sequential



Exploratory sequential



MMR Diagram Symbols (Morse, 2003)

Boxes →
Steps within a single quan or qual strand

Ovals →
Mixing or Connecting

priority →

timing →

Notation	What It Indicates	Example
Uppercase letters	Prioritized methods	QUAN, QUAL
Lowercase letters	Lesser priority	quan, qual
+	Convergent methods	QUAN + QUAL
→	Sequential methods	QUAL → quan

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MMR Notation in Writing

Basic designs ← → Advanced designs

Purpose of integration

CONVERGENT PARALLEL QUAN + QUAL = converge results	EMBEDDED Experiment [QUAN + qual] = enhance understanding
EXPLANATORY SEQUENTIAL QUAN → qual = explain results	TRANSFORMATIVE Feminist theory (QUAN → qual) = highlight gender inequality
EXPLORATORY SEQUENTIAL QUAL → quan = generalize findings	MULTIPHASE QUAL → QUAN → [QUAN+QUAL] = program development

From: Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks, CA: Sage.

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MMR Notation in Writing

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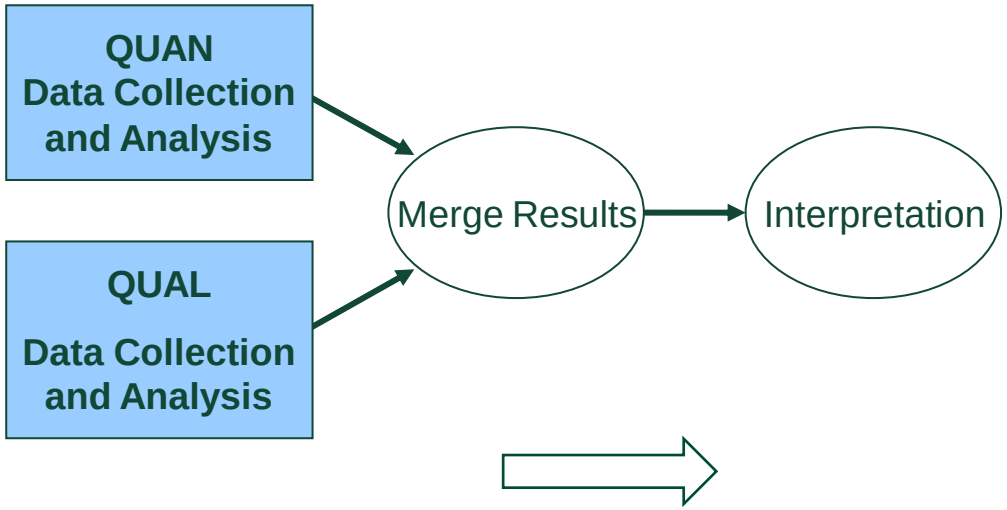
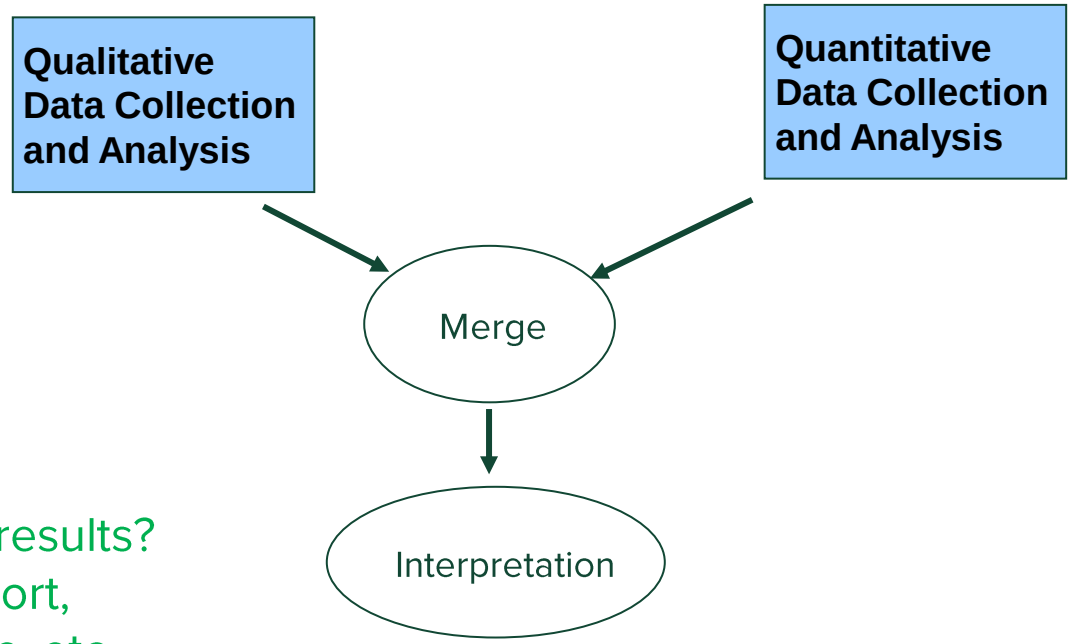
Convergent Parallel Design

