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Ensuring Quality in Qualitative Research: A Researcher's Reflections

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Ensuring Quality in Qualitative Research: A Researcher's Reflections

Abstract

This reflective paper is the outcome of my qualitative research engagement aligned with quality standards. I began with autoethnography in my master's research in mathematics education (see Dahal, 2013), then moved on to narrative inquiry in my MPhil research (see Dahal, 2017), and collaborative autoethnography in my doctoral research (see Dahal, 2023). With the above, this paper aims to clarify the quality criteria used in autoethnography, narrative inquiry, and collaborative autoethnography based on my experiences to evaluate the robustness of qualitative research from various ontological and epistemological vantage points. Likewise, this article offers a comprehensive overview of the key elements of qualitative research across master, MPhil, and Ph.D. research that can be used to evaluate the rigor of qualitative reports. In this introspection, I explored the significance of qualitative research and the need to assess it, considering quality criteria and/or characteristics. Quality criteria also offer some insights and recommendations for improving the standard of qualitative reports. From these musings, I deduced that established norms of quality are the product of preexisting paradigmatic (e.g., interpretivism, criticalism, postmodernism, and intergalism) practices and broader socio-institutional processes. It is unrealistic to expect that a single, all-encompassing set of quality standards will be developed for qualitative research due to the diversity of its paradigms. This paper provides novice and veteran researchers and practitioners with an overview of qualitative research's theoretical and methodological foundations and the applicable standards and deciding factors for evaluating qualitative reports.

Keywords

research engagement, quality standards, autoethnography, narrative inquiry, collaborative autoethnography, quality criteria, evaluate qualitative reports

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Ensuring Quality in Qualitative Research: A Researcher's Reflections

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This reflective paper is the outcome of my qualitative research engagement aligned with quality standards. I began with autoethnography in my master's research in mathematics education (see Dahal, 2013), then moved on to narrative inquiry in my MPhil research (see Dahal, 2017), and collaborative autoethnography in my doctoral research (see Dahal, 2023). With the above, this paper aims to clarify the quality criteria used in autoethnography, narrative inquiry, and collaborative autoethnography based on my experiences to evaluate the robustness of qualitative research from various ontological and epistemological vantage points. Likewise, this article offers a comprehensive overview of the key elements of qualitative research across master, MPhil, and Ph.D. research that can be used to evaluate the rigor of qualitative reports. In this introspection, I explored the significance of qualitative research and the need to assess it, considering quality criteria and/or characteristics. Quality criteria also offer some insights and recommendations for improving the standard of qualitative reports. From these musings, I deduced that established norms of quality are the product of preexisting paradigmatic (e.g., interpretivism, criticalism, postmodernism, and intergalism) practices and broader socio-institutional processes. It is unrealistic to expect that a single, all-encompassing set of quality standards will be developed for qualitative research due to the diversity of its paradigms. This paper provides novice and veteran researchers and practitioners with an overview of qualitative research's theoretical and methodological foundations and the applicable standards and deciding factors for evaluating qualitative reports.

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Introduction

Sometime around December 2021... I ask myself idly at around 4 o'clock in the afternoon "Why is it important for qualitative researchers to consider quality standards? What standards of excellence apply to the qualitative study you are conducting or reading? What role does the researcher play in shaping the research? In what ways do the people who are the focus of the study influence and react to the findings? In qualitative research, is generalization possible or desired, and how does this relate to data collection? How far could qualitative findings extend beyond the study's included data sources?" as I waited for the Ph.D. class on an early cool evening on one Friday of December 2021. As I sat and waited for class time, which was usually on time, this time, however, I found myself thinking back to something that had been discussed in our most

recent session of Advanced Qualitative Research Methods with Professor Luitel: “how are you going to regulate your research process?” As my thoughts continued: “How to regulate the research process?” my doubts were fighting back against my good spirits. (Personal Diary, 2021)

Aligned to the above vignette, Kitto et al. (2008) commented, “a report of qualitative research should address the criteria of clarification and justification; procedural rigor; representativeness; interpretative rigor; reflexivity and evaluative rigor; and transferability” (p. 243). In response to the questions—why are quality criteria important to qualitative researchers? Which quality criteria apply to the qualitative research that you are performing? In this paper, I address how qualitative research outcomes and/or results can be achieved and demonstrated to be of high quality (particularly master and M.Phil. dissertations and Ph.D. thesis). In recent years, qualitative research has been dominant and has increasingly been used for educational and social sciences research programs. Due to being popular of qualitative research, qualitative researchers have debated their role as applied or theoretical research. These popularities make qualitative research processes less likely to explain research findings and methodological rigor to global researchers based on the researchers’ experiences aligned with evidence-based research. Following the shift toward evidence-based, participatory, and transformative research and practices, qualitative research quality assurance has grown (Liamputtong & Ezzy, 2005; Paudel et al., 2023; Reynolds et al., 2011) for assessing the quality of the qualitative researchers’ engagement in qualitative research. The qualitative engagement of the researchers believes the research quality impacts academic disciplines and local and global educational research policies.

Moreover, while assessing the quality standards system of qualitative reports, Guba and Lincoln (1989) is a widely used approach for judging the quality of qualitative research. Instead, Lincoln and Guba (1985) proposed five criteria for evaluating the quality of qualitative research: credibility, transferability, dependability, confirmability, and authenticity. It is praised for its comprehensiveness and recognition of the interpretive nature of qualitative research. However, it is also challenged for being overly complex and hard to apply in practice. Despite these challenges, Guba and Lincoln (1989)’s approach for assessing the quality of qualitative research is still a useful tool for assessing the quality of qualitative reports. These criteria are still widely accepted and used as tools for assessing the quality of qualitative research and/or reports (Corwin & Clemens, 2020). It offers a way of thinking about the different aspects of qualitative research quality and can help researchers create more rigorous and credible qualitative reports.

