

Mixed Methods

Participant Guide

Study Designs

Research studies usually fall into one of two categories: quantitative or qualitative. When designing a study, there are three primary ways researchers can conduct a study: quantitative only, qualitative only, and some combination of the two. The main difference between these two research types is the data they collect and the different knowledge they generate.

QUANTITATIVE

Data that is numerical and obtained from measurements, surveys with closed-ended numeric responses, or statistics is called quantitative data. Quantitative data is excellent for measuring how much, how often, and other statistics, along with answering “what” types of closed-ended numerical questions like, “rate on a scale of 1 to 5,” and “pick from these choices.”

QUALITATIVE

Qualitative data is descriptive using surveys with open-ended questions, interviews, observations, and recording experiences. Qualitative data is ideal for answering “how” and “why” types of questions, with open ended responses that allow participants to describe, explain, and elaborate on their experiences, attitudes, and beliefs.

MIXED METHODS

Employing mixed methods involves the integration, or “mixing,” of quantitative and qualitative data within a study.

Test a theory, specify a hypothesis, deductive, generalizability
(quantitative)

AND

Establish meaning, participants' views, inductive, particularity
(qualitative)

Variables

Variables are part of the building blocks of research. They help a researcher transform their thoughts and ideas into measurable things. There are three main types of variables:

INDEPENDENT AND DEPENDANT VARIABLES

The **independent variable** is often the one that the researcher makes changes to or manipulates to determine its influence on the dependent variable. In the example below, "in-jail MOUD use" is the independent variable.

The **dependent variable** is expected to change because of the presence, absence, or magnitude of the independent variable. In the example below, "MOUD treatment post-release from jail" is the dependent variable.

MEDIATING AND MODERATING VARIABLES

Mediating variables explain why or how the independent variable causes changes in the dependent variable. A mediator is the reason an independent variable impacts the dependent variable. In the example below, "intention to use community-based MOUD" is the mediating variable.

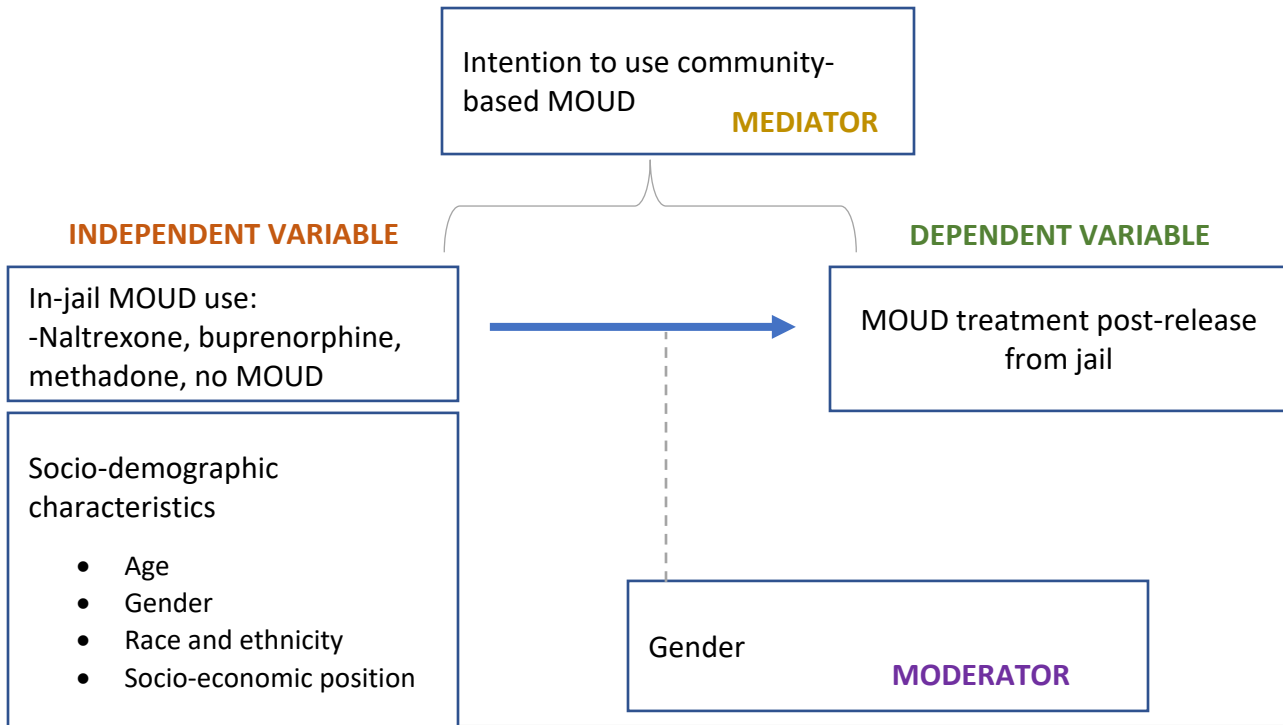
A **moderator** is different. We examine moderators to understand whether the relationship between an independent and dependent variable differs for different types of people or under different conditions. A moderator affects the strength or direction of the relationship between an independent and dependent variable. It captures when, for whom, or under what conditions an effect occurs. In the example below, "gender" is the moderating variable.

