Using Triangulation and Crystallization to Make Qualitative Studies Trustworthy and Rigorous

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Abstract

Qualitative research is often criticized for lacking rigor and consisting of opinions that result from researcher bias. But like well-designed quantitative research, qualitative studies can be trustworthy. Qualitative researchers generally agree that some practices, such as triangulation, can be used to increase the credibility of the kind of research they conduct. Unfortunately, many researchers are confused about or unaware of the different types of triangulation strategies, leading them to write papers without accurately identifying which ones they used. Triangulation is also a contested approach for many qualitative researchers because it is oftentimes associated with a post-positivist paradigm. Unlike quantitative researchers, many qualitative researchers rely on an interpretive paradigm. In this paper, I clarify how four different types of triangulation strategies differ from each other and how triangulation can be used to increase the rigor, credibility, and trustworthiness of qualitative studies. I also discuss how qualitative researchers can deal with the concerns related to the use of triangulation and explain the advantages and limitations of using crystallization as an alternative approach.

Keywords

triangulation, crystallization, qualitative inquiry

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Qualitative research is often criticized for lacking rigor and consisting of opinions that result from researcher bias. But like well-designed quantitative research, qualitative studies can be trustworthy. Qualitative researchers generally agree that some practices, such as triangulation, can be used to increase the credibility of the kind of research they conduct. Unfortunately, many researchers are confused about or unaware of the different types of triangulation strategies, leading them to write papers without accurately identifying which ones they used. Triangulation is also a contested approach for many qualitative researchers because it is oftentimes associated with a post-positivist paradigm. Unlike quantitative researchers, many qualitative researchers rely on an interpretive paradigm. In this paper, I clarify how four different types of triangulation strategies differ from each other and how triangulation can be used to increase the rigor, credibility, and trustworthiness of qualitative studies. I also discuss how qualitative researchers can deal with the concerns related to the use of triangulation and explain the advantages and limitations of using crystallization as an alternative approach.

Keywords: triangulation, crystallization, qualitative inquiry

Introduction

Many researchers are confused about or unaware of the different types of triangulation strategies, leading them to write papers without accurately identifying which ones they used (Fusch et al., 2018). Triangulation is also a contested term for qualitative researchers because it is associated with a post-positivist paradigm (Glesne, 2016). Another problem associated with the use of this approach is that the word "triangulation" is used in an imprecise way in the field of qualitative research (Bogdan & Biklen, 2007). Researchers relying on a post-positivist paradigm use triangulation to gain a more accurate picture of the real world. But those depending on a perspective assuming that the world is socially constructed and that no single reality exists often say they triangulate to capture a wide variety of perspectives (Varpio et al., 2017). Using a term in different ways can be a problem because it can make it hard to assess how precisely a study was conducted. Researchers often report what they will triangulate but not how they will achieve this goal, making it impossible for readers to evaluate whether their techniques align with their theoretical perspectives (Varpio et al., 2017).

In this paper, I clarify how different types of triangulation strategies differ from each other and how triangulation can be used to increase the rigor, credibility, and trustworthiness of qualitative studies. I also discuss how qualitative researchers can deal with the concerns related to the use of triangulation, and I explain the advantages and limitations of using crystallization as an alternative approach.
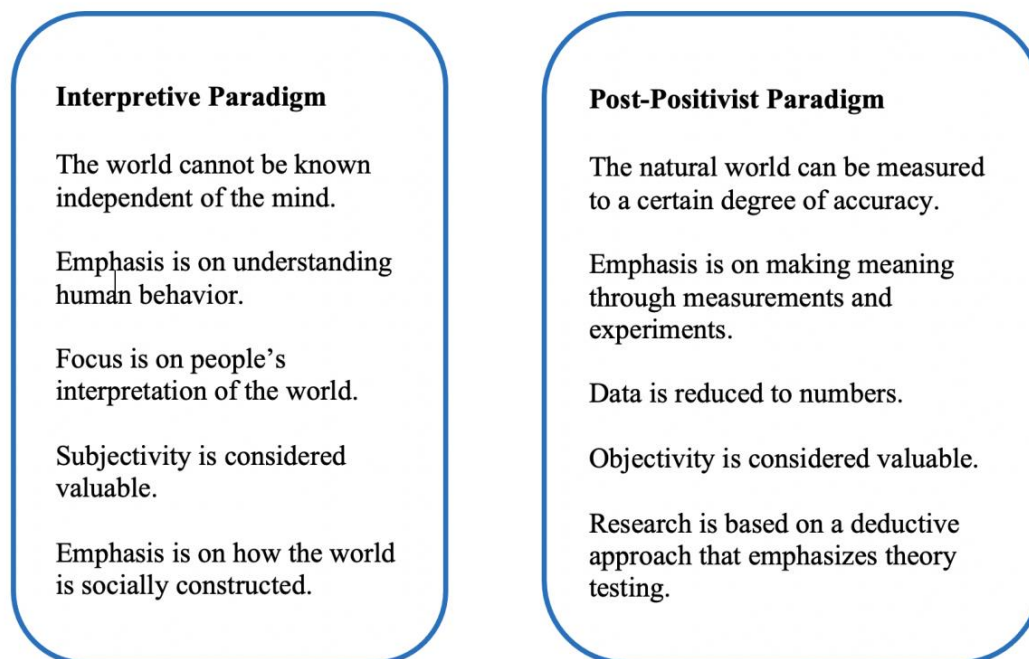
Unfortunately, qualitative studies are often criticized for lacking rigor, even though this kind of research can provide crucial insights. Critics frequently say that this approach to