All the above, for the purpose of producing high-quality results, continuous reflection and target audience and/or participants' input are vital. In response to the questions—how does the researcher influence the study's direction? How do the research's subjects influence its direction and interpretation? The researcher who engages in personal reflexivity examines his/her own contributions to the research process. Instead of focusing inward, end-user involvement involves reaching out to the community being studied for input at every stage of the research process. These two ongoing issues should ideally be tackled well in advance of the anticipated research protocol. Personal introspection and user participation both raise questions of “who speaks, for whom, to whom, and for what purposes.”

More so, when conducting qualitative research, it is important to consider the generalizability of the findings. This means asking whether the research outcomes and insights can be applied to a larger population or to other situations. Levitt (2021) argues that qualitative generalization should be made not to the population but to the phenomenon being studied. In other words, the goal of qualitative research is to understand a particular phenomenon in depth, and the findings of such research can be applied to other similar phenomena, even if they are

not generalizable to the population. For instance, my master, M.Phil. and Ph.D. research, do the outcomes and insights convince or resonate with readers who have lupus? The reader evaluates the research product's transferability. What about their loved ones? To the professionals who are caring for them? Where do you stand, perhaps someone who has never heard of lupus before reading this? Researchers can consider the generalizability of their findings by considering whether repeating the study with women who have lupus in different locations (such as other cities or countries) would yield useful additional information (Treharne & Riggs, 2015).

On the contrary, qualitative research disciplines have rarely used quality assurance as a concept or set of procedures, and no standardized guidance exists. Qualitative researchers in global education need a praxis-driven approach to quality assurance to withstand external scrutiny and give internal collaborators confidence in results interpretation. Furthermore, debates on what constitutes "good" qualitative research have tended to be centered firmly within social science disciplines like sociology or anthropology, making them difficult to understand for multi-disciplinary qualitative researchers.

With the above background, to fulfill the requirements of my master's, M.Phil., and doctoral degrees in qualitative inquiry, I sought guidance on ensuring the quality of qualitative research. In the absence of a unified approach encapsulated in the guidance format, I needed to reflect on my practices of ensuring the quality of qualitative research addressing quality assurance before developing suitable guidance. Hence, this paper explores how qualitative research paradigms, such as interpretivism, criticalism, postmodernism, and integralism, have been conceptualized and defined as quality assurance. With this section of quality in qualitative research, this paper covers setting quality standards in my qualitative research of my master's research in mathematics education, narrative inquiry in my MPhil research, and collaborative autoethnography in my doctoral research.

Setting Quality Standards in My Research Projects

The quality standards for each paradigm (e.g., interpretivism, criticalism, postmodernism, and intergalism) are different. They are essential for making findings more trustworthy, viable, original, and contextual. Considering this, I was aware of various research paradigms with their corresponding quality standards in my research writing process of research paradigms: interpretivism, criticalism, postmodernism, and intergalism. As my study embraced autoethnography in master research (see Dahal, 2013), narrative inquiry in M.Phil. research (see Dahal, 2017), and collaborative autoethnography in doctoral research (see Dahal, 2023), and other approaches in professional career such as participatory action research (Dhungana et al., 2022), action research (Dahal & Pageni, 2019), research and development (Dahal et al., 2023), and teaching experiments (Dahal et al., 2022a; among others), the standards for ensuring quality in those research differed from those used in any positivist research. Also, the norms for quality standards of each paradigm are different as they are based on the nature of each research paradigm. In this regard, my concern was highly on understanding the nature of each research paradigm that I used in my inquiries and its corresponding quality standards based on by master, MPhil and Ph.D. study.

For maintaining the quality of my research studies, I followed the set of standards arising from the paradigms of interpretivism, criticalism, postmodernism and integralism (Lincoln, 1995; Lincoln et al., 2011; Luitel, 2009) wherein I subscribed autoethnography for master's degree, narrative inquiry for M.Phil. study and collaborative autoethnography for my Ph.D. study, which were crucial to conduct the research inquiry process along the right track by maintaining the quality standards (Cohen et al., 2011). As a practitioner, the quality standards have become appropriate for my research study to maintain its certain standards

where I have best interpreted my voices through insider approach in the context of my socio-cultural status quo and various contextual phenomena (Reed-Danahay, 1997). By setting these standards for my research inquiry, I became conscious of my lively findings but not generalizable and applicable to certain contexts.

Maintaining the quality of data, its presentation, and quality of entire research is a challenging job for a researcher or research practitioner like me. Besides positivistic and post positivistic research methods, ensuring quality standards in interpretivism, criticalism, postmodernism, and integralism paradigms, research studies are crucial and difficult tasks throughout the research. Regarding research, quality standards are essential to guide the entire research construction (Lincoln & Guba, 1985) and present research to the audience with a greater quality. My research on master and Ph.D. has the foundation of multi-paradigmatic research but different in M.Phil. study. In this paper, I am going to discuss some of the quality standards that I ensured in my inquiries in master, M.Phil., and Ph.D. research to make it more trustful, original, viable, and lively.

Next, the case of quality standards in autoethnographic studies (autoethnography and collaborative autoethnography) are situated in narratives of self-culture-others (Dahal & Luitel, 2022). The worthiness of overall autoethnographic presentations perhaps lies in the originality of narratives or data texts grounded in the subjects of research (research participants and contexts), the linkage of these data based on narratives and stories to the lifeworld of people, and the presence of instances that connects mind and body including the heart with the notion of connecting life and research (Dahal et al., 2022b). As I am doing an autoethnographic inquiry, this appears to be more authentic to represent the insider's voice, thereby connecting the context of the outsider—a culture (Reed-Danahay, 1997). With this, in the next section, I discussed the quality standards that I ensured throughout my research journey. I will discuss how I ensured the caliber of my master's, M.Phil., and Ph.D. research projects.