Timing: concurrent

Purpose of integration: compare and converge different results for a complete understanding

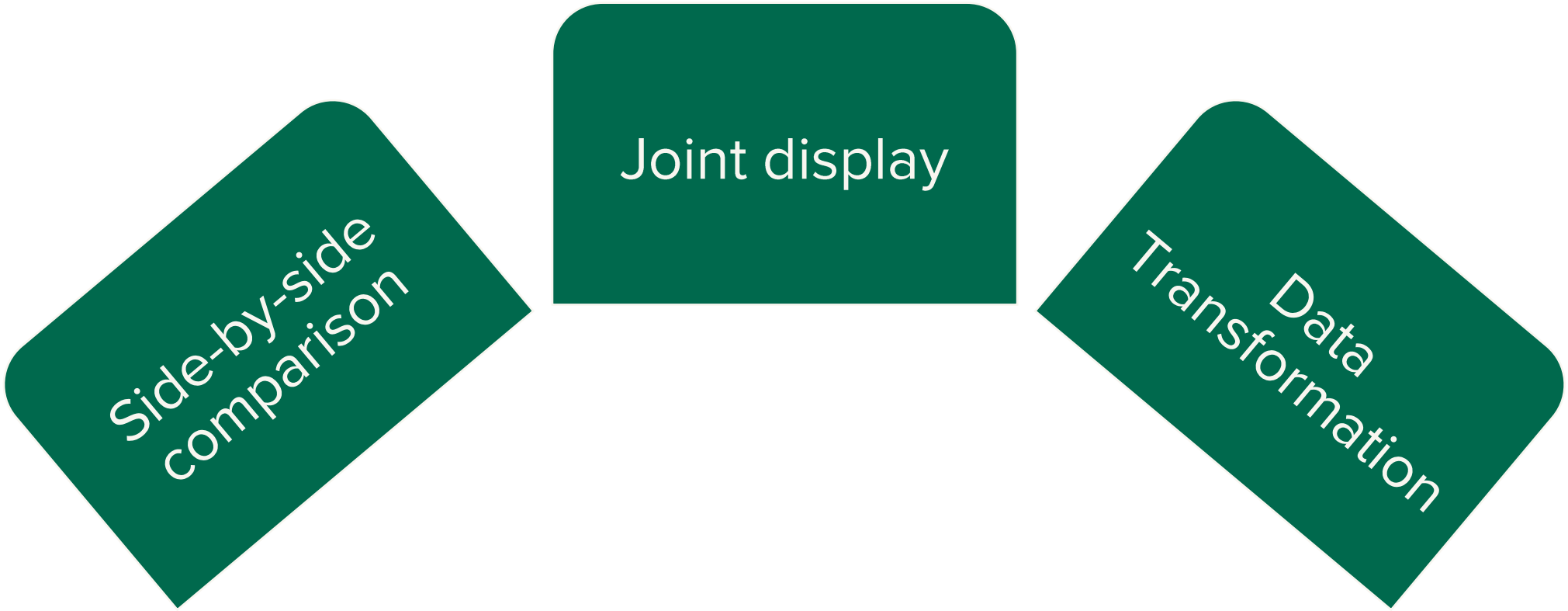
Convergent Parallel Design





How to merge QUAN and QUAL results?
→ compare, relate, confirm, support, illustrate, describe, corroborate, etc. [QUAN+QUAL]