research consists of opinions resulting from researcher bias (Noble & Smith, 2015). Other criticisms involve viewing qualitative studies as anecdotal research that lacks generalizability. Such beliefs exist because of perceiving this kind of research as composed of case studies that focus on a single setting or phenomenon (Cope, 2014). But not all qualitative studies consist of case studies that focus on a single setting, and like well-designed quantitative research, qualitative studies can be trustworthy. To be of high quality, qualitative research needs to be meticulous.

Although qualitative researchers often use various strategies to create trustworthy studies, one challenge they need to deal with is the lack of consensus on the standards needed to demonstrate rigor for their studies (Noble & Smith, 2015). Quantitative researchers use statistical tests to determine the validity and reliability of their studies. However, many qualitative researchers believe these tests do not apply to the kinds of analyses and paradigmatic assumptions associated with qualitative research (Bailey, 2018). Fortunately, qualitative researchers can use certain practices, such as triangulation, to increase the credibility of the kind of research they conduct. But triangulation is challenging to use and is a method without a one-size-fits-all approach (Van Hasselt, 2021). One of the reasons triangulation can be a confusing approach relates to the different ways it is used. Although some researchers use it in a way that is consistent with a post-positivist paradigm, others implement this strategy according to an interpretive paradigm (see Figure 1).

Figure 1
Differences Between Interpretive and Post-Positivist Paradigms

Interpretive Paradigm

The world cannot be known independent of the mind.

Emphasis is on understanding human behavior.

Focus is on people's interpretation of the world.

Subjectivity is considered valuable.

Emphasis is on how the world is socially constructed.

Post-Positivist Paradigm

The natural world can be measured to a certain degree of accuracy.

Emphasis is on making meaning through measurements and experiments.

Data is reduced to numbers.

Objectivity is considered valuable.

Research is based on a deductive approach that emphasizes theory testing.

Note. Adapted from Glesne (2016).

## Differences Between Interpretive and Post-Positivist Paradigms

Some qualitative researchers conduct research based on a post-positivist paradigm and believe an external reality can be understood (Tracy, 2013). However, many qualitative researchers rely on methods associated with an interpretive tradition (Green & Thorogood,

2018). Interpretivism is based on the idea that the role of the researcher is to interpret people's perceptions instead of trying to make sense of the world independent of what is in participants' minds (Glesne, 2016). Researchers who use interpretive approaches focus on how people make meaning of phenomena rather than answer questions about the objective reality of the world (Glesne, 2016).

The ontology associated with post-positivism is based on the idea that researchers can measure a reality external to people's ideas with a certain degree of accuracy (Glesne, 2016). Researchers relying on a post-positivist paradigm tend to use quantitative methods. Post-positivism evolved from positivism when researchers realized that the world cannot be known with certainty. Positivism emphasizes that a fixed reality exists and that researchers can know and measure it (Green & Thorogood, 2018). But in the 1930s and 1940s, the ontology on which positivism was founded was criticized, leading to a new way of understanding the world. Some researchers continued to believe that research can reveal objective facts but started to believe that studies could not be completely objective and that measurements are fallible. Post-positivism is based on this change in views toward positivism (Glesne, 2016).

Triangulation can make qualitative research more rigorous and trustworthy by allowing researchers to acquire a deeper and more comprehensive understanding of the setting and the participants (Bailey, 2018). This understanding increases the credibility of qualitative research (Merriam & Tisdell, 2016). Unfortunately, as noted earlier, researchers have been confused about or unaware of various types of triangulation practices. Although Denzin (1978) clearly identified different kinds of triangulation strategies in social research (see Figure 2), authors have often used inaccurate terms to refer to these different types (Fusch et al., 2018).