Quality Ensuring of my Master Research Project

In 2011, I enrolled in the Master of Education program in Mathematics Education at Kathmandu University School of Education. This was a pivotal moment for me. A college education at Kathmandu University was never on my radar. Because of this change, I feel like my entire life's purpose, outlook, and approach have shifted. In order to foster positive relationships with my mathematics students, I was exposed to numerous new pedagogical practices and content during my studies. Even though I had confidence in my teaching abilities, I ended up being a novice educator. It became painfully obvious to me during the presentation and subsequent discussion how far behind I was in my pedagogical game. To what extent can I improve my social skills? Teaching and learning in the classroom are fascinating and introspective, which has helped me better understand my students and myself. In all my years of schooling, I never once considered methods like that. There was a shift toward more hands-on, interactive learning in the classroom. Even though some of the classes were as same as I attended in my previous university (i.e., Tribhuvan University), I was exposed to many new ways of thinking about things like teamwork, communication, research, analysis, reflection, and assessment. I think it helped me shift my pedagogy from a more traditional approach to one that emphasizes student building from the ground up. Most importantly, this academic degree program prompted me to revisit some of my favorite teaching strategies from years past. Though not all the material we covered in class was riveting, we talked and listened to each other a lot. The academic degree program gave me a solid grounding in research methods and pedagogical theory, which I found invaluable in furthering my understanding of these topics. This has undoubtedly greatly aided me in terms of my ability to be analytical, creative, and reflective. The courses aided my capacity for deep reflection and curiosity. However, some

classes' presentations lacked real interaction with the audience. Some students used to just sit and listen while others presented. Nobody talked to each other or shared their thoughts freely. This led me to believe that some of my classes were pointless. As we began talking about the course material in class, I realized that I was not particularly interested in the material. Conversations, interactions, and presentations took place, but current events and concerns were not addressed. Not enough emphasis was placed on developing students' capacity for proactive planning, introspective analysis, and pedagogical reflection, and the courses reflected an outdated pedagogical tradition. How can teaching and learning support the teaching and learning process and improve the teacher-student relationship?

Reflecting on my research experiences, I found myself drawn to the critical research paradigm. This paradigm is based on the ontological assumption that reality is socially constructed, the epistemological assumption that knowledge is subjective and provisional, and the methodological assumption that research should be dialogic and dialectical (Guba & Lincoln, 1989). The current understanding of reality is that it is a transactional and subjective process. When I conduct research, I see it as my responsibility to act as a catalyst for positive change in my community and the larger world. When conducting research within a positivistic paradigm, there is no room for the researcher to articulate their developing sense of "self." Thus, the critical research paradigm is the one I have settled on for my study.

Likewise, the paradigm of criticalism allows me to critically examine the assumptions, values, and beliefs that are covertly embedded in my thinking and action in my relationship with teachers and students in mathematics teaching and learning using an ontology of critical selfhood that is itself transformative. The next research paradigm I used was interpretivism. A movement within the social sciences, interpretivism emerged as a response to positivism's limitations. For Taylor et al. (2009), the primary concern of interpretivism is the generation of context-based understanding of people's thoughts, beliefs, values, and associated social actions. In doing so, reflective writings have played a significant role in my research, and as an interpretive researcher, I have tried to better understand their function and extrapolate their findings to similar situations.

Postmodernism paradigm assisted me in offering my voice with my beliefs about constructivism as a new method (in our context) to improve my pedagogical practices and increase students' ability to use their experiences and discover the world according to their own beliefs. Postmodernism in qualitative research paradigm exists from the literary criticism that applies skepticism and conscience as inquiry platforms (Taylor, 2015). Taylor (2015) further advocated that post modernism elicits both fear and favor via its basic principle, be suspicious of all grand narratives (including that of postmodernism, and respond to its critics, not without irony). The postmodern paradigm I employed as an influential paradigm to facilitate my research as reflecting, multi-perspective thinking, and voicing. This paradigm enabled me to use different irony and metaphorical logic in all my chapters such as pain feeler, pain giver, pain killer and pain healer which helped me to reflect multiple voices as the learner, teacher, and researcher. Believing in the pluralistic and holistic notions of postmodernity, I was enabled to use multiple curriculum images in my curriculum chapter thereby offering critical voices, envisioning and imagination. Barone (1995) uses postmodernism to understand the manner of the social world and there being no clear truth of the knowledge since it is something subjective which differs among individuals. This paradigm helped me develop the multiple realities, ways of knowing, being and valuing the world, thereby allowing me to change my deep-seated traditional knowledge-transmitting practice into knowledge-generating or constructing ways of knowing. I explored my hegemonic practice of teaching under the traditional paradigm through my autographical reflection, which helped me connect my prior experience with culture (Afonso & Taylor, 2009), thereby helping me to seek multiple responses to the question, who is the self that teaches? (Luitel, 2009). I have used poetic, narrative, and metaphorical logics to

embrace epistemic pluralism (Gautam, 2011) to situate myself in a postmodernist inquirer. Regarding quality standards, I suggested (reader) that the rigor of those narrative inquiries be judged and evaluated on verisimilitude, transferability, pedagogical thoughtfulness and critical reflexivity (Palaganas et al., 2017).

Verisimilitude is the degree by which the reader can tell how true and realistic this quality standard defines the stories (Luitel & Dahal, 2021) I unfolded. Using my own experiences as primary data in the study challenges me with the degree of connectedness I may evoke with the readers. According to Bullough and Pinnegar (2001), self-study should ring true and enable connections. Therefore, the need to provide vivid descriptions of my own experiences and detailed information of the places and people involved in my stories and conversations is highly essential.

The extent to which the findings of a research study can be applied to other settings or contexts is its transferability. Transferability in the context of education refers to the applicability of a study's findings to other schools, classrooms, or students (Bryman et al., 2008). Hence, in my research, using stories and conversations I have taken the readers – which could be pre-service teachers, in-service teachers, teacher educators or even researchers – as I recount the lived experiences that I have had in my teaching praxis – to the experiences which they can identify and assimilate with. However, for me to establish transferability in the self-inquiry, I should be able to provide extensive and careful descriptions of the time, the place, the context, and the culture which bring my experiences together and weave these into narratives that invoke the reader's pedagogical thoughtfulness. That is, to engage the readers, my stories should be able to establish a degree of similarities between my situations and theirs.

