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Nahid Golafshani

University of Toronto, ngolafshani@laurentian.ca

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Abstract

The use of reliability and validity are common in quantitative research and now it is reconsidered in the qualitative research paradigm. Since reliability and validity are rooted in positivist perspective then they should be redefined for their use in a naturalistic approach. Like reliability and validity as used in quantitative research are providing springboard to examine what these two terms mean in the qualitative research paradigm, triangulation as used in quantitative research to test the reliability and validity can also illuminate some ways to test or maximize the validity and reliability of a qualitative study. Therefore, reliability, validity and triangulation, if they are relevant research concepts, particularly from a qualitative point of view, have to be redefined in order to reflect the multiple ways of establishing truth.

Keywords

Reliability, Validity, Triangulation, Construct, Qualitative, and Quantitative

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Understanding Reliability and Validity in Qualitative Research

Nahid Golafshani

University of Toronto, Toronto, Ontario, Canada

The use of reliability and validity are common in quantitative research and now it is reconsidered in the qualitative research paradigm. Since reliability and validity are rooted in positivist perspective then they should be redefined for their use in a naturalistic approach. Like reliability and validity as used in quantitative research are providing springboard to examine what these two terms mean in the qualitative research paradigm, triangulation as used in quantitative research to test the reliability and validity can also illuminate some ways to test or maximize the validity and reliability of a qualitative study. Therefore, reliability, validity and triangulation, if they are relevant research concepts, particularly from a qualitative point of view, have to be redefined in order to reflect the multiple ways of establishing truth. Key words: Reliability, Validity, Triangulation, Construct, Qualitative, and Quantitative

This article discusses the use of reliability and validity in the qualitative research paradigm. First, the meanings of quantitative and qualitative research are discussed. Secondly, reliability and validity as used in quantitative research are discussed as a way of providing a springboard to examining what these two terms mean and how they can be tested in the qualitative research paradigm. This paper concludes by drawing upon the use of triangulation in the two paradigms (quantitative and qualitative) to show how the changes have influenced our understanding of reliability, validity and triangulation in qualitative studies.

What is Quantitative Research?

Researchers who use logical positivism or quantitative research employ experimental methods and quantitative measures to test hypothetical generalizations (Hoepfl, 1997), and they also emphasize the measurement and analysis of causal relationships between variables (Denzin and Lincoln, 1998). To illustrate the meaning of quantitative research for its use of explaining social problems, Bogdan and Biklen (1998) note:

Charts and graphs illustrate the results of the research, and commentators employ words such as 'variables', 'populations' and 'result' as part of their daily vocabulary...even if we do not always know just what all of the terms mean...[but] we know that this is part of the process of doing research. Research, then as it comes to be known publicly, is a synonym for quantitative research. (p. 4)

Quantitative research allows the researcher to familiarize him/herself with the problem or concept to be studied, and perhaps generate hypotheses to be tested. In this paradigm: (1) the emphasis is on facts and causes of behaviour (Bogdan & Biklen, 1998), (2) the information is in

the form of numbers that can be quantified and summarized, (3) the mathematical process is the norm for analysing the numeric data and (4) the final result is expressed in statistical terminologies (Charles, 1995).

Generally, quantitative research "...supported by the positivist or scientific paradigm, leads us to regard the world as made up of observable, measurable facts" (Glesne & Peshkin, 1992, p. 6) though their assumption that "social facts have an objective reality" and "variables can...be identified and relationships measured" (p. 7) is problematic. The notion of 'measuring' means to understand, say, educational issues by performing an operation called 'measurement' on the physical world by the observer (Crocker & Algina, 1986). Stevens (1946) defines measurement as the assignment of numerals to objects or events according to rules. From these definitions, one may perceive measurement as necessarily objective, quantitative and statistically relevant. Simply put, measurement can be about numbers, objective hard data.

A quantitative researcher attempts to fragment and delimit phenomena into measurable or common categories that can be applied to all of the subjects or wider and similar situations (Winter, 2000). In his/her attempts, the researcher's methods involve the "use of standardised measures so that the varying perspectives and experiences of people can be fit into a limited number of predetermined response categories to which number are assigned" (Patton, 2001, p.14). For example, a quantitative researcher may prepare a list of behaviour to be checked or rated by an observer using a predetermined schedule or numbers (scales) as an instrument in his/her method of research. Thus, a quantitative researcher needs to construct an instrument to be administered in standardised manner according to predetermined procedures. But the question is if the measuring instrument measures what it is supposed to measure. In the broadest sense, devising a test (Crocker & Algina, 1986) or the validity of an instrument is on focus. The significance of this test is to ensure replicability or repeatability of the result.