Figure 2
Different Kinds of Triangulation Strategies
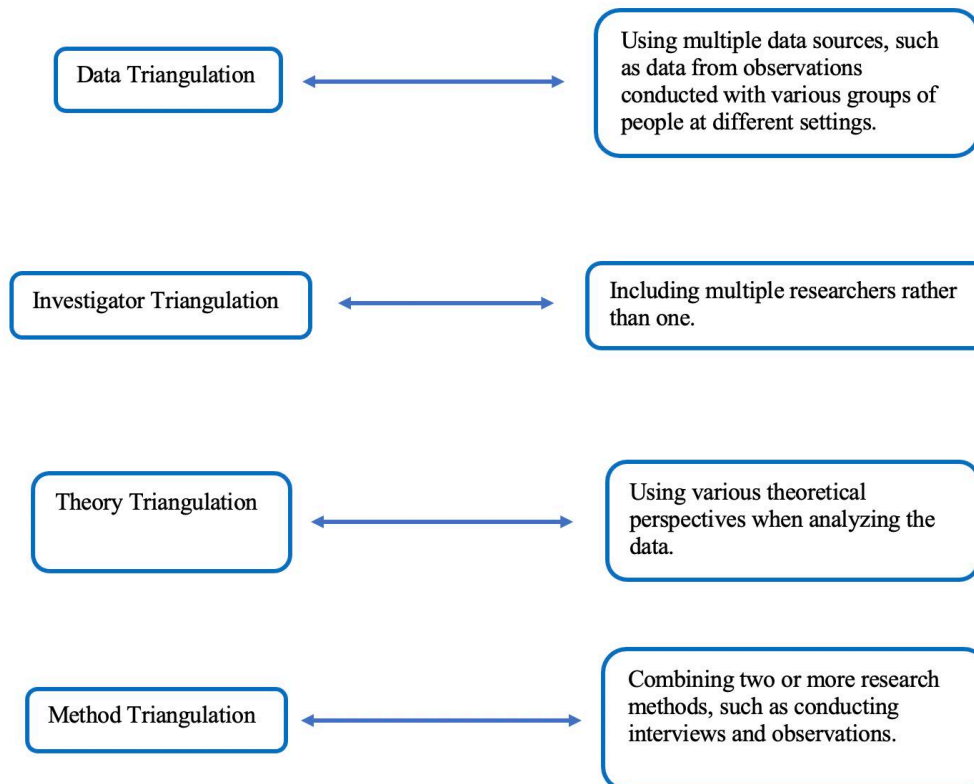
Note. The information in this figure is from Denzin (1978)

The confusion about different types of triangulation strategies frequently occurs between method triangulation and data triangulation. For example, Fusch et al. (2018) found a description of data triangulation indicating that it consists of collecting multiple sources such as archival records, open-ended interviews, and participant and direct observations. The problem with this description is that it is an example of method triangulation because it consists of collecting data using three different methods: observations, interviews, and archival records.

When qualitative researchers use incorrect terms to describe how they conduct their research, those who read their reports may notice the misidentification and question its trustworthiness accordingly. Such mistakes lead to low-quality research because one of the components of rigorous qualitative studies includes reporting research accurately (Johnson et al., 2020). Thus, qualitative researchers need to understand what triangulation is and how different types of this approach vary from each other. Without this understanding, they reduce their chances of using the different kinds of triangulation strategies to produce trustworthy studies.

Overview of Triangulation

Triangulation was originally used by applying trigonometry laws to establish the location of a fixed point. Although the precise origins of this method are unknown, the ancient Egyptians and Greeks used it. Historically, sailors have used it to track their locations (Hales, 2010). In the 1970s, Norman Denzin recommended the use of triangulation for qualitative research (Braun & Clarke, 2013). Triangulation has also been used by quantitative and mixed-methods researchers. In qualitative research, this approach has been conceptualized as one that focuses on using multiple methods to reveal shared perspectives (Campbell et al., 2020). But Denzin (1978) indicated that this definition consists of only one form of triangulation and that four kinds of this strategy exist: data triangulation, investigator triangulation, theory triangulation, and method triangulation. Denzin's conception of triangulation is important to explore because qualitative researchers widely cite and use his ideas on this topic (Rothbauer, 2008).