Pedagogical thoughtfulness is the act of thinking carefully about one's teaching, which “arises from phenomenological-hermeneutical traditions and addresses the extent to which present and future readers of my text are evoked to question, reflect and examine their own pedagogical practices” (Van Manen, 1991). I hope this quality standard brings evocative, perspectival, and dialogic texts: How often has this research engaged my readers, including readers' perspectives and reflections on the relationship issues with teacher-students?

Critical reflexivity, which is the ability to reflect on one's beliefs and practices critically, engages me in pedagogical thoughtfulness. I hope that students, teachers, and teacher educators will come to realize the importance of being reflective in one's own beliefs and practices. Therefore, in this self-inquiry, understanding the relationship of my constructivist belief and classroom practices plays a vital role in encouraging the readers to think about the educational issues underpinning their pedagogical practices. According to Brookfield (2001), “critical reflection focuses on adult educators as inquirers into their own, and others, practice” (p. 33). Hence, engaging in this process allowed me to critically examine and ask questions about the classroom beliefs and practices that I was exposed to as a learner, as well as beliefs and practices that I may have promoted in my classroom as a teacher and educator. The notions of ideological critique and pragmatist constructivism are amongst the traditions emphasized in the process of critical reflection. The former allows me to challenge the dominant and hidden ideologies, beliefs, and assumptions embedded in my culture as a learner and teacher, such as language issues and traditional mathematics classroom practices. The latter emphasizes the role I play as I construct and deconstruct my experiences and meanings.

Quality Ensuring of my M.Phil. Research Project

In my M.Phil. research journey, I intend to represent six research participants' narrative stories (i.e., questioning experiences) on understanding and uses questioning in mathematics. I have utilized the concepts of “entry and exit” to present the narratives of mathematics teachers and/or educators. In addition, I have analyzed each story and interpreted the narratives in

relation to various theoretical perspectives (e.g., behaviorism, constructivism, and sociological perspectives) and practices for meaning-making, using the concepts of “re-entry and exit” for the narratives' meaning-making (Dahal, 2017; Dahal & Pangeni, 2019; Mitchell, 2011). Therefore, I used a hybrid method to examine narrative information by combining a focus on individual experiences with overarching themes. I did some additional interpretive reviewing to better understand the many facets of teacher inquiry. Stories from educators are presented along overarching themes and individual educator perspectives are questioned. The first set of themes, or “nodes,” were generated from interviews with six mathematics educators (Riessman, 2008). I was looking for hidden meanings in the story, and the teachers' comments gave me some clues. After listing the themes as nodes, I was able to find the segments of the interviews that pertained to each educator's story and tag or attach them accordingly. Likewise, for qualitative research to be credible and trustworthy, reliability is crucial. Measures of quality assurance ensure that research is conducted in a rigorous and systematic manner (Golafshani, 2003; Reynolds et al., 2011).

As a qualitative researcher, I was curious about the perspectives of mathematics educators and approaches to questioning in the classroom and how those perspectives compare to mine. In general, the author established credibility by providing the reader with detailed accounts that were credible (Geertz, 1983; Mishler, 1990). Eventually, the reader will be able to evaluate the reliability of the study (Craig, 2013). As a qualitative researcher, I am interested in how “rich, thick descriptions” allow teachers to immerse themselves in the stories in ways that make sense given their own professional experiences and the contexts of their classrooms (Creswell, 2013). Denzin (1989) argued that a study could be trusted if its rich, detailed descriptions match the researcher's stated perspective. As can be seen, then, I have a heavy burden and a lot of responsibilities in my research to ensure that it is conducted to a high-quality standard. Also, unlike experimental or quasi-experimental studies, qualitative research does not adhere to a set of strict design guidelines. Like the concepts of internal validity, external validity, reliability, and objectivity from more traditional, scientific studies (Golafshani, 2003), trustworthiness allows qualitative researchers to control for potential sources of bias in a study's design, implementation, analysis, and interpretation (Guba, 1981; Lincoln & Guba, 1985; Loh, 2013). This investigation was planned and carried out considering the four criteria. Quality standards, such as those discussed by Webster and Mertova (2007) which I have found to be useful in my own inquiry as well. In my inquiry, I found that the term “access” can be interpreted in two distinct ways (Webster & Mertova, 2007).

First, I have access to the research subjects, their interpretations and applications of questions, and their knowledge-building procedures. The availability and representation to the research participants of the research notes, transcripts, and data on which the researcher has based the finding is the second form of “access” in my research. Additionally, research participants were given access to the study's background, process, data, and knowledge construction. Sincerity, realism, and authenticity (Schwandt et al., 2007) in their study of the human as a research “instrument” in what they call a naturalistic inquiry highlight the following features that support a claim of trustworthiness of narrative research: responsiveness, flexibility, a holistic focus, knowledge base expansion, procedural immediacy, opportunities to explore atypical responses, and so on (Loh, 2013; Webster & Mertova, 2007). The measures taken to ensure the most reliable interviewing, data collection, and interpretation demonstrate trustworthiness. First, I tried to ask interviewees questions they were familiar with to increase their responses' reliability. Interviewees felt comfortable opening to one another and revealing personal information because of the relaxed atmosphere and open nature of the interviews. After conducting interviews, I analyzed the instructor's speech patterns and interactions to better address authenticity concerns. Eder and Fingerson (2002) also propose that examining interviewees' discourse styles may be useful for addressing issues of rapport and validity.

Researchers can do several things to encourage interviewees to use their natural dialect codes and conversational styles. First, they can make it clear that they are not evaluating the language or dialect of the interviewee. Second, they can use language that is free of judgment. Thirdly, they can establish a rapport with the interviewee by discussing common interests or experiences. I based my analysis on three facets of narrative research into the veracity of the story. First, the stories and their pivotal events that I have researched and reported on resonate with my own life. Second, there is some credibility to the reporting. Thirdly, similar and dissimilar events confirmed the veracity of accounts and reporting results when using a method of critical events. Authenticity was another criterion I used when judging stories. Like the idea of realism, it is intertwined with the other. Therefore, it is probably most effective if I give enough detail to convince the readers that the story is told seriously and honestly. For example, if the story is coherent enough, it can give the reader the impression that it happened.