COVARIATE OR "CONTROL" VARIABLES

Covariate variables that could impact the dependent variable in addition to, or independent of, the independent variable.

Conceptual Framework

Researchers use conceptual frameworks to organize the variables for their study.



COVARIATE VARIABLES

1. What is the primary relationship of interest? Identify the key variables.
 - Dependent variable
 - Independent variable
2. What else influences the dependent variable?
 - Identify covariates.
3. Is the primary relationship different for different groups?
 - Identify moderators.
4. Why does the independent variable influence the dependent variable?
 - Identify mediators.

Mixed Methods History

There are 60 years of mixed methods research.

- In 1959 Campbell & Fisk used multiple methods to study psychological traits.
- In the 1970s, there was recognition that all methods have bias and limitations and that use of quantitative and qualitative data sources to neutralize limitations and triangulate findings could achieve convergence across methods.
- In the 1990s there was a systematic integration of quantitative and qualitative methods, and an overall expansion of mixed methods designs.
- In the 2010s, development continued with the notation of challenges and practical issues.
- Today, mixed methods research has expanded to other countries and disciplines.

Want to learn more about quantitative, qualitative, and mixed methods study designs? Check out the book, *Research Design: Qualitative, quantitative, and mixed methods approaches*, by Creswell JW & Creswell JD.

[Creswell JW & Creswell JD. Research design: Qualitative, quantitative, and mixed methods approaches. Thousand Oaks, CA: Sage Publications; 2018.](#)

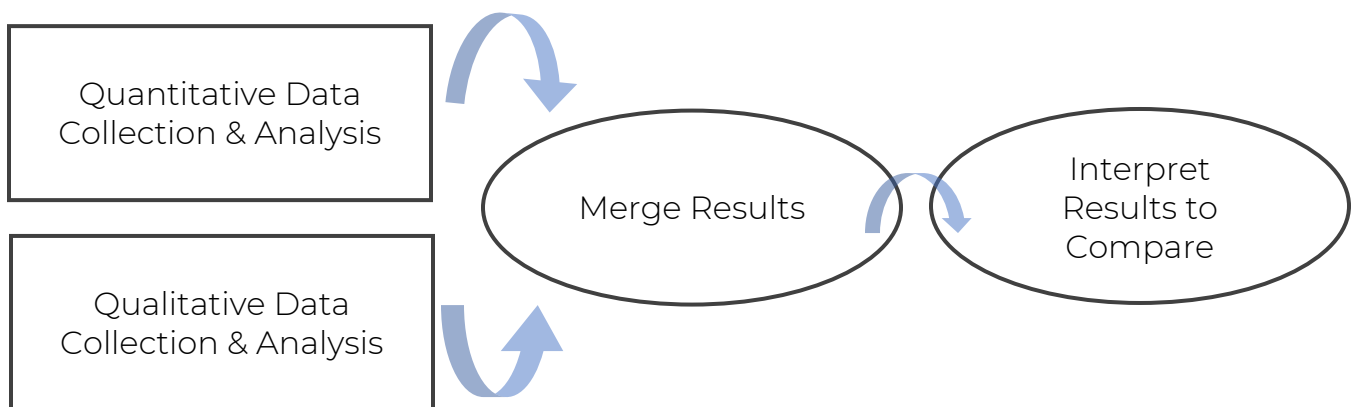
Mixed Methods Study Design

Mixed Methods is an approach that draws on both Quantitative and Qualitative data. This approach can be a pragmatic way to answer a research question. It can also be more synergistic, meaning the two types of data collection feed into one another and can inspire new research questions. It can be a very generative approach, inspiring new questions for research from its process. There are three primary types of mixed methods designs: convergent, explanatory sequential, and exploratory sequential.