Data Triangulation

Data triangulation involves using as many data sources as possible that relate to the topic being investigated. Denzin (1978) distinguished triangulating by data sources from triangulating by data methods, discussing that when researchers triangulate by data sources, the same method is implemented. He used several examples to show how this strategy can be implemented with participant observation. For instance, rather than use participant observation with only a group of doctors working in a hospital, researchers can use it with several groups of different types of people, such as doctors, nurses, and patients. In this example, the same method (participant observation) is being used, but the data sources (groups of people) consist of different types of people. Another way to triangulate by data sources using participant observation involves observing at different times, such as in the morning and in the evening, or at the beginning of the month and at the end. A third way can be to observe at different settings, such as inside and outside a hospital.

One reason researchers often misidentify which form of triangulation they implemented involves the failure to use Denzin's original description of the different types of triangulation strategies (Fusch et al., 2018). Misidentification occurs also because researchers do not use one of the many credible secondary sources on this topic. Although other authors have provided accurate examples of the different kinds of triangulation, the description in Denzin's (1978)

book entitled "The Research Act: A Theoretical Introduction to Sociological Methods" is one of the most comprehensive.

Investigator Triangulation

Investigator triangulation is implemented when multiple researchers rather than just one investigate a phenomenon (Hales, 2010). One of the ways to implement investigator triangulation is to use this strategy to eliminate the bias that may occur when a single researcher conducts a study. Denzin (1978) indicated that investigator triangulation "ensures greater reliability in observations" (p. 297). He discussed an example involving how reliability can be established when two or more persons observe the same thing. But he also stated that complete consensus among researchers cannot be attained because different researchers do not interpret their data the same way.

Although Denzin indicated that reliability can be enhanced when two or more persons observe the same thing, reliability is a contentious concept for many qualitative researchers. O'Conner and Joffe (2020), for example, indicated that establishing reliability between researchers to ensure greater consistency in the coding of data is not universally accepted for improving qualitative research. One of the objections associated with ensuring reliability among researchers is that doing so contradicts the agenda of researchers who rely on an interpretive paradigm (O'Conner & Joffe, 2020).

Reliability is a contentious term for many qualitative researchers because it is based on the belief that a single, stable social reality exists. According to this belief, researchers can discover causal relationships by uncovering laws that explain phenomena. However, qualitative researchers do not manipulate conditions to determine whether their findings are replicable (Merriam & Tisdell, 2016). Reliability in the traditional sense is impossible to achieve when conducting qualitative research. To show why, Merriam and Tisdell (2016) referred to an example involving what would happen if the same researchers were to repeat a qualitative study in the same way with the same participants in the same context. The participants and the context would change over time because of factors such as aging and learning. But this does not mean the original study was flawed.

Other qualitative researchers view the idea of using multiple researchers to reduce or eliminate bias as a problematic practice as well. For instance, Braun et al. (2019) described that this practice demands discarding components they believe characterize good qualitative research (i.e., researcher subjectivity and reflexivity). Although there is no precise agreement on what a qualitative paradigm is, attempting to control researcher bias through reliability techniques is inconsistent with how such a paradigm is frequently conceptualized (Braun et al., 2019). To conduct research consistent with how a qualitative paradigm is often conceived, multiple investigators can collaborate to create a more thorough perspective on a topic rather than to reduce bias (Glesne, 2016).

For researchers who analyze qualitative data through a realist or post-positivist approach, using reliability methods makes sense. Realism is the ontology with which quantitative research is associated and is based on the idea that the world can be known through appropriate research techniques that focus on discovering a fixed reality that is "out there." But relying on a realist approach is problematic for many qualitative researchers. Using multiple researchers, and other types of triangulation strategies, cannot take them closer to a single, fixed truth because for them, this type of thing is nonexistent (Braun & Clarke, 2013).

Theory Triangulation

Denzin (1978) discussed that researchers rarely achieve theory triangulation because they usually rely on a small set of perspectives to guide their studies. By using more perspectives, data could be gathered that may refute other data collected through only one perspective. In other words, to evaluate the utility of data, different kinds of data based on different perspectives could be collected and placed side-by-side. Conducting research this way allows investigators to collect negative evidence rather than gather data to only support their propositions. Researchers proceeding this way explain negative cases before they collect more data. Negative cases are not necessarily thrown out completely because they may contain some components supporting the final theory that results when all the theories are compared.

Denzin discussed a hypothetical example about how researchers might implement a study using theory triangulation. His example involved an investigation of small-group, face-to-face behavior. One way of conducting such a study is by focusing on which of three theories best explains how people behave during face-to-face encounters when in small groups. In such a study, the first theory might focus on the idea that a person will likely stop an activity if it leads to punitive consequences. A behavior that supports this theory, therefore, would occur if people change what they wear after being criticized for how they dress. The second theory might be based on the notion that a person would behave using more deception toward achieving a goal if the goal is more important to this person. A behavior consistent with this theory would happen if a person makes the kinds of statements that lead to a desired goal. And the third theory might involve the belief that how people behave varies according to a given situation. For example, new kinds of behavior may occur if people react to things other than a goal or a threat. After collecting the data to explore these three theories, an analyst would be in a better position to evaluate the strength of each one (Denzin, 1978).