Three strategies in merging results



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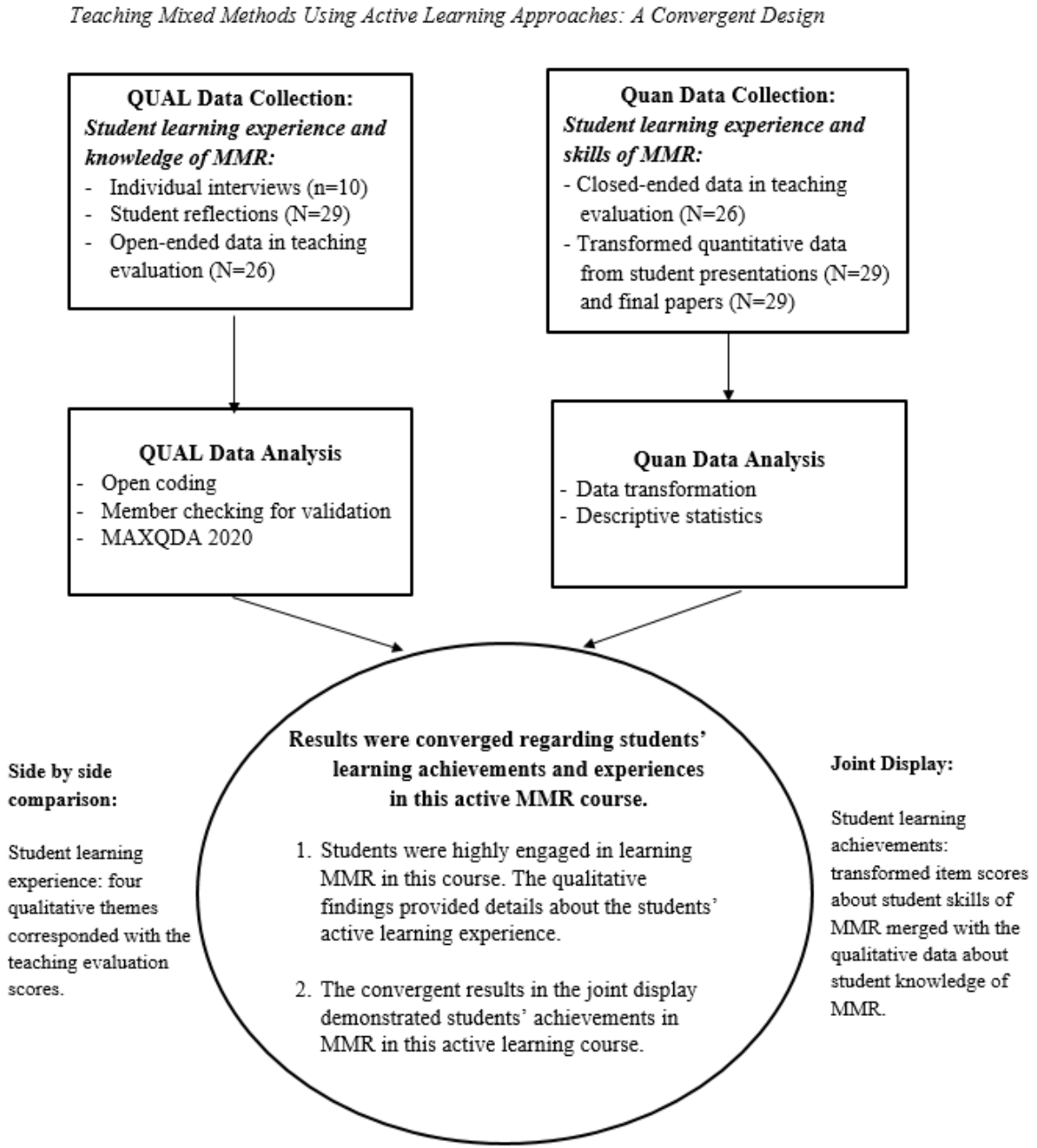
Example of a convergent parallel research project

Zhou, Y. (in press). Teaching Mixed Methods Using Active Learning Approaches. *The Journal of Mixed Methods Research.*



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Example of data transformation

Data Transformation Rubrics

Elements in the Grading Rubrics	0 Missing	1 Included and fairly stated	2 Included and well stated
• included a mixed methods research title			
• used mixed methods terminology			
• developed mixed methods research questions			
• explained a rationale of using mixed methods			
• adopted a mixed methods research design based on research questions			
• developed a mixed methods diagram with integration evidence			
• planned mixed methods sampling			
• planned integration strategies in data collection			
• planned integration strategies in data analysis			
• discussed mixed methods paradigms			

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Example of joint display

Joint Display of Students' Learning Achievements

Elements in the Grading Rubrics	Transformed Presentations (N=29) Range [0, 2]	Transformed Final Papers (N=29) Range [0, 2]	Open Coding Results
Students included a mixed methods research title.	1.34	1.38	A few students discussed the mixed methods research title. *"Right from the title, I can see mixing evidence."*
Students used mixed methods terminology.	1.28	1.59	Students were able to define mixed methods using accurate terms. They discussed the importance of correctly using MM terminology and described the key terms in MMR, such as data transformation and triangulation vs. mixing. *"They use the language that makes it very plain to you that, 'oh, an integration is happening here.'"*
Students developed mixed methods research questions.	1.76	1.41	Students described the needs of including a mixed methods research question. They were able to connect it with the rationales and research design. *"Mixed-methods questions should focus on the intent of mixing, to integrate the qualitative methodology and the quantitative data."*

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Example of side-by-side comparison

Inquiry-based Instruction and Scaffolding. The students said that the class was very communicative, "more like a conversation rather than a lecture." The instructor's role "was not limited to the narration of the course materials." Instead, the instructor "was constantly questioning" and "kept probing." The students "had time to ask questions" and reflect on other students' questions.