CONVERGENT

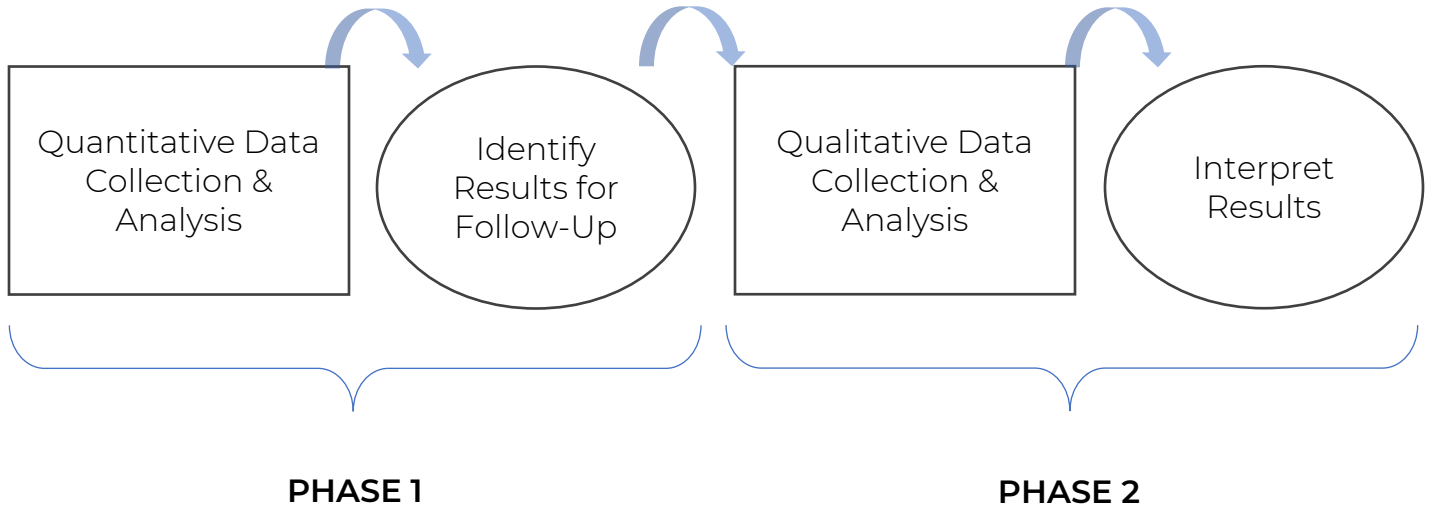
The convergent design has one phase in which quantitative and qualitative data are collected at the same time. Later, the results are merged to answer the research question.