Carter et al. (2014) offered a similar definition of theory triangulation to Denzin's, discussing that this form of triangulation is based on using different theories to interpret data. They indicated that when this type of triangulation is applied, it helps researchers support or refute their findings.

The following example of how I used theory triangulation illustrates how a researcher might implement this form of triangulation with two theories. I recently published a paper that consisted of analyzing various publications using two theories as a lens to interpret the views of the authors who published these works (Morgan, 2023). My paper focused on addressing several research questions, one of which focused on exploring the extent to which massive open online courses (MOOCs) alleviate or maintain the inequalities caused by colonialism. These courses can be valuable for people in countries with high levels of poverty because they are offered for free or for considerably less than the cost of enrolling in traditional classes. Although some authors have described that one of the reasons educational institutions created MOOCs was to democratize education, critics have argued that MOOCs may create educational inequalities rather than reduce them.

The two theories I used to interpret the data were social reproduction theory and Freire's theory of transformative learning. Social reproduction theory emphasizes that educational institutions perpetuate inequalities instead of promoting equal educational opportunities. In contrast, Freire's theory of transformative learning focuses on the importance of providing people with the skills to evaluate situations so that they can act to liberate themselves from oppressive practices.

In using these theories, I analyzed how various authors interpreted the way MOOCs were designed and implemented. If authors indicated that MOOCs were designed and implemented in a way that reduces student participation, it was a sign that this approach to providing instruction was not in harmony with Freire's views. An approach to instruction in

which students are passively receiving information is more likely to silence the voices of marginalized people rather than teach them the skills to act against oppressive practices. In the concluding section of this paper, I discussed that to alleviate the inequalities caused by colonialism, educational institutions would need to increase designing MOOCs that encourage student participation and avoid implementing those that promote the passive exchange of knowledge.

However, using only one theory did not provide me with the full picture regarding the extent to which MOOCs reduce or maintain inequalities. It is possible for people living in poor households to gain valuable knowledge and skills by enrolling in MOOCs designed to have students receive knowledge passively rather than participate actively. For example, this kind of knowledge can help them gain information that can increase their chances of getting better jobs.

Although Freire's approach is important for understanding the extent to which MOOCs maintain or alleviate inequalities, using social reproduction theory provided me with more details about this topic. When I used social reproduction theory, I discovered that MOOCs promoted educational inequities toward many poor people in developing countries because they could not complete these courses. Not having access to the technology that wealthier people had was one of the reasons that prevented them from benefiting from these courses. Thus, using these two theories provided me with stronger evidence to conclude that MOOCs contributed to inequalities, albeit in different ways.

Method Triangulation

Method triangulation involves collecting data using several methods, such as observing, interviewing, and analyzing documents. This form of triangulation can be used to check how credible one source is. Data collected from an interview, for example, can be confirmed by what researchers observe participants doing and what they read in documents about the topic being studied (Merriam & Tisdell, 2016).

Although using a certain method to confirm the results of what a different method yields can be a useful approach, Denzin (1978) discussed that to produce trustworthy studies, using different methods did not need to provide the same results. He believed the same results did not need to be obtained because the use of any one method can reveal aspects of a phenomenon that the use of a different method may not uncover. Denzin compared the insights the use of multiple methods yields to the way a kaleidoscope shows different colors depending on how it is held. One of the reasons using different methods frequently reveals dissimilar aspects of what is being investigated relates to the weaknesses and strengths of any one method.

Methods that involve interviewing and direct observation lead to reactivity issues, which occur because using these methods can change the behavior of participants. For instance, when participants know they are being observed, they frequently change their behavior. And the characteristics of the observers, such as their race and age, often cause more reactivity, especially when they differ greatly from those of the participants. Although reactivity occurs in any research process that involves interaction with participants (McKechnie, 2008), interviews and observations are beneficial because they allow the direct study of behavior (Denzin, 1978). In contrast, analyzing documents does not allow researchers to study behavior directly, but this method is useful because it does not influence the behavior of the participants (Merriam & Tisdell, 2016).

Ways to Deal with the Problems Associated with Triangulation

The problems associated with the use of triangulation for qualitative studies need to be addressed because many researchers rely on triangulation methods. In fact, Merriam and Tisdell (2016) stated that triangulation is likely the best-known strategy researchers use to support the credibility of their research. And Bogdan and Biklen (2007) indicated that authors of qualitative research dissertations commonly use the word "triangulation" to influence readers that their research was conducted carefully.