Students also actively prepared for questions and answers in class discussion (4.88/5). They said, "you have to read the textbook before you come in or you're just going to flounder while you're in here;" and "assuming I came into class always without reading the text, I think that I will be getting the icing but I will miss the cake [laughter] because you don't have the base

Challenges

1 Selection of paradigms

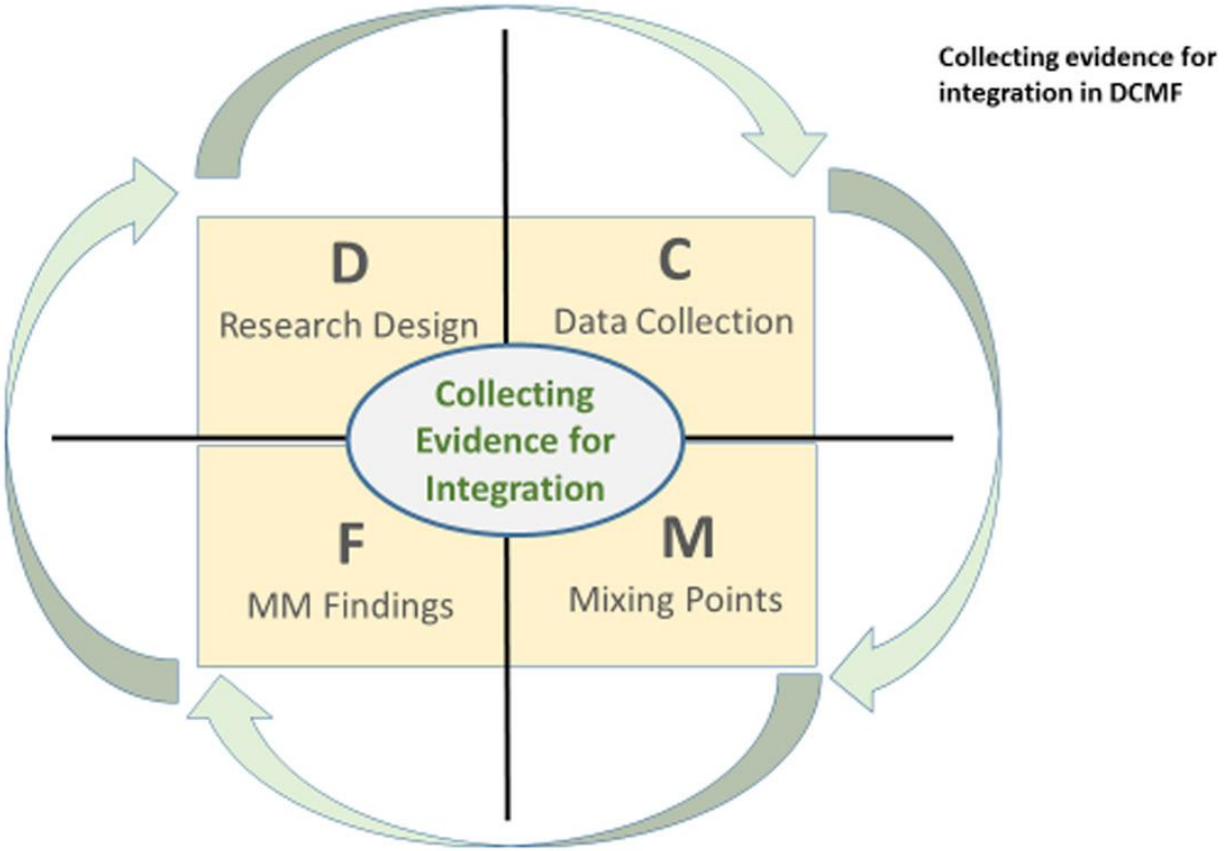
- *Pragmatism (Morgan, 2007), dialectics (Greene & Hall, 2010), transformative (Mertens, 2003), critical realism (Maxwell & Mittapalli, 2010)*

2 Validity issues regarding the planning

- *Same focus? Parallel constructs/variables assessed? Same samples? Unequal sample size?*

3 Converging issues regarding the results

- *Separate results presented? How to compare and present results? Divergent results?*



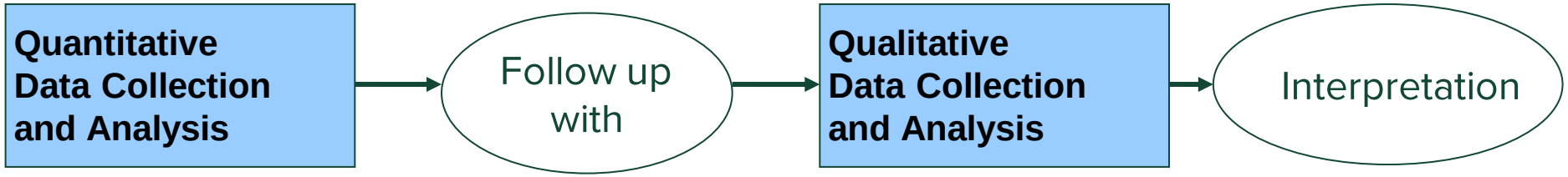
Zhou, Y., & Wu, M. L. (2022). Reported methodological challenges in empirical mixed methods articles: a review on JMMR and IJMRA. *Journal of Mixed Methods Research*, *16*(1), 47-63.