1 Phase



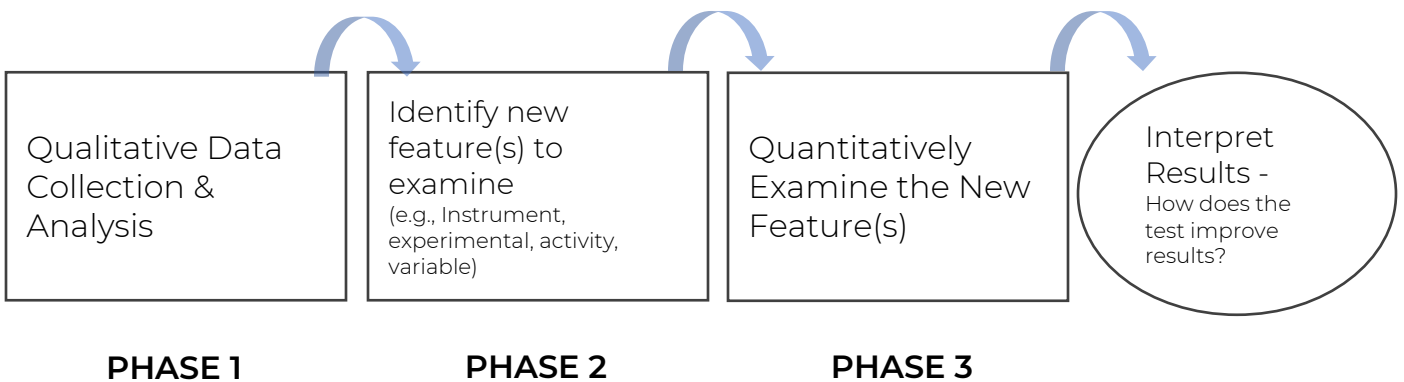
EXPLANATORY SEQUENTIAL

Explanatory sequential designs begin with quantitative research and analysis. Then qualitative research is conducted to explain the quantitative results in more detail.



EXPLORATORY SEQUENTIAL

Exploratory sequential designs begin with qualitative research to explore participant views. The results are used to build a quantitative phase.



WHEN SHOULD YOU USE A MIXED METHODS 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 converge or diverge	Convergent
Explaining quantitative results with qualitative data	A more in-depth understanding of the quantitative results (often cultural relevance)	Explanatory sequential
Developing better measurement instruments	A test of better measures for a sample of a population	Exploratory sequential

Creswell JW & Creswell JD. Research design: Qualitative, quantitative, and mixed methods approaches. Thousand Oaks, CA: Sage Publications; 2018.

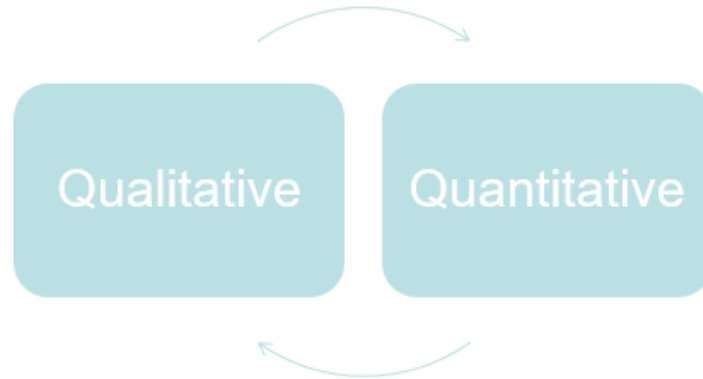
CHALLENGES TO A MIXED METHODS DESIGN

But with any design, there are challenges. One of the challenges shown here is how to present your findings.

- Complex designs
- Need for extensive data collection
- Time-intensive to analyze both quantitative and qualitative data
- Familiarity with quantitative and qualitative forms of research
- Use of different samples for each phase of study
- Integration of findings and display in a single visual

STRENGTHS TO A MIXED METHODS DESIGN

- Permits a more complete and synergistic utilization of data
- Generative



ADDITIONAL MIXED METHODS DESIGNS

There are other mixed methods designs that we did not cover today listed below:

Reasons for Choosing Mixed Methods	Expected Outcomes	Recommended Mixed Methods Design
Understanding experimental results by incorporating perspectives of individuals	An understanding of participant views within the context of an experimental intervention	Mixed methods experimental (intervention design)
Comparing one or more case studies	An understanding of the differences and similarities among several cases	Mixed methods case study
Developing an understanding of needed changes for a marginalized group	A call for action	Mixed methods participatory-social justice
Understanding the need for an impact of a program	A formative and summative evaluation	Mixed methods evaluation

Creswell JW & Creswell JD. Research design: Qualitative, quantitative, and mixed methods approaches. Thousand Oaks, CA: Sage Publications; 2018.

MIXED METHODS CHECKLIST

To describe a mixed methods study:

- Provide a basic definition of mixed methods research.
- Give reasons (or justification) for using both quantitative and qualitative data.
- Convey the potential use/value of a mixed methods design.
- Identify criteria for choosing a mixed method design.
- Identify the mixed methods design.
- Provide a visual model (a diagram) to illustrate the design.
- Describe data collection and analysis for each component.
- Describe the sampling strategies for each component.
- Describe procedures for validation for each component.