Advice Against Using the Term

When researchers started to use triangulation for qualitative research, they began using this strategy in different ways, causing confusion (Bogdan & Biklen, 2007). Some qualitative researchers were influenced by logical positivism, leading them to believe that triangulation can validate claims and allow them to get to the truth of a situation. Their logic was based on the idea that if you used multiple sources and saw and heard the same thing, "then you could be confident in claiming things were the way you were seeing and hearing them" (Glesne, 2016, p. 44).

However, as noted earlier, this way of conducting research is problematic for many qualitative researchers. For these researchers, getting closer to a single, objective truth makes no sense since they believe that mind-independent truth does not exist. Hence, rather than viewing triangulation as a method that helps them get to the truth of a situation, some qualitative researchers regard it as an approach to collect multiple perspectives relating to a topic (Braun & Clarke, 2013).

One problem with using triangulation for qualitative research is that there is another strategy that focuses on the use of multiple methods, researchers, theories, and data sources but assumes that the purpose of doing so is not to reveal a singular truth. This strategy is designed to open a more complex and in-depth understanding of a topic. The term often used to describe this strategy is "crystallization" (Tracy, 2010). Since the concept of triangulation emerged within a realist paradigm that focused on preventing subjectivity, Tracy (2010) suggested using the term "crystallization" to describe the implementation of multiple strategies to analyze data within an interpretive paradigm.

Since triangulation has been used in ways that can perplex researchers, Bogdan and Biklen (2007) recommended avoiding the use of this term, arguing that the term intimidates and confuses more than it clarifies and informs. Instead of using a term they felt is imprecise, they advised researchers to specify how their data was collected. To proceed this way, researchers can make statements about the data collecting methods, the analysis process, and the techniques they applied to produce a trustworthy study. This specification of the process may be a more credible way to reveal to readers what was done instead of using a term that carries imprecision.

Triangulation as a Worthy Approach to Qualitative Research

Although some authors have raised doubts about whether triangulation can be used in a way compatible with an interpretive paradigm, others have suggested that it has often been used in this manner. For example, Green and Thorogood (2018) explained that although triangulation originated from realist epistemologies based on the belief that one truth exists, it was modified when authors recommended its use for qualitative inquiry. When this occurred, rather than using triangulation to search for a more accurate truth, triangulation was viewed as a method for providing a more complete understanding. In other words, the goal was to use

triangulation not to get more consistent data about an object but to use multiple methods to reduce the weaknesses inherent with each one (Green & Thorogood, 2018).

Glesne (2016) expressed a similar perspective, discussing that although triangulation is a contested term that has influenced qualitative researchers guided by logical empiricism, it can help researchers using an interpretive framework in several ways. First, researchers can make unwarranted assumptions when they interpret their data. But when they consider different views, they may gain a better understanding on which view is most likely to be credible. Second, researchers can work together to produce a more nuanced understanding. Inconsistencies do not mean that the findings from a given perspective are wrong but that such information provides insights on the complexity of the situation (Glesne, 2016).

Patton (2015) suggested that using the term "triangulation" to describe methods that are part of a research process consistent with an interpretive paradigm should not be problematic. He mentioned that a "common misconception about triangulation involves thinking that the purpose is to demonstrate that different data sources or inquiry approaches yield essentially the same result" (Patton, 2015, p. 676).

Crystallization as a Research Method

Authors working under an interpretive paradigm may want to avoid using the term "triangulation" since it is an ambiguous term associated with a post-positivist paradigm. Instead, they may want to use the term "crystallization." Researchers relying on crystallization as a practice are less likely to misinterpret its principles because unlike triangulation, crystallization focuses on avoiding a search for objectivity (Ellingson, 2009). Richardson (2000) indicated that crystallization yields a deep and complex understanding designed to reveal multiple perspectives. This kind of understanding occurs because crystallization allows researchers to use various approaches to make sense of data to build a richer account of a phenomenon. Researchers combine art and science and use novel ways of representing experiences (Neves et al., 2023).

To achieve such an analysis, they typically combine at least one constructionist or post-positivist method with an artistic, performative, or other creative approach (Ellingson, 2009). For instance, a researcher may use one of Richardson's creative writing practices to write a report that documents the findings of an interview. One of these practices involves transforming an interview into a poem, using only the words, syntax, diction, and other elements of the speaker (Richardson, 2000). Richardson's paper entitled "Writing: A Method of Inquiry" is a good source for developing ideas on using different genres because it includes not only examples of various kinds of writing practices but also examples of mixed-genre works.