Reliability and Validity in Quantitative Research

"Reliability and validity are tools of an essentially positivist epistemology."
(Watling, as cited in Winter, 200, p. 7)

Reliability

Joppe (2000) defines reliability as:

...The extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable. (p. 1)

Embodied in this citation is the idea of replicability or repeatability of results or observations.

Kirk and Miller (1986) identify three types of reliability referred to in quantitative research, which relate to: (1) the degree to which a measurement, given repeatedly, remains the same (2) the stability of a measurement over time; and (3) the similarity of measurements within a given time period (pp. 41-42).

Charles (1995) adheres to the notions that consistency with which questionnaire [test] items are answered or individual's scores remain relatively the same can be determined through

the test-retest method at two different times. This attribute of the instrument is actually referred to as stability. If we are dealing with a stable measure, then the results should be similar. A high degree of stability indicates a high degree of reliability, which means the results are repeatable. Joppe, (2000) detects a problem with the test-retest method which can make the instrument, to a certain degree, unreliable. She explains that test-retest method may sensitize the respondent to the subject matter, and hence influence the responses given. We cannot be sure that there was no change in extraneous influences such as an attitude change that has occurred. This could lead to a difference in the responses provided. Similarly, Crocker and Algina (1986) note that when a respondent answer a set of test items, the score obtained represents only a limited sample of behaviour. As a result, the scores may change due to some characteristic of the respondent, which may lead to errors of measurement. These kinds of errors will reduce the accuracy and consistency of the instrument and the test scores. Hence, it is the researchers' responsibility to assure high consistency and accuracy of the tests and scores. Thus, Crocker and Algina (1986) say, "Test developers have a responsibility of demonstrating the reliability of scores from their tests" (p. 106).

Although the researcher may be able to prove the research instrument repeatability and internal consistency, and, therefore reliability, the instrument itself may not be valid.

Validity

The traditional criteria for validity find their roots in a positivist tradition, and to an extent, positivism has been defined by a systematic theory of validity. Within the positivist terminology, validity resided amongst, and was the result and culmination of other empirical conceptions: universal laws, evidence, objectivity, truth, actuality, deduction, reason, fact and mathematical data to name just a few (Winter, 2000).

Joppe (2000) provides the following explanation of what validity is in quantitative research:

Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are. In other words, does the research instrument allow you to hit "the bull's eye" of your research object? Researchers generally determine validity by asking a series of questions, and will often look for the answers in the research of others. (p. 1)

Wainer and Braun (1998) describe the validity in quantitative research as "construct validity". The construct is the initial concept, notion, question or hypothesis that determines which data is to be gathered and how it is to be gathered. They also assert that quantitative researchers actively cause or affect the interplay between construct and data in order to validate their investigation, usually by the application of a test or other process. In this sense, the involvement of the researchers in the research process would greatly reduce the validity of a test.

Insofar as the definitions of reliability and validity in quantitative research reveal two strands: Firstly, with regards to reliability, whether the result is replicable. Secondly, with regards to validity, whether the means of measurement are accurate and whether they are actually measuring what they are intended to measure. However, the concepts of reliability and validity are viewed differently by qualitative researchers who strongly consider these concepts

defined in quantitative terms as inadequate. In other words, these terms as defined in quantitative terms may not apply to the qualitative research paradigm. The question of replicability in the results does not concern them (Glesne & Peshkin, 1992), but precision (Winter, 2000), credibility, and transferability (Hoepf, 1997) provide the lenses of evaluating the findings of a qualitative research. In this context, the two research approaches or perspectives are essentially different paradigms (Kuhn, 1970).

What is Qualitative Research?

Qualitative research uses a naturalistic approach that seeks to understand phenomena in context-specific settings, such as "real world setting [where] the researcher does not attempt to manipulate the phenomenon of interest" (Patton, 2001, p. 39). Qualitative research, broadly defined, means "any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification" (Strauss and Corbin, 1990, p. 17) and instead, the kind of research that produces findings arrived from real-world settings where the "phenomenon of interest unfold naturally" (Patton, 2001, p. 39). Unlike quantitative researchers who seek causal determination, prediction, and generalization of findings, qualitative researchers seek instead illumination, understanding, and extrapolation to similar situations (Hoepfl, 1997).