Creswell JW & Creswell JD. Research design: Qualitative, quantitative, and mixed methods approaches. Thousand Oaks, CA: Sage Publications; 2018.

Scenarios

Here are some examples of different types of research designs through scenarios.

QUANTITATIVE STUDY DESIGN

Mortality Among Patients Treated with Medications for Opioid Use Disorder

You want to assess how many patients treated with medications for an opioid use disorder die from an overdose or other causes. You analyze the death records on more than 32,000 patients treated for opioid use disorder in one state during a four-year period. You find that patients have a much higher risk of premature mortality than people in the general population. Also, mortality risk is higher when patients are out-of-treatment than in-treatment.

Evans, E., Li, L., Min, J., Huang, D., Urada, D., Lei, L., Hser, Y.I., & Nosyk, B. (2015). Mortality among individuals accessing pharmacological treatment for opioid dependence in California, 2006 – 2010. *Addiction*, 110: 996–1005. PMID: 4452110.

QUALITATIVE STUDY DESIGN

Benefits and Harms of Involuntary Treatment for Opioid Use Disorder

Involuntary treatment for opioid use disorder saves lives in the moment, but it also means that patients cannot make choices about their healthcare. You want to explore the ethical issues of involuntary treatment.

You hold focus groups with 70 patients, their family and friends, and clinical staff. You ask participants about the benefits and risks of involuntary treatment and to describe scenarios in which it seems appropriate.

Evans, E., Harrington, C., Roose, R., Lemere, S., Buchanan, D. (2020). Perceived benefits and harms of civil commitment for opioid use disorder. *Journal of Law, Medicine, and Ethics*. Dec;48(4):718-734.

CONVERGENT STUDY DESIGN

Long-term Outcomes to Buprenorphine/naloxone Versus Methadone in a Multi-site Trial

You randomly assign more than 1,000 patients to receive either methadone or buprenorphine to treat opioid use disorder. You conduct a follow-up survey with patients. To assess outcomes, you ask on the survey if patients have used opioids in the past month (yes or no). Meanwhile, your research partner holds focus groups with 100 patients. Patients are asked to explain why they prefer one type of medication over the other. You analyze the findings from the survey and from the focus groups to understand patient outcomes and reasons patients stay engaged with treatment.

Hser, YI, Evans, E., Huang, D., Weiss, R., Saxon, A., Carroll, K.M., Woody, G., Liu, D., Wakim, P., Matthews, A., Hatch-Maillette, M., Jelstrom, E., Wiest, K., McLaughlin, P., & Ling, W. (2016). Long-term outcomes after randomization to buprenorphine/naloxone versus methadone in a multi-site trial. *Addiction*, 111(4):695-705. PMID: 4801718 <<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4801718>.

Teruya C, Schwartz RP, Mitchell SG, Hasson AL, Thomas C, Buoncristiani SH, Hser YI, Wiest K, Cohen AJ, Glick N, Jacobs

EXPLANATORY SEQUENTIAL STUDY DESIGN

Use of Complementary and Integrative Healthcare by U.S. Military Veterans with Chronic Musculoskeletal Pain

You analyze quantitative electronic health record data on 468,806 veteran patients to see who uses yoga or meditation to treat chronic pain. Results show that women are more likely than men to use these services. To understand why, you hold focus groups with patients and their doctors. In the focus groups, you show participants the quantitative results and you ask them to share when, why, and how they use yoga and meditation.

Evans, E., Herman, P., Washington, D., Lorez, K.A., Yuan, A., Upchurch, D.M., Marshall, N., Hamilton, A.B., & Taylor, S.L. (2018). Gender differences in use of complementary and integrative health by U.S. military veterans with chronic musculoskeletal pain. *Women's Health Issues*. 28(5):379-386. PMID: 6699154

EXPLORATORY SEQUENTIAL STUDY DESIGN

Evaluation of a Mobile App for Methadone Maintenance Clients

You hear about a mobile phone app that helps patients to stay on top of the medications they are supposed to take each day. You'd like to adapt it to use with patients being treated for opioid use disorder.