In addition to using poetry to transform an interview, researchers can use other strategies to be creative, such as producing ethnographic fiction. Researchers using this approach apply their imaginations to reveal how they perceive the settings they explored ethnographically. Although producing ethnographic fiction benefits authors in several ways, it is also associated with a few disadvantages. On one hand, authors can use this approach to avoid revealing who they studied and free themselves from ethical restrictions. However, researchers interested in producing social change will likely have less luck with this approach because works of "fiction" influence policymakers less than other kinds of studies. Declaring that a study is fiction also may make a work harder to publish (Richardson, 2000).

Richardson referred to various forms of evocative representations that researchers can use in the crystallization process, including autoethnography, ethnographic fiction, poetic representation, and ethnographic drama. She also suggested that using these forms works well with a postmodern framework. Using such a framework to interpret data is in harmony with

the crystallization process because the core idea on which postmodernism is based involves questioning whether any single approach can produce authoritative knowledge. Rather than considering that conventional methods of knowing are useless, postmodernism encourages the use of new methods, which are subject to questioning (Richardson, 2000).

Ellingson (2009) indicated that crystallization fits with various qualitative paradigms and that the only one it does not complement is positivism. She mentioned that it is based on implementing the following principles:

- Providing thick descriptions by compiling many details and offering forms of representation, organization, and analyses of those details.
- Using multiple points of the qualitative continuum to produce knowledge by combining several approaches to reflect contrasting ways of knowing.
- Using more than one style of writing or another medium, such as video or painting.
- Including reflexive content about the researcher's role in the research process.
- Avoiding a search for objectivity in favor of viewing knowledge as partial and constructed.

Since good qualitative research provides an in-depth understanding of a topic, crystallization's focus on providing thickly described interpretations is in harmony with an interpretive paradigm. But in addition to the disadvantages previously discussed with using this approach, Ellingson (2009) mentioned other drawbacks. One of these is that not all researchers have the skills to use multiple styles of writing and to analyze data according to different paradigms. Another limitation is that because crystallization focuses on providing in-depth understanding, researchers need to cover fewer topics. The demands on focusing on one topic more deeply leave them with little space to include content that covers a wide range of knowledge in an article or a book. Ellingson (2009) explained that researchers "make strategic choices about focus because of space limitations and demands for specificity of purpose" (p. 17). Reviewers may also criticize researchers relying on crystallization because audiences tend to perceive multi-genre projects as inconsistent and because crystallization has received insufficient recognition as a legitimate method (Ellingson, 2009).

To illustrate how a researcher might apply crystallization to conduct a study, Neves et al. (2023) published a paper focusing on two case studies. Their research involved the use of sociological narratives and creative writing to understand loneliness, and they analyzed the lived experiences of older people. They discussed that by using different genres consisting of different narrative types, they could amplify the voices of vulnerable communities.

Their research was conducted at two Australian care homes and included participant observation and interviews to develop sociological narratives. The participant observations led to insights on the spatial and social environments of the residents, and the interviews focused on understanding how the participants experienced loneliness. After identifying themes, they focused on two case studies because these cases provided the loneliest accounts and illustrated the themes well.

They also asked a well-known author, Josephine Wilson, to write creative narratives. They then contrasted the sociological and creative narratives. By using these two approaches, they argued that they could "better understand participants and their perspectives in multidimensional ways" (p. 40).

Conclusion

One of the ways to make qualitative research more rigorous and trustworthy is to use triangulation. Unfortunately, many researchers are confused about or unaware of various aspects of this approach to research. Sometimes they use inaccurate terms to refer to the different types of triangulation strategies. The term "triangulation" can be confusing for qualitative researchers also because it can describe different approaches to interpreting data. This ambiguity creates chances for researchers to use forms of triangulation that do not align with the theoretical perspectives they claim they are using to interpret their data.

One possibility for dealing with the imprecise way the term "triangulation" is frequently used is to avoid using this term. Another is to use the term "crystallization" for studies conducted according to the principles on which crystallization is based. Unlike triangulation, it is difficult to think of crystallization as an approach focusing on getting researchers closer to a truth independent of the mind because this approach emphasizes avoiding a search for objectivity. A third option is for researchers to use the term "triangulation" but to provide details clarifying which forms of this practice were implemented and showing that the way triangulation was used matched the theoretical perspectives of their research.

Understanding the reasons the word "triangulation" is a contested term for qualitative inquiry should help researchers decide whether to use this term. Researchers who want to use triangulation also need to know how the different types of this practice differ from each other. This knowledge will aid researchers to make the decisions they believe will most likely lead readers to feel that their studies are trustworthy.