Another method of quality assurance in interpretivism's narrative inquiry is familiarity. When my ways of thinking become habitual, my mathematics instructors may stop noticing that I am thinking in a particular way or wondering what motivated me to do so (a phenomenon that Amsterdam and Bruner (2000) refer to as "dulling"). Mathematics teachers often emphasize the value of emotional distance as a means of reversing one's perception of the world and reintroducing oneself to the wonder of the unfamiliar, reclaiming and reappreciating what was previously forgotten. For there to be a story, something unexpected must happen, so I followed Bruner's (2002) advice and used familiarity in my research. The narrative is extremely attuned to anything that shakes our worldview. It is a tool, not for problem-solving per se, but for elucidating and exploring possibilities. In this sense, one could argue that critical events themselves capture the "unforeseeable," and that this has the potential to provide a perspective that practice, in that it permits a closer examination of specific professional practices rather than, as is often the case, of practice as a whole or "a way of life" (Amsterdam & Bruner, 2000). According to Webster and Mertova (2007), storytelling can be a potent tool for addressing the complexities of human-centeredness in a variety of learning environments. It provides a window into human consciousness and can help us comprehend the various ways in which people learn. Teachers in this study come from a variety of backgrounds, but by analyzing their stories, we can gain insight into how they think about and implement questioning in the classroom.

So, transferability denotes the extent to which other contexts and policymakers can use the findings of a study. To what extent "the results of the work at hand can be applied to a wider area, such as for question paper design, policy, etc." is of most interest to researchers is an especially hot topic (Shenton, 2004). In my research, I reported on findings from a small sample that are attributable solely to those individuals and their settings. It is the researcher's responsibility to give the reader "sufficient contextual information about the fieldwork sites" so that they can judge the transferability, as suggested by Lincoln and Guba (1985). Shenton (2004) suggests a method that provides a substantial explanation of the phenomenon being studied and aids in the development of the framework in order to increase the likelihood of transferability. Because of this, the results can be considered for their transferability to other contexts in narrative research. I used this method in my research. As a method for checking the veracity of interview summaries, I used member checking within the group (Candela, 2019; Harper & Cole, 2012). These abstracts were written by me, using the same language and terminology as the interviewees themselves and quoting as many statements as I could find expressed in very concise sentences from each interview with a mathematics teacher. I opted for a summary approach because I wanted to make sure that teachers read everything and because I was worried about how much time interviews would take. I emphasized that teachers could improve the quality of their summaries by revising and enhancing them prior to and after reading their narratives. No professors, as far as I can tell, reworked their original accounts of

the interviews. This was done by comparing the interview summaries against the original interviews to ensure that the former accurately represented the latter and did justice to the subjects' experiences and perspectives (Scheurich, 2014).

As a researcher, I was similarly cognizant of the fact that every aspect of my output had to be of the highest possible standard. It is important to maintain quality standards in a study, as stated by Guba and Lincoln (1989). I used a story-based approach, or narrative inquiry as a research method. Moreover, I believe I have incorporated plot norms, one of the key elements of story, as narrative inquiry centers on the experiences of research participants compiled into narratives (Clandinin, 2013). I tried to capture the highs and lows of my participants' experiences in their narrative sketches (Lee et al., 2013). By focusing on temporality, sociality, and place, my research was able to fulfill narrative research requirements (Connelly & Clandinin, 2006). In addition, I intend to keep to the highest standards of methodological honesty, theoretical aim, and ethical conduct throughout the course of my research. Furthermore, it is imperative to engage in critical reflection regarding the three primary areas of focus in my narrative inquiry, namely time, society, and location, to ensure the attainment of consistent and high-quality outcomes.

Quality Ensuring of my Ph.D. Research Project

Subscribing collaborative autoethnography, my collaborators and I wrote about our personal experiences on a certain topic (Gal et al., 2013). We followed some principles that help us to write in a way that is honest, respectful, and insightful (Chang et al., 2013). We shared our stories with each other, reflected on them together, and tried to understand what they meant and how they were related to each other. We looked for un/common themes and insights that emerged from our stories (Dahal & Luitel, 2023). Overall, collaborative autoethnography is a research method that involves working with others to reflect on our personal experiences and write about them. It is a way of doing research that is relevant and meaningful for our times (Roy & Uekusa, 2020). In my collaborative autoethnography, I respect the diversity of perspectives and experiences that collaborators and critical friends brings to the project wherein I did not follow rigid rules, but rather some guiding principles that helped me to conduct ethical and rigorous research. I have chosen a topic that resonates with me and my collaborators, and I was open to learning from the process of inquiry. I worked together with my collaborators to analyze data and to explore the deeper meanings and implications of my stories (Arnold & Norton, 2021). I also seek feedback from a critical friend who can challenge and support me in my meaning making process.

With above, my Ph.D. research study aimed to envision science, technology, engineering, arts/humanities, and mathematics (STEAM) based mathematics education and critically assess my own lived experiences within collaborative autoethnography as a research approach. For this, I embraced multi-paradigmatic design space (Luitel, 2009; Luitel & Taylor, 2019; Qutoshi, 2015; Taylor et al., 2012; Willis, 2007) under transformative STEAM-based research. Likewise, different perspectives of criticalism, postmodernism, interpretivism, and integralism paradigms further embraced my ways of exploring, interpreting, and meaning-making my perspectives.