First, you hold focus groups with 25 patients in treatment for opioid use disorder to share a prototype of the app. During these groups, participants can play with the prototype while you ask how it might be adapted to engage patients in treatment. You use the findings from these groups to refine the design of the prototype.

Then, you pilot-test the newly adapted app. To do this, you randomly assign a group of 25 patients to receive usual treatment plus the app and another group of 25 patients to receive only usual treatment.

You follow-up with both groups with a survey to assess outcomes. You find that patients in the group who used the app have better outcomes than patients in the treatment-as-usual group.

To better understand when and why the app was useful, you hold another round of focus groups with patients. In these groups, you ask why patients used it and how it was helpful.

Adapted from <https://pubmed.ncbi.nlm.nih.gov/26618796>

QUALITATIVE DATA COLLECTION AND ANALYSIS

- Broad themes and non-verbal responses are captured.
- Sessions are recorded and transcribed.
- Transcriptions are checked for accuracy and used to develop a codebook.

PROTOCOL

- Informed consent process
- Statement of ground rules
- Self-administered survey
- Recruitment plan
- Discussion guide
- Data collection methods

FOCUS GROUPS

Focus groups are designed to last no more than two hours and are capped at six to eight participants. This gives each person enough time to share insights in response to the prompts.



In addition, focus groups are held separately by role. For example, in a study on re-entry, the correctional officers are together in one group and the re-entry staff are together in a second group. This plan is expected to promote discussion and enables the consultant to assess whether the experiences and insights of individuals who play the same role are similar or different.



INTERVIEWS

Conducting separate in-depth interviews with influential individuals avoids any potential power differentials among staff that could preclude the full participation of some individuals.

- Conduct in-depth Interviews with influential staff.
- Interviews avoid power differentials among staff.

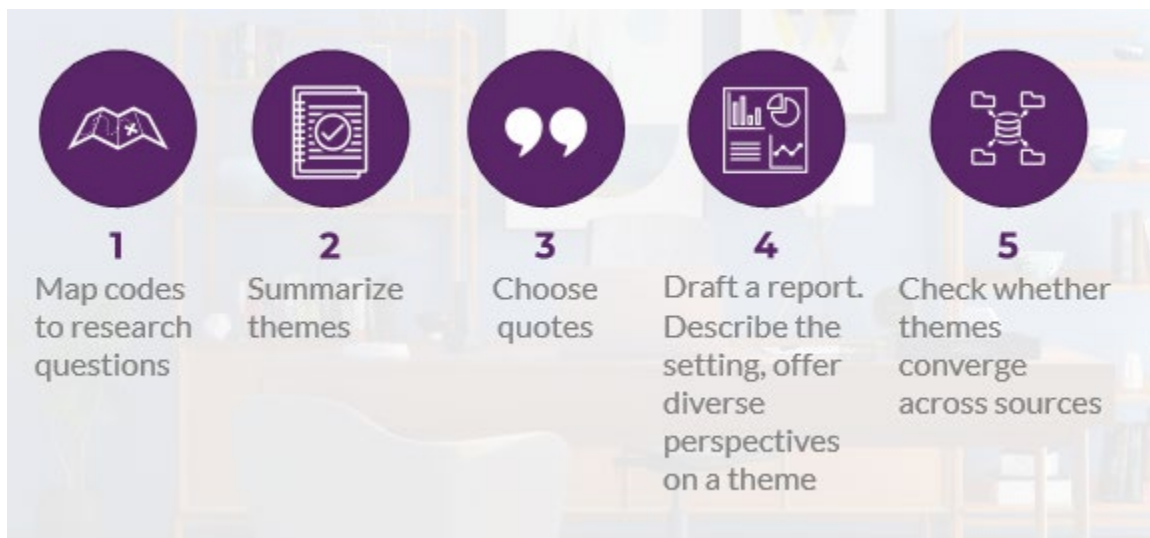
CODEBOOK

- The team reads the same transcript and identifies potential codes that emerge from the data and define them.
- A second transcript is read and coded with the draft codebook.
- The team refines the codes and finalizes the codebook.
- The team uses the codebook to code all the transcripts from the focus groups and interviews.

During the coding process, the research team meets weekly to compare notes, check that the definition of codes has not drifted in meaning, and resolve discrepancies in coding. Once all the transcripts are coded, the team conducts analyses of the coded data.