References

Bailey, C. A. (2018). *A guide to qualitative field research.* Sage.

Bogdan, R. C., & Biklen, S. K. (2007). *Qualitative research in education: An introduction to theory and methods*. Pearson.

Braun, V., & Clarke, V. (2013). *Successful qualitative research: A practical guide for beginners.* Sage.

Braun, V., Clarke, V., Hayfield, N., & Terry. G. (2019). Thematic analysis. In P. Liamputtong (Ed.), *Handbook of research methods in health social sciences* (pp. 843-860). Springer.

Campbell, R., Goodman-Williams, R., Feeney, H., & Fehler-Cabral, G. (2020). Assessing triangulation across methodologies, methods, and stakeholder groups: The joys, woes, and politics of interpreting convergent and divergent data. *American Journal of Evaluation, 4*(1), 125-144. https://doi.org/10.1177/1098214018804195

Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. J. (2014). The use of triangulation in qualitative research. *Oncology Nursing Forum, 41*(5), 545-547. https://doi.org/10.1188/14.ONF.545-547

Cope, D. G. (2014). Methods and meanings: Credibility and trustworthiness of qualitative research. *Oncology Nursing Forum, 41*(1), 89-91. https://doi.org/10.1188/14.ONF.89-91

Denzin, N. K. (1978). *The research act: A theoretical introduction to sociological methods* (2nd ed.). McGraw Hill.

Ellingson, L. L. (2009). *Engaging crystallization in qualitative research*. Sage.

Fusch, P., Fusch, G. E., & Ness, L. R. (2018). Denzin's paradigm shift: Revisiting triangulation in qualitative research. *Journal of Social Change, 10*(1), 19-32. https://doi.org/10.5590/JOSC.2018.10.1.02

Glesne, C. (2016). *Becoming qualitative researchers: An introduction*. Pearson.

Green, J., & Thorogood, N. (2018). *Qualitative methods for health research*. Sage.

Hales, D. (2010). *Introduction to triangulation*. UNAIDS. http://www.unaids.org/sites/default/files/sub_landing/files/10_4-Intro-to-triangulation-MEF.pdf

Johnson, J. L., Adkins, D., & Chauvin, S. (2020). Qualitative research in pharmacy education: A review of the quality indicators of rigor in qualitative research. *American Journal of Pharmaceutical Education*, *84*(1), 138-146. https://doi.org/10.5688/ajpe7120

McKechnie, L. E. F. (2008). Reactivity. In L. M. Given (Ed.), *The Sage encyclopedia of qualitative research methods* (pp. 729-730). Sage.

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). Jossey Bass.

Morgan, H. (2023). Improving massive open online courses to reduce the inequalities created by colonialism. *Education Sciences, 13*, 1-12. https://doi.org/10.3390/educsci13080772

Neves, B. B., Wilson, J., Sanders, A., & Kokanovic, R. (2023). Using crystallization to understand loneliness in later life: Integrating social science and creative narratives in sensitive qualitative research. *Qualitative Research, 23*(1), 38-54. https://doi.org/10.1177/14687941211005943

Noble, H., & Smith, J. (2015). Issues of validity and reliability in qualitative research. *Evidence Based Nursing, 18*(2), 34-35. https://doi.org/10.1136/eb-2015-102054

O'Conner, C., & Joffe, H. (2020). Intercoder reliability in qualitative research: Debates and practical guidelines. *International Journal of Qualitative Methods, 19*, 1-13. https://doi.org/10.1177/1609406919899220

Patton, M. Q. (2015). *Qualitative research and evaluation methods.* Sage.

Richardson, L. (2000). Writing: a method of inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 923-948). Sage.

Rothbauer, P. M. (2008). Triangulation. In L. M. Given (Ed.), *The Sage encyclopedia of qualitative research methods* (pp. 892-894). Sage.

Tracy, S. J. (2010). Qualitative quality: Eight ''big-tent'' criteria for excellent qualitative research. *Qualitative Inquiry, 16*(10), 837-851. https://doi.org/10.1177/1077800410383121

Tracy, S. J. (2013). *Qualitative research methods: Collecting evidence, crafting analysis, communicating impact.* Wiley-Blackwell.

Van Hasselt, M. (2021). Data triangulation for substance abuse research. *Addiction, 116,* 2613-2615. https://doi.org/10.1111/add.15596

Varpio, L., Ajjawi, R., Monrouxe, L. V., O'Brien, B. C., & Rees, C. E. (2017). Shedding the cobra effect: Problematising thematic emergence, triangulation, saturation and member checking. *Medical Education, 51*(1), 40-50. https://doi.org/10.1111/medu.13124

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