Qualitative analysis results in a different type of knowledge than does quantitative inquiry because one party argues from the underlying philosophical nature of each paradigm, enjoying detailed interviewing and the other focuses on the apparent compatibility of the research methods, "enjoying the rewards of both numbers and words" (Glesne & Peshkin, 1992, p. 8). This means such methods like interviews and observations are dominant in the naturalist (interpretive) paradigm and supplementary in the positive paradigm, where the use of survey serves in opposite order. Although it has been claimed (Winter, 2000) that quantitative researchers attempt to disassociate themselves as much as possible from the research process, qualitative researchers have come to embrace their involvement and role within the research. Patton (2001) supports the notion of researcher's involvement and immersion into the research by discussing that the real world are subject to change and therefore, a qualitative researcher should be present during the changes to record an event after and before the change occurs. However, both qualitative and quantitative researchers need to test and demonstrate that their studies are credible. While the credibility in quantitative research depends on instrument construction, in qualitative research, "the researcher is the instrument" (Patton, 2001, p. 14). Thus, it seems when quantitative researchers speak of research validity and reliability, they are usually referring to a research that is credible while the credibility of a qualitative research depends on the ability and effort of the researcher. Although reliability and validity are treated separately in quantitative studies, these terms are not viewed separately in qualitative research. Instead, terminology that encompasses both, such as credibility, transferability, and trustworthiness is used.

Reliability and Validity in Qualitative Research

To understand the meaning of reliability and validity, it is necessary to present the various definitions of reliability and validity given by many qualitative researchers from different perspectives.

Reliability

Although the term 'Reliability' is a concept used for testing or evaluating quantitative research, the idea is most often used in all kinds of research. If we see the idea of testing as a way of information elicitation then the most important test of any qualitative study is its quality. A good qualitative study can help us "understand a situation that would otherwise be enigmatic or confusing" (Eisner, 1991, p. 58). This relates to the concept of a good quality research when reliability is a concept to evaluate quality in quantitative study with a "purpose of explaining" while quality concept in qualitative study has the purpose of "generating understanding" (Stenbacka, 2001, p. 551). The difference in purposes of evaluating the quality of studies in quantitative and qualitative research is one of the reasons that the concept of reliability is irrelevant in qualitative research. According to Stenbacka, (2001) "the concept of reliability is even misleading in qualitative research. If a qualitative study is discussed with reliability as a criterion, the consequence is rather that the study is no good" (p. 552).

On the other hand, Patton (2001) states that validity and reliability are two factors which any qualitative researcher should be concerned about while designing a study, analysing results and judging the quality of the study. This corresponds to the question that "How can an inquirer persuade his or her audiences that the research findings of an inquiry are worth paying attention to?" (Lincoln & Guba, 1985, p. 290). To answer to the question, Healy and Perry (2000) assert that the quality of a study in each paradigm should be judged by its own paradigm's terms. For example, while the terms Reliability and Validity are essential criterion for quality in quantitative paradigms, in qualitative paradigms the terms Credibility, Neutrality or Confirmability, Consistency or Dependability and Applicability or Transferability are to be the essential criteria for quality (Lincoln & Guba, 1985). To be more specific with the term of reliability in qualitative research, Lincoln and Guba (1985, p. 300) use "dependability", in qualitative research which closely corresponds to the notion of "reliability" in quantitative research. They further emphasize "inquiry audit" (p. 317) as one measure which might enhance the dependability of qualitative research. This can be used to examine both the process and the product of the research for consistency (Hoepfl, 1997). In the same vein, Clont (1992) and Seale (1999) endorse the concept of dependability with the concept of consistency or reliability in qualitative research. The consistency of data will be achieved when the steps of the research are verified through examination of such items as raw data, data reduction products, and process notes (Campbell, 1996).

To ensure reliability in qualitative research, examination of trustworthiness is crucial. Seale (1999), while establishing good quality studies through reliability and validity in qualitative research, states that the "trustworthiness of a research report lies at the heart of issues conventionally discussed as validity and reliability" (p. 266). When judging (testing) qualitative work, Strauss and Corbin (1990) suggest that the "usual canons of 'good science'...require redefinition in order to fit the realities of qualitative research" (p. 250).