I used criticalism to critically reflect on "myself" and others for identifying and changing socially changing from to unjust structures, beliefs, and practices referred to as deep democracy (Kincheloe & McLaren, 2000) in my field where I was engaged. I do this by examining existing mathematics pedagogies and imagining STEAM-based mathematics education. In my research context, as a critical researcher, my role incorporated advocacy and/or other forms of active engagement (Taylor et al., 2012) as a change agent. Likewise, the

critical paradigm is the key research paradigm that informs me to be critical about our traditions, thoughts, and actions and give rise to conscious awareness to be prepared for envisioning new perspectives and practices. Thus, the paradigm of criticalism helped me to empower myself and others during the research study. However, due to the limitation of criticalism, I offered postmodernism paradigm as a supportive paradigm in my research to be more expressive to relate to minds and hearts for the representation of my/others' thoughts and feelings through various forms of genres.

I used the postmodernism paradigm as a window through which I can peer into others' minds and hearts through subjective lenses in order to capture inaccessible and ineffable everyday realities (e.g., beliefs, attitudes, values, emotions) and present them using various modes of logic and genres (Luitel, 2012, 2019; Qutoshi, 2015). Some of them were dialectical, poetic, narrative, and metaphorical. Similarly, the postmodern research paradigm enriches the autoethnographers with a diverse repertoire of modes of inquiry by incorporating pluralism and vitality (Taylor et al., 2012). The new forms of representation—literary and visual imagery—helpful in my inquiry to explore my lived and living experiences while developing evocative narratives for envisioning STEAM-based mathematics education. However, I also used the interpretive paradigm as a supportive paradigm to reflect upon my actions and meaning making.

Cohen et al. (2011) argue that interpretivism can be used to investigate human behavior because it enables researchers to comprehend the significance of human action. Further, Cohen et al. (2011) contend that interpretivism can assist researchers in understanding why people behave as they do and identify the factors that influence behavior. This indicates that the interpretive research paradigm in my collaborative autoethnographic inquiry demands the interaction with myself and my research participants in all aspect of the research process, which helps to reflected upon my and research participants' actions thereby interpret the multiple realities for meaning making (Pant, 2015, 2019; Shrestha, 2018). In this line, the interpretive paradigm in my collaborative autoethnographic inquiry was helpful for generating a context-based understanding of myself and my research participants' thoughts, beliefs, values and associated with social actions (Qutoshi, 2015; Taylor et al., 2012). As a result, I got the chance to exercise the interpretive research paradigm to envision STEAM-based mathematics education. As an interpretive researcher, in-depth descriptions and interpretations are necessary to understand the phenomenon but not limited to myself. Hence, I was engaged into a deeper understanding of the phenomenon to envision STEAM-based mathematics education. However, I used integralism as a supportive paradigm to enable me to envision holistically the craft stories of my professional experiences that are interpreted subjectively.

Integralism paradigm as an enabler for envisioning holistically transformative STEAM-based mathematics education. This holistic view from different perspectives and theories within the paradigms of criticalism, postmodernism and interpretivism enabled me to reflect on and capture a wider meaning of educational practices in STEAM based mathematics education by offering possible alternatives to my research issue (Qutoshi, 2015; Taylor et al., 2012). Likewise, reflection enables me to think holistically about alternatives to construct the vision of STEAM-based mathematics education. In the process of capturing a wider meaning, I used multiple logics and genres, imagination and perspectival language while narrating my lived experiences (Taylor, 2015) aligned to my collaborative friends. These writing processes enabled me to use the metaphor of knowing as reconceptualizing self that opened my views and provide an opportunity to critique my "self" (Luitel & Taylor, 2013). In this way, the integral view of my inquiry offered me to employ multiple logics and genres, imagination and perspectival language to crystallize my questions in fostering envision of STEAM-based mathematics education.

In the process of ensuring the quality of Ph.D. research, the quality of my research was regulated by comparing various forms and/or layers of data. These data were achieved and/or demonstrated throughout the research process to multiple research paradigms through collaborative autoethnographic inquiry by enabling me to cultivate pedagogical as well as professional possibilities (Qutoshi, 2015). Logics such as dialogic, poetic, metaphoric and narratives were some forms of data layers generated through multiple research paradigms using collaborative autoethnography. Likewise, these forms of logics and genres held six quality standards (Luitel, 2012; Qutoshi, 2015; Taylor et al., 2012), which were more feasible for my collaborative autoethnographic inquiry:

Incisiveness as focus on significant issue, illuminating as cultivating subtleties, verisimilitude as likeliness, transferability as viability, pedagogical thoughtfulness as evoking readers and critical reflexivity as transformative process; are dialogical logic for complimentarily, metaphorical logic for multi-schema analysis and envisioning, poetic logic and genres for unpacking ineffability, narrative logic and genres for diachronic representations and nonlinguistic logics. (pp. 107-109)

To address quality standards from the perspectives of multiple research paradigms in my collaborative autoethnographic inquiry, credibility and transferability in interpretivism; pedagogical thoughtfulness, critical reflexivity, and ideology critique in criticalism; and illuminating, and verisimilitude in postmodernism and holism in integralism are considered (Luitel, 2012; Luitel & Taylor, 2019; Taylor et al., 2012).

Credibility as a quality standard of interpretivism with the question; how can you believe me as an autoethnographer? For this, to ensure the process, possibly persuasive in every situation, to account its believable and appropriateness among myself and others (Mills et al., 2010). Likewise, this quality standard is side by side, demanding for honesty to be ensured by myself as an autoethnographer as a result my visibility and intentions be exposed openly in the research (Dauphinee, 2010). The collaborative autoethnographic inquiry as a research methodology aims to do precisely what is usually taken for granted or excluded from the research to ensure its legitimacy (Chang et al., 2016; Dahal & Luitel, 2022; Dauphinee, 2010).

Transferability as another quality standard of interpretivism with the question; how can you value usefulness to others (Luitel, 2012) of my entire research process? Thus, the transferability in my collaborative autoethnographic inquiry, attempted to provide rich details of the context, events and movements that I have experienced while implementing the research process, as a result, readers recognized the transferability of my research process to their context. Likewise, my vision for STEAM-based mathematics is helpful for the readers.