Explanatory Sequential Design

Timing: sequential

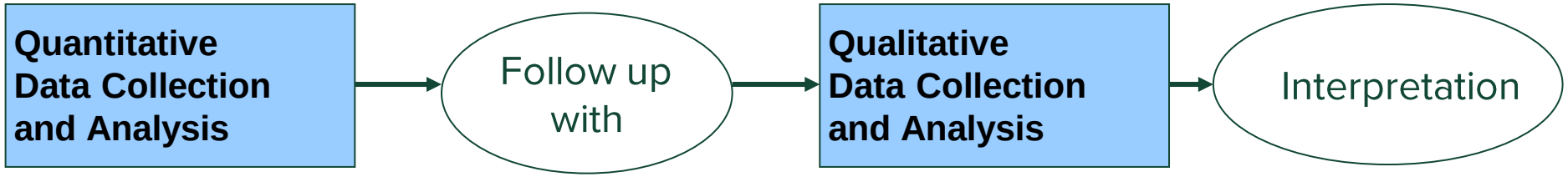
Purpose of integration: to explain QUAN results; or to develop the QUAL strand

Explanatory Sequential Design



Intents: → Use the qualitative data to help explain the quantitative results [QUAN→qual]

Explanatory Sequential Design



Intents: → Use the qualitative data to help explain the quantitative results [QUAN→qual]

→ Use the quantitative results to develop the qualitative phase [quan→ QUAL]

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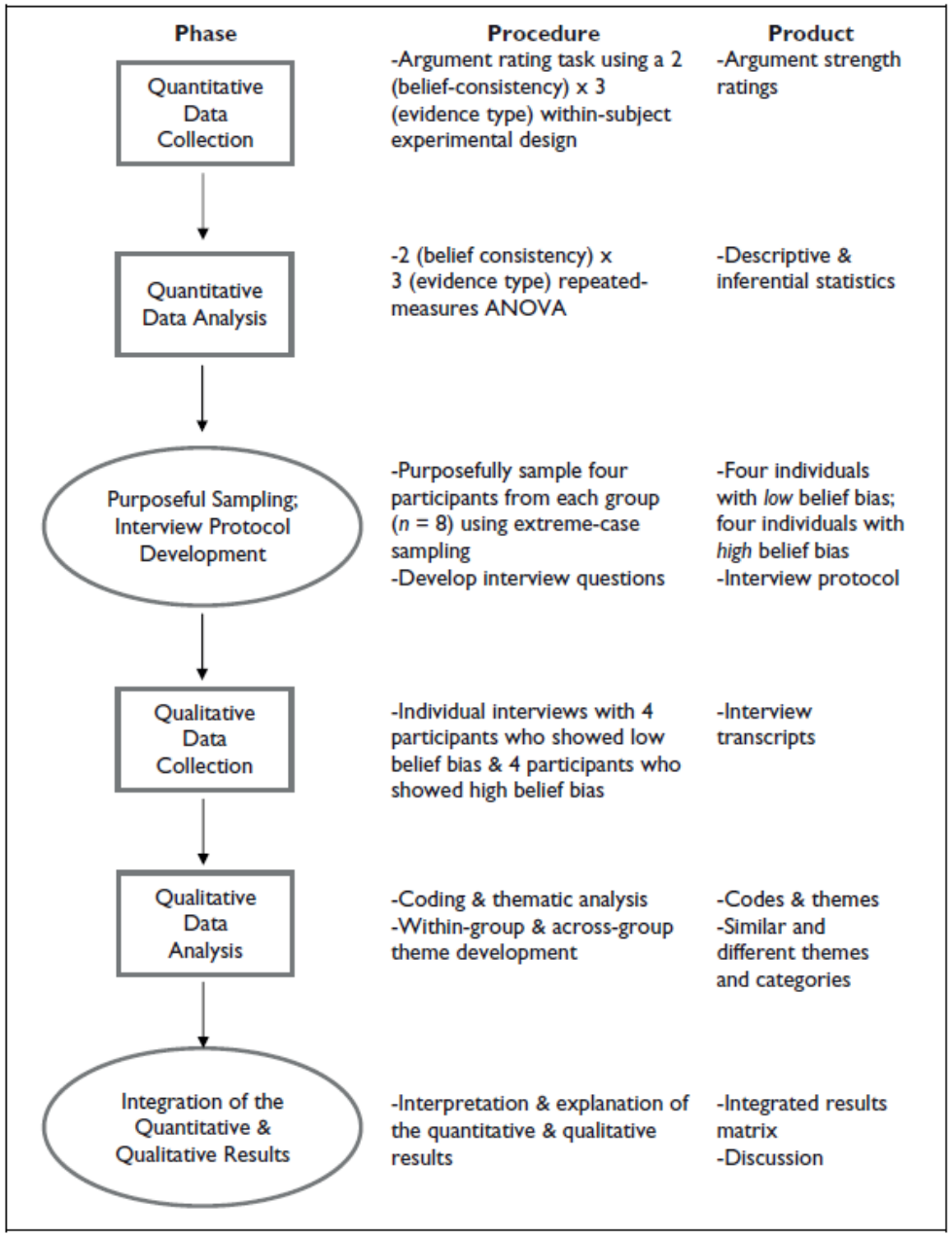
An Example of Explanatory Sequential Design

McCrudden & McTigue (2019)
Belief Bias about Climate Change with High School Students
JMMR 13(3) 381-400

Table 2. Excerpt From the Interview Guide With the Rationale for the Questions.