DATA ANALYSIS

The focus is first on those codes that best map to the research questions as summarized in the conceptual framework. Then the team develops a summary of the themes that emerge from analysis of the codes, and identifies exemplary quotes for each theme. The team prepares a report of preliminary findings.



MEMBER CHECKING

When some preliminary findings are ready, they are presented in a process known as “member checking.” During the presentation, it is asked if the findings are accurate and if the summary of themes is resonant with the experiences of the staff.

- How are the results consistent with what you know about the program and your experiences with it?
- What resonates with you and why?
- What surprised you and why?

VALIDITY, RELIABILITY, AND SAMPLE SIZE

Qualitative research addresses these issues, and ensures the validity and reliability of findings, in ways that are different from quantitative research.

VALIDITY

Are the findings accurate, trustworthy, authentic, credible?
Use multiple validity procedures.

Triangulate	Examine evidence from different sources. Do themes converge across sources?
Member checking	Have participants review preliminary findings.
Rich and thick description	Describe the setting in detail, offer many perspectives about a theme.
Researcher bias	Comment on how interpretation of findings is influenced by researchers' backgrounds, characteristics, experiences.
Negative or discrepant information	Present contradictory evidence.
Prolonged fieldwork	Develop in-depth understanding via fieldwork.
Peer debriefing	Have an external peer review the study and provide interpretation.
External auditor	Have an external expert unknown to the researcher or project assess the entire project.

Creswell JW & Creswell JD. Research design: Qualitative, quantitative, and mixed methods approaches. Thousand Oaks, CA: Sage Publications; 2018. LeCompte and Goetz, 1982 Lincoln & Guba, 1985

RELIABILITY

Are the approaches consistent or stable?

METHODS:

- Document procedures.
- Create a detailed protocol and database.
- Review transcripts for errors.
- Avoid drift in definition of codes.
- Cross-check codes by comparing results that were derived independently.
- Calculate intercoder reliability.

SAMPLE SIZE

Is the sample size large enough to achieve saturation of themes?

- Data saturation is when no new information or themes are observed in the data (Guest et al., 2006).
- When is a sample size large enough to achieve saturation? It depends.
 - Sample sizes range from 5 or more.
 - General rule of thumb – 20 or more.
- Aim for the minimum sample size needed to uncover a range of perspectives/experiences and will yield saturation.

Summary

Elements of a well-designed mixed methods study:

1. Collect and analyze both quantitative (closed-ended) and qualitative (open-ended) data.
2. Use rigorous procedures in data collection and analysis that are appropriate to each method, such as ensuring the appropriate analytic sample size.
3. Integrate the data during data collection, analysis, or discussion.
4. Use procedures that implement qualitative and quantitative components either concurrently or sequentially, with the same sample or with different samples.
5. Frame the methods within an appropriate philosophical/theoretical model or framework.

Wisdom J & Creswell JW. Mixed Methods: Integrating Quantitative and Qualitative Data Collection and Analysis While Studying Patient-Centered Medical Home Models. Rockville, MD: Agency for Healthcare Research and Quality. February 2013. AHRQ Publication No. 13-0028-EF.

Resources

Here are some additional resources:

PAPERS ON ADMINISTRATIVE DATA FOR RESEARCH

Anglin MD, Nosyk B, Jaffe A, Urada D, Evans E. Offender diversion into substance use disorder treatment: the economic impact of California's proposition 36. *Am J Public Health*. 2013 Jun;103(6):1096-102. doi: 10.2105/AJPH.2012.301168. Epub 2013 Apr 18. PMID: 23597352; PMCID: PMC3698729.

Evans E, Grella CE, Murphy DA, Hser YI. Using administrative data for longitudinal substance abuse research. *J Behav Health Serv Res*. 2010 Apr;37(2):252-71. doi: 10.1007/s11414-008-9125-3. Epub 2008 Aug 5. PMID: 18679805; PMCID: PMC2850956.

Evans E, Anglin MD, Urada D, Yang J. Promising practices for delivery of court-supervised substance abuse treatment: perspectives from six high-performing California counties operating Proposition 36. *Eval Program Plann*. 2011 May;34(2):124-34.