In contrast, Stenbacka (2001) argues that since reliability issue concerns measurements then it has no relevance in qualitative research. She adds the issue of reliability is an irrelevant matter in the judgement of quality of qualitative research. Therefore, if it is used then the "consequence is rather that the study is no good" (p. 552).

To widen the spectrum of conceptualization of reliability and revealing the congruence of reliability and validity in qualitative research, Lincoln and Guba (1985) states that: "Since there can be no validity without reliability, a demonstration of the former [validity] is sufficient to

establish the latter [reliability;]" (p. 316). Patton (2001) with regards to the researcher's ability and skill in any qualitative research also states that reliability is a consequence of the validity in a study.

Validity

The concept of validity is described by a wide range of terms in qualitative studies. This concept is not a single, fixed or universal concept, but "rather a contingent construct, inescapably grounded in the processes and intentions of particular research methodologies and projects" (Winter, 2000, p.1). Although some qualitative researchers have argued that the term validity is not applicable to qualitative research, but at the same time, they have realised the need for some kind of qualifying check or measure for their research. For example, Creswell & Miller (2000) suggest that the validity is affected by the researcher's perception of validity in the study and his/her choice of paradigm assumption. As a result, many researchers have developed their own concepts of validity and have often generated or adopted what they consider to be more appropriate terms, such as, quality, rigor and trustworthiness (Davies & Dodd, 2002; Lincoln & Guba, 1985; Mishler, 2000; Seale, 1999; Stenbacka, 2001).

The discussion of quality in qualitative research initiated from the concerns about validity and reliability in quantitative tradition which "involved substituting new term for words such as validity and reliability to reflect interpretivist [qualitative] conceptions" (Seale, 1999, p. 465).

The issue of validity in qualitative research has not been disregarded by Stenbacka (2001) as she has for the issue of reliability in qualitative research. Instead, she argues that the concept of validity should be redefined for qualitative researches. Stenbacka (2001) describes the notion of reliability as one of the quality concepts in qualitative research which "to be solved in order to claim a study as part of proper research" (p. 551).

In searching for the meaning of rigor in research, Davies and Dodd (2002) find that the term rigor in research appears in reference to the discussion about reliability and validity. Davies and Dodd (2002) argue that the application of the notion rigor in qualitative research should differ from those in quantitative research by "accepting that there is a quantitative bias in the concept of rigor, we now move on to develop our reconception of rigor by exploring subjectivity, reflexivity, and the social interaction of interviewing" (p. 281).

Lincoln and Guba (1985) argue that sustaining the trustworthiness of a research report depends on the issues, quantitatively, discussed as validity and reliability. The idea of discovering truth through measures of reliability and validity is replaced by the idea of trustworthiness (Mishler, 2000), which is "defensible" (Johnson 1997, p. 282) and establishing confidence in the findings (Lincoln & Guba, 1985).

If the issues of reliability, validity, trustworthiness, quality and rigor are meant differentiating a 'good' from 'bad' research then testing and increasing the reliability, validity, trustworthiness, quality and rigor will be important to the research in any paradigm.

Testing Validity and Reliability

So far, the concepts of reliability and validity as they have been redefined for their usefulness in qualitative research have been presented. Now, the question which remains to be answered is 'How to test or maximize the validity and as a result the reliability of a qualitative study?'

If the validity or trustworthiness can be maximized or tested then more “credible and defensible result” (Johnson, 1997, p. 283) may lead to generalizability which is one of the concepts suggested by Stenbacka (2001) as the structure for both doing and documenting high quality qualitative research. Therefore, the quality of a research is related to generalizability of the result and thereby to the testing and increasing the validity or trustworthiness of the research.

In contrast, Maxwell (1992) observes that the degree to which an account is believed to be generalizable is a factor that clearly distinguishes quantitative and qualitative research approaches. Although the ability to generalize findings to wider groups and circumstances is one of the most common tests of validity for quantitative research, but Patton (2001) states generalizability as one of the criteria for quality case studies depending on the case selected and studied. In this sense the validity in quantitative research is very specific to the test to which it is applied – where triangulation methods are used in qualitative research. Triangulation is typically a strategy (test) for improving the validity and reliability of research or evaluation of findings. Mathison (1988) elaborates this by saying:

Triangulation has risen an important methodological issue in naturalistic and qualitative approaches to evaluation [in order to] control bias and establishing valid propositions because traditional scientific techniques are incompatible with this alternate epistemology. (p. 13)

Patton (2001) advocates the use of triangulation by stating “triangulation strengthens a study by combining methods. This can mean using several kinds of methods or data, including using both quantitative and qualitative approaches” (p. 247). However, the idea of combining methods has been challenged by Barbour (1998). She argues while mixing paradigms can be possible but mixing methods within one paradigm, such as qualitative research, is problematic since each method within the qualitative paradigm has its own assumption in “terms of theoretical frameworks we bring to bear on our research” (p. 353). Even though triangulation is used in quantitative paradigm for confirmation and generalization of a research, Barbour (1998) does not disregard the notion of triangulation in qualitative paradigm and she states the need to define triangulation from a qualitative research’s perspective in each paradigm. For example, in using triangulation of several data sources in quantitative research, any exception may lead to a disconfirmation of the hypothesis where exceptions in qualitative research are dealt to modify the theories and are fruitful.

In this view, Healy and Perry (2000) explicate on the judging validity and reliability within the realism paradigm which relies on multiple perceptions about a single reality. They argue the involvement of triangulation of several data sources and their interpretations with those multiple perceptions in the realism paradigm.

Another paradigm in qualitative research is constructivism which views knowledge as socially constructed and may change depending on the circumstances. Crotty (1998) defined constructivism from the social perspectives as “the view that all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context” (p. 42). In any qualitative research, the aim is to “engage in research that probes for deeper understanding rather than examining surface features” (Johnson, 1995, p. 4) and constructivism may facilitate toward that aim. The constructivist notion, that reality is changing whether the observer wishes it or not (Hippis, 1993), is an indication of multiple or

possibly diverse constructions of reality. Constructivism values multiple realities that people have in their minds. Therefore, to acquire valid and reliable multiple and diverse realities, multiple methods of searching or gathering data are in order. If this calls for the use of triangulation in the constructivism paradigm, then the use of investigators, method and data triangulations to record the construction of reality is appropriate (Johnson, 1997). An open-ended perspective in constructivism adheres with the notion of data triangulation by allowing participants in a research to assist the researcher in the research question as well as with the data collection. Engaging multiple methods, such as, observation, interviews and recordings will lead to more valid, reliable and diverse construction of realities. To improve the analysis and understanding of construction of others, triangulation is a step taken by researchers to involve several investigators or peer researchers' interpretation of the data at different time or location. In a related way, a qualitative researcher can "use investigator triangulation and consider the ideas and explanations generated by additional researchers studying the research participants" (Johnson, 1997, p. 284).

Triangulation may include multiple methods of data collection and data analysis, but does not suggest a fix method for all the researches. The methods chosen in triangulation to test the validity and reliability of a study depend on the criterion of the research.

Our Understanding

From the foregoing discussion, the association of quantitative paradigm with qualitative research through validity and reliability have changed our understanding of the traditional meaning of reliability and validity from the qualitative researchers' perspectives. Reliability and validity are conceptualized as trustworthiness, rigor and quality in qualitative paradigm. It is also through this association that the way to achieve validity and reliability of a research get affected from the qualitative researchers' perspectives which are to eliminate bias and increase the researcher's truthfulness of a proposition about some social phenomenon (Denzin, 1978) using triangulation. Then triangulation is defined to be "a validity procedure where researchers search for convergence among multiple and different sources of information to form themes or categories in a study" (Creswell & Miller, 2000, p. 126).

Therefore, reliability, validity and triangulation, if they are to be relevant research concepts, particularly from a qualitative point of view, have to be redefined as we have seen in order to reflect the multiple ways of establishing truth.

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Author's Note

Nahid Golafshani is a doctoral student in the department of Curriculum, Teaching and Learning at the Ontario Institute for Studying Education\University of Toronto where she learns and gains experiences by working with the diverse group of students and faculties. Her area of specialization is Mathematics Education. Her researches include multicultural teaching and learning, teachers' beliefs, and problem-based mathematics learning and learning. Ms. Golafshani may be contacted at Ontario Institute for Studying Education\University of Toronto Curriculum, Teaching and Learning, 252 Bloor Street West, Toronto, Ontario, Canada M5S 1V6; Telephone: 519-747-4559; Fax Telephone: (253) 322-8961; E-mail: ngolafshani@oise.utoronto.ca

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