	Relevant quantitative findings	Interview question	Rationale for the question
Temperature arguments	• Participants in the *more-objective group* did not rate the belief-consistent (4.70) and belief-inconsistent (4.60) arguments differently. • Participants in the *less-objective group* rated the belief-consistent arguments (6.00) higher than belief-inconsistent arguments (4.20).	1. Please read this argument (argument *against* climate change). On the rating task, you gave this argument a(n) "___". Why did you gave it a(n) "___?"	Elicit reasoning behind the rating for the *temperature* argument *against* climate change
		2. Please read this argument (argument *for* climate change). On the rating task, you gave this argument a(n) "___". Why did you gave it a(n) "___?"	Elicit reasoning behind the rating for the *temperature* argument *for* climate change
		3. You gave the same/different rating to these arguments. Why did you do this?	Enable students to compare and explain their ratings for the temperature arguments in conjunction with each other



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Challenges

Requires longer time for data collection at two phases

Two IRBs

Validity issues: how are the two phases are connected? How is the follow-up Qualitative phase is built on the first-phase Quantitative results (what, who, how)?

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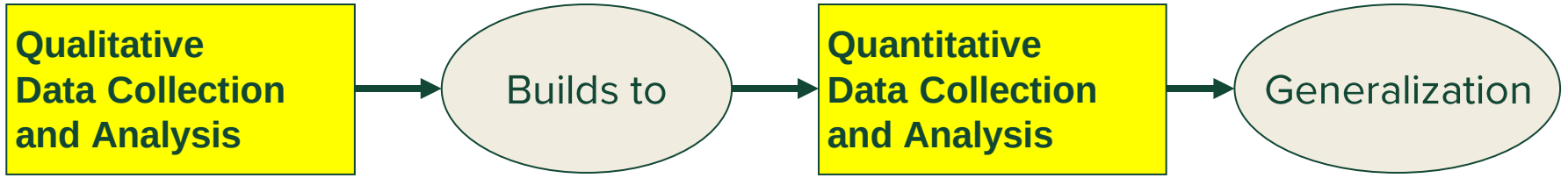
Exploratory Sequential Design

Timing: sequential

Purpose of integration: to generalize the initial QUAL findings; or to develop an instrument /intervention

Exploratory Sequential design



Intent: To explore first then confirm [qual/QUAL → QUAN/quan]

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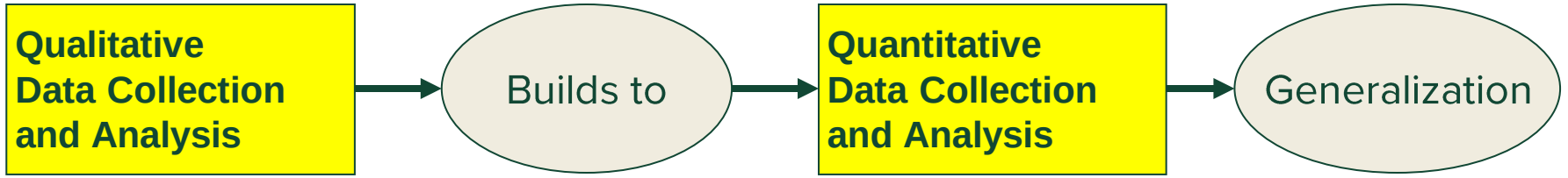
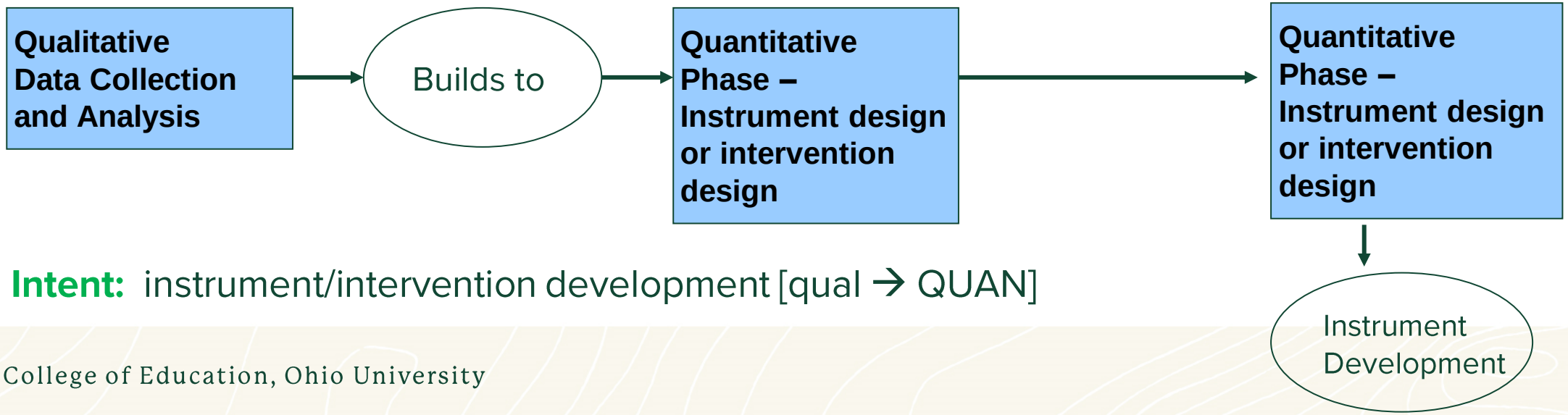
Exploratory Sequential design