Transferability appears to be parallel to internal validity in post positivistic research studies (Bryman, 2016) and it is the usefulness of the research in similar other contexts or scenarios. This is a quality standard of the findings of a research inquiry which might be applicable, to a greater degree, to another situation if the research studies are done using the similar methodology. In the case of collaborative autoethnographic studies, the presented narratives might have the characteristics to evoke readers to adopt the findings in similar other contexts. So, the usefulness of these narratives can clarify another similar context (Ellis, 2004).

In the case of my research, I have used stories, vignettes, and conversations of my lived experiences to evoke the readers to think/apply the usefulness of the findings in similar contexts. In doing so, I tried to ensure the feasibility or viability while presenting the discussions throughout this inquiry and tried to be as practical as possible. I have ensured that the people such as learners, teachers, teacher educators, and other stakeholders who have

interacted with my research will find the usefulness of the inquiry I have presented in their personal and professional contexts.

According to Guba and Lincoln (2005), the usefulness of one research activity or findings of one research study can be transferred to another context or setting by identifying what sorts of similarities and dissimilarities between the researched and would-be researched site. Bryman (2012a, 2012b) has considered this quality standard as the external validity related to a tendency to implement the findings or results in general aspects. Further, the degree of usefulness of the epiphanies presented by the researcher cannot be tested as the laboratory experiment through random samples of the respondents. It is through the readers who truly can find out whether the presented stories or events resemble their own experiences or about the lives of other individuals they know. In this regard, Pant (2015) has argued that this idea of transferability is not the “replication” and “generalizability” rather it is about the adaptability of research aspects in a similar contextual setting.

Considering the aspects of transferability, my collaborative autoethnographic inquiry has included various stories, vignettes and narratives of my lived experiences aligned with my collaborators in different periods of time and contexts. These narratives are crucial and helpful for others (readers) to understand similar contexts and find out the possibilities of those findings or results in those contexts (Ellis, 2004). Obviously, the problems and possible solutions may not be cent percent transferred into another context, but searching for some resemblance and with some contextualization, these alternatives might be helpful to the readers and academic practitioners. Due to this reason, I tried my best to present the real contextual scenario as thoroughly as possible.

The quality standard of pedagogical thoughtfulness under criticalism with the question; how would you reflect and examine your existing practices as a teacher, parent, school leader and researcher? Thus, the pedagogical thoughtfulness in collaborative autoethnographic inquiry helped me to become aware of deep-seated assumptions guiding their values (Luitel, 2012; Taylor et al., 2012). Likewise, I attempted to generate evocative, perspectival and multiple genre-based texts for readers to engage in my research process and to make them conceptualize my vision for STEAM-based mathematics education. That helped the readers to engage in my research texts and reflect upon their perspectives.

Next, when I interacted with the term, pedagogical thoughtfulness, oftentimes, I started becoming more thoughtful about the usefulness of my research in the context of teaching and learning. While doing so, I needed to critically reflect upon my beliefs, values, and teaching and learning practices that make me pedagogical thoughtful (Van Manen, 1991, 2016). When people (learners, teachers, teacher educators, etc.) do this, they are empowered to be aware of their practices that lead them for pedagogical transformation. Pedagogical thoughtfulness increases the likelihood of teachers and teacher educators becoming aware of the deep-seated assumptions guiding their beliefs and practices (Luitel, 2009). So, my standpoint in this research is to make readers think and reflect critically on their beliefs and values to be aware of their practices.

Thus, I value that the agenda of every educational research should be making people aware in the field of education. Therefore, I ensure that the quality of being pedagogically thoughtful throughout this research with my lived experiences constituting the values, beliefs, and assumptions from the broader spectrum of education. Moreover, through this research, I aim that education leaders should be the agents of change (Luitel & Taylor, 2019; Pant, 2019). To ensure pedagogical thoughtfulness, I presented multiple forms of genres and arts-based representations (pictures, models, etc.) concerning my envisioning of STEAM-based mathematics so that readers can connect their lifeworld better and be pedagogically thoughtful. Moreover, I tried to include some evocative, thoughtful, and thought-provoking questions that

might be helpful for readers to think and make critical self-reflection which might result empowering actions.

The standard of critical reflexivity entails to become critically aware of the limitations of my chosen epistemological stance(s) and personal and methodological concerns shown in my reflexivity notes/insights, and theoretical referents by exposing as well as being conscious of my subjectivity (Palaganas et al., 2017; Shrestha, 2018). Drawing on Luitel (2009, 2012), Taylor et al. (2012), and Shrestha (2018), the critical research paradigm, I maintained the quality standard of my research through critical reflexivity by (i) making the process of interpretation visible to readers; (ii) critically reflecting upon my assumptions; and (iii) consciously and critically reflecting upon my evolving subjectivities throughout the process of the research inquiry.

I have used criticalism in my inquiry, which allowed me to think critically, raise questions against it, and reflect upon my and others' cherished values, beliefs, and practices. The taken-for-granted practices, assumptions, hegemonic traditions, and socially and politically exaggerated ideologies seem to promote disempowerment. Doing so ensures that readers, me, collaborators, and critical friends become aware of these things, thereby practicing empowerment in our context. This is also about transforming the practices for empowerment and emancipation. Reflexivity is “an ability to notice our responses to the world around us, other people and events, and to use that knowledge to inform our actions, communications and understandings” (Etherington, 2004, p. 19). We can see our actions through critical perspectives when we include the critical component in this.

Being critically reflective means being conscious about what/how/why we did/do those practices and making a change in the future attempts by being critically aware and realizing how we/I can improve our practices (Whitehead, 2008). In this, critical reflection is a fundamental thing to being a reflective practitioner. In this research study, I ensure that critical reflections on my unfolding experiences and practices make me and my readers aware for moving towards inclusive and holistic practices. I am guided by Brookfield's (1999, as cited in Pant, 2015) concept of three different phases of critical reflection. First, I identified those embedded assumptions. Second, I assessed those assumptions regarding my practices. Finally, I developed and envisaged more empowering assumptions (note: you can identify these throughout this research inquiry). In this way, I ensured the quality standard by adopting critical reflexivity in my research.