Finlay AK, Wong JJ, Ellerbe LS, Rubinsky A, Gupta S, Bowe TR, Schmidt EM, Timko C, Burden JL, Harris AHS. Barriers and Facilitators to Implementation of Pharmacotherapy for Opioid Use Disorders in VHA Residential Treatment Programs. *J Stud Alcohol Drugs*. 2018 Nov;79(6):909-917.

Gabrielian S, Hamilton AB, Alexandrino A, Hellemann G, Young AS. "They're homeless in a home": Retaining homeless-experienced consumers in supported housing. *Psychol Serv*. 2017 May;14(2):154-166.

Hser YI, Evans E. Cross-system data linkage for treatment outcome evaluation: lessons learned from the California Treatment Outcome Project. *Eval Program Plann*. 2008 May;31(2):125-35. doi: 10.1016/j.evalprogplan.2008.02.003. Epub 2008 Feb 19. PMID: 18374980; PMCID: PMC2413098.

Larochelle MR, Bernstein R, Bernson D, Land T, Stopka TJ, Rose AJ, Bharel M, Liebschutz JM, Walley AY. Touchpoints - Opportunities to predict and prevent opioid overdose: A cohort study. *Drug Alcohol Depend*. 2019 Nov 1;204:107537. doi: 10.1016/j.drugalcdep.2019.06.039. Epub 2019 Sep 3. PMID: 31521956; PMCID: PMC7020606.

Niv N, Hamilton A, Hser YI. Impact of court-mandated substance abuse treatment on clinical decision making. *J Behav Health Serv Res*. 2009 Oct;36(4):505-16.

Saloner B, Chang HY, Krawczyk N, Ferris L, Eisenberg M, Richards T, Lemke K, Schneider KE, Baier M, Weiner JP. Predictive Modeling of Opioid Overdose Using Linked Statewide Medical and Criminal Justice Data. *JAMA Psychiatry*. 2020 Jun 24;77(11):1-9. doi: 10.1001/jamapsychiatry.2020.1689. Epub ahead of print. PMID: 32579159; PMCID: PMC7315388.

Teruya C, Schwartz RP, Mitchell SG, Hasson AL, Thomas C, Buoncristiani SH, Hser YI, Wiest K, Cohen AJ, Glick N, Jacobs P, McLaughlin P, Ling W. Patient perspectives on buprenorphine/naloxone: a qualitative study of retention during the starting treatment with agonist replacement therapies (START) study. *J Psychoactive Drugs*. 2014 Nov-Dec;46(5):412-26.

Course References

Here are the references used in the development of this course and participant guide:

Aneshensel CS. (2012). *Theory-Based Data Analysis for the Social Sciences*, Second Edition, Thousand Oaks, CA: Sage.

Creswell JW & Creswell JD. *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: Sage Publications; 2018.

Creswell JW, Klassen AC, Plano Clark VL, Clegg Smith K. 2011. Best practices for mixed methods research in the health sciences. Rep., Off. Behav. Soc. Sci. Res., Natl. Inst. Health, Bethesda, MD. https://obssr.od.nih.gov/wp-content/uploads/2016/02/Best_Practices_for_Mixed_Methods_Research.pdf

Janice M Morse , Linda Niehaus , Ruth R Wolfe & Seanne Wilkins (2006) The role of the theoretical drive in maintaining validity in mixed-method research, *Qualitative Research in Psychology*, 3:4, 279-291

Mackinnon DP. Integrating Mediators and Moderators in Research Design. *Res Soc Work Pract*. 2011 Nov;21(6):675-681. doi: 10.1177/1049731511414148.

Palinkas LA, Mendon SJ, Hamilton AB. Innovations in Mixed Methods Evaluations. *Annu Rev Public Health*. 2019 Apr 1;40:423-442.

Wang T. Human insights missing from big data. TedTalk. https://www.ted.com/talks/tricia_wang_the_human_insights_missing_from_big_data/up-next?language=en

Wisdom J & Creswell JW. *Mixed Methods: Integrating Quantitative and Qualitative Data Collection and Analysis While Studying Patient-Centered Medical Home Models*. Rockville, MD: Agency for Healthcare Research and Quality. February 2013. AHRQ Publication No. 13-0028-EF.