Phase 1 Phase 2 [Phase 3]

Intent: To explore first then confirm [qual/QUAL → QUAN/quan]



Intent: instrument/intervention development [qual → QUAN]

How to use qualitative findings to develop an instrument (e.g., survey)

Zhou, Y. (2019). A mixed methods model of scale development and validation analysis. *Measurement: Interdisciplinary Research and Perspectives*, *17*(1), 38-47.

A model of how to use exploratory sequential design to develop a scale?

Zhou, Y. (2019). A mixed methods model of scale development and validation analysis. *Measurement: Interdisciplinary Research and Perspectives*, *17*(1), 38-47.

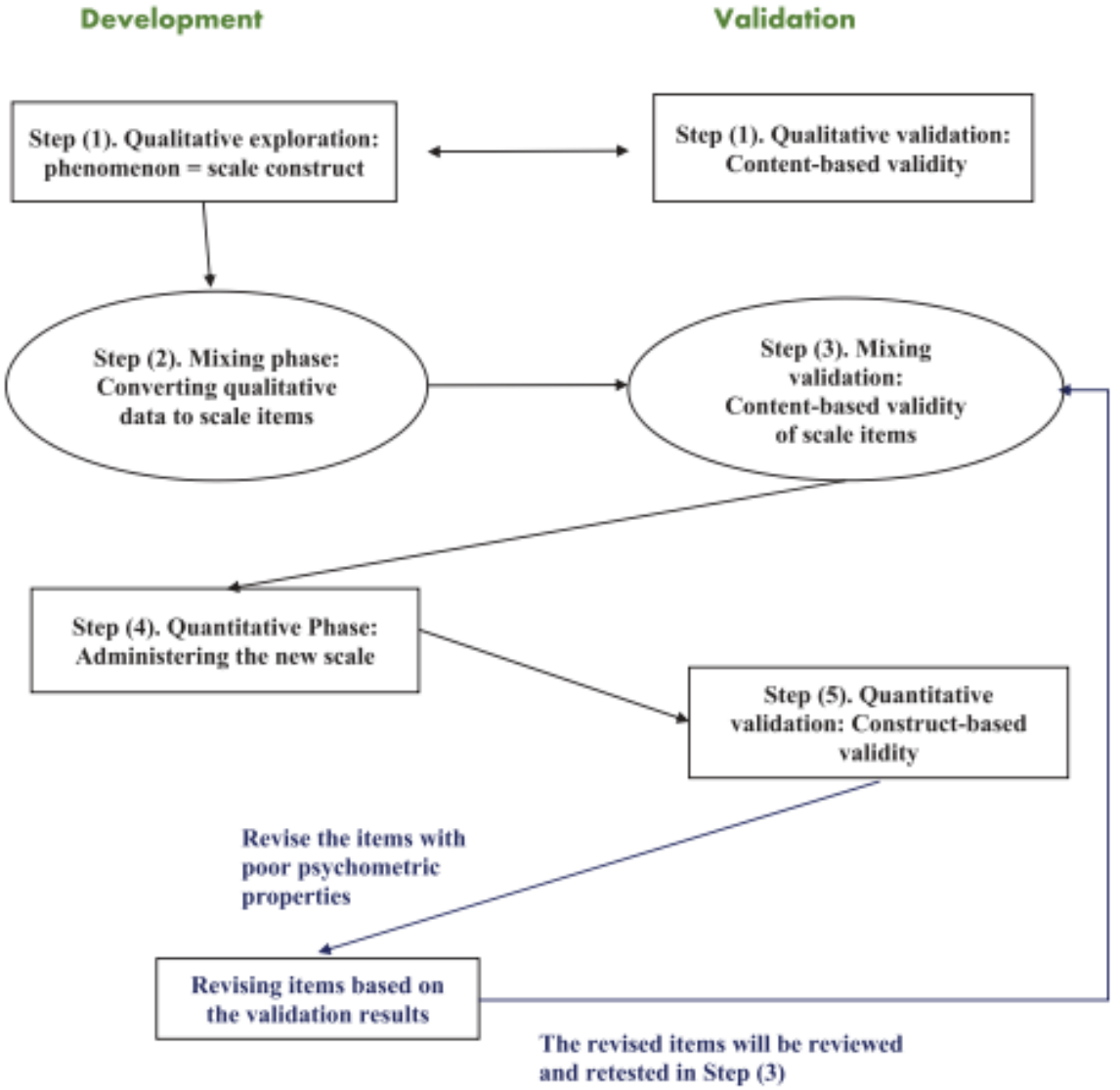
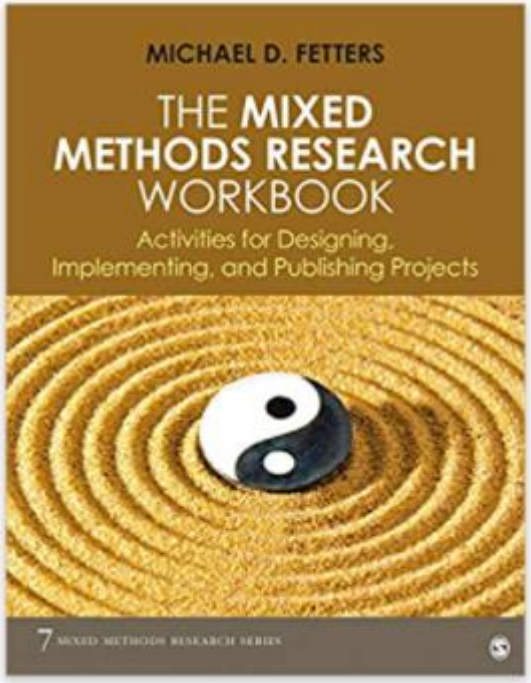


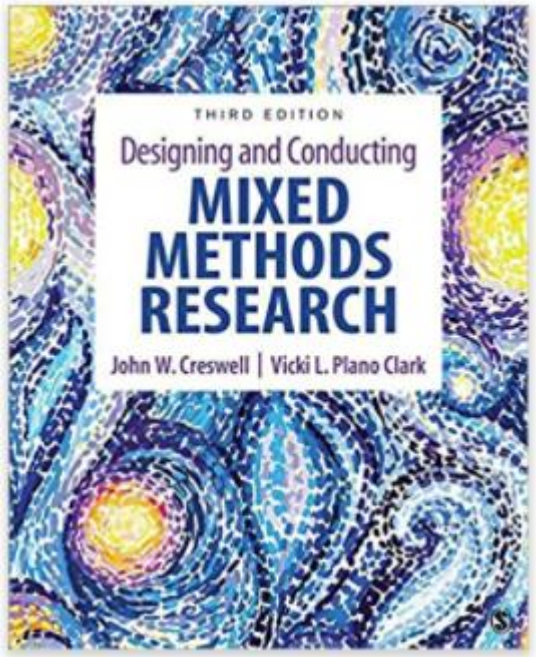
Figure 1. Mixed Methods Model of Scale Development and Validation Analysis.

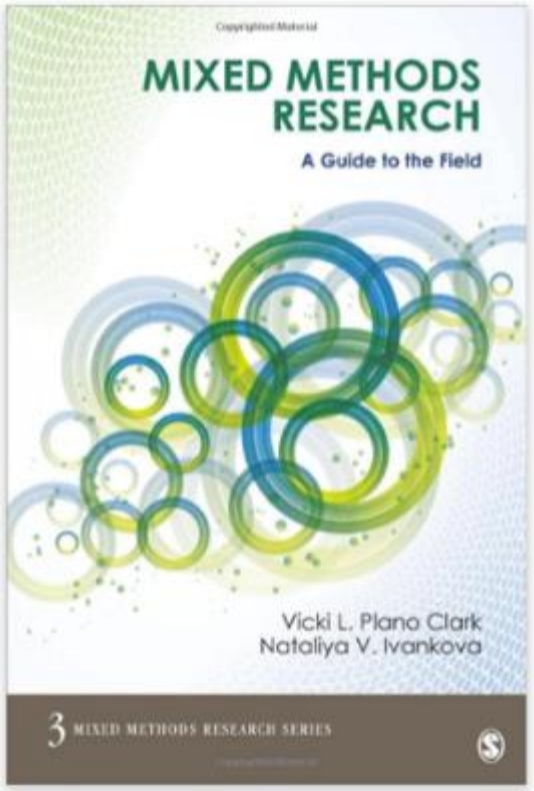
Challenges

- Requires longer time for data collection at two phases
- Two IRB
- Validity issues: psychometrics expertise, sample vs. population, same sample, unequal sample sizes?

Recommended books







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Question & Answer

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