Critical reflection is a matter of “stance and dance” (Brookfield & Preskill, 2016) and a distinguishing attribute of reflective practitioners to be oriented towards transformation (Larrivee, 2000). In this regard, I have taken my role sincerely as a reflective thinker by re/examining my personal and professional belief systems as well as deliberate consideration of the ethical implications and impact of practices. The basic orientation of my collaborative autoethnographic inquiry was towards the critical reflection of my deep-seated beliefs, values, hegemonic practices, and my ongoing practices. Including criticalism as one of the research paradigms for my research study empowered me to take a critical stance on those beliefs and practices which were and have been taken for granted.

The quality standard of ideology critique under criticalism as a learning process crucial to the realization of the phenomenon focuses on how learners recognize and challenge the ideological domination and manipulation (Brookfield, 2001; Taylor et al., 2012). Thus, in my collaborative autoethnographic inquiry, the ideology critique helped to become aware of the learning process and assumption. Consequently, I attempted to generate evocative, perspectival and genre texts for readers to engage the participants in my research process and to conceptualize my vision for STEAM-based mathematics. That helped the readers engage in my research texts and reflect upon their perspectives as a learning process.

Illuminating is the process of enriching and making more complex meaning of issues of my collaborative autoethnographic inquiry, the quality standard of illuminating under postmodernism, illuminates significant research issues by accounting enrichment, vividness and complexity. Likewise, the accounting is done through narrative, reflective, performance, poetic and non-linguistic logics, and genres (Luitel, 2009, 2012; Taylor et al., 2012).

Verisimilitude is the quality standard of appearing to be true or real, which informs me to articulate my stories and vignettes to be more believable and/or lifelike, as a result, the readers will be engaged by connecting to their own phenomenon. Likewise, adhering to the quality standard of verisimilitude under postmodernism, I wrote narratives, vignettes and stories using different genres to make my research texts realistic, plausible, or believable to the readers (Taylor & Medina, 2011). Subscribing writing as/for an inquiry encourages me to describe the phenomenon thickly. In this line, verisimilitude supported making my writing more evocative and imaginative.

Verisimilitude is whilst reading and listening to some of the other's stories and narratives, I became thoughtful and mindful in linking them with my living world. Sometimes, I try to be an actor in the presented narratives as if they were written for me. I try to imitate the dialogue and creatively imagine the scenes. This happens when the narratives have an element verisimilitude or when the author(s) has/have integrated lifelikeness in their stories and narratives. Something similar happens when it comes to the world of postmodern arts-based research. Simplifying the terms verisimilitude, it is likely to be like the life of people or lifelikeness or believable.

In a great degree, it encompasses the meaning of being very similar, true, or real. The term, "verisimilitude," first was coined by Karl Popper (1902–1994) in the philosophy of science. However, it has been spread in qualitative inquiry. It is used as a criterion (others include plausibility, internal coherence, and correspondence to readers' own experience) which is important for judging narrative inquiry, as a criterion for making judgments about the evocative power of authenticity of a textual representation, and as the relationship of a particular text to some agreed-on standards of a particular interpretive community (Schwandt, 2014). In the context of postmodernism, I maintained various genres of writing to present the analysis. This helped my readers connect their lifeworld more with the context I presented in my study.

In the case of collaborative autoethnography, Ellis (2004) argued that autoethnographic texts achieve the quality of verisimilitude as they evoke a feeling that the experience described is lifelike, believable, and seemingly possible. This refers to readers' inquisitiveness to inquire questions and make possible doubts for them to engage throughout the stories. The degree of connectedness to evoke my readers to engage with my narratives and to be an actor in the presented stories, I provided intense descriptions (in a more evocative and emotional form) of my experiences, thereby including a thorough description of the plots, contexts, people, and even involved in my stories, vignettes, and conversations to make narratives as real as they were. Throughout my narrative presentation, I happened to speak in multiple voices to my stories, making them more engaging, interesting, illuminating, and evocative to the readers (Pant, 2015, Dahal & Luitel, 2023).

Likewise, verisimilitude is the "lifelikeness" or believability of the narratives. According to Luitel (2009), the quality standard of verisimilitude is a radical shift from the positivistic research standard of objective truth. Ellis (2004) suggests that autoethnographic narratives need to contain the quality standard of verisimilitude which has the genuine quality of inducing the feeling that the incidents or epiphanies presented are lifelike, believable, and possible in a real-life context.

In this portion, I used the postmodern approach's verisimilitude quality standard to include situations and insights that readers would find credible (Taylor & Medina, 2011).

Further, these aspects provided me with space to present my stories and events through multiple voices. I have made detailed and thick descriptions of my stories and experiences, including places, context, and people who are in/directly involved there. Moreover, by maintaining the quality standard of verisimilitude, I have unpacked my various pedagogical experiences and contradictions in the form of stories and narratives honestly and truthfully so that the readers, collaborators, and critical friends can judge the truthfulness of my stories by relating them to their contexts and socio-cultural practices. In this way, I have presented my narratives in a way I can so that others such as collaborators and critical friends can connect these narratives to their various personal and professional contexts.

My Reflections

My research methods have led me to identify some useful quality criteria that, if followed, would allow for a streamlined and informative assessment of qualitative results. Criteria shall be especially helpful for dissertations, theses, and articles that use one of the many common qualitative data collection methods, such as interviews, focus groups, document analysis, or in-depth observation (alone or in combination). I suggest that they publish and disseminate their findings as articles to enhance the rigor and clarity of their research. Authors can assure reviewers and readers have faith in the study's rigor and findings by adhering to the quality criteria as I outlined and employ in master's, M.Phil., and Ph.D. degrees.

Similarly, this article outlines some of the essential 'quality criteria' that indicate high-quality qualitative research based on my own experiences conducting such research. To improve the overall quality of a qualitative study, it is important to provide a detailed account of the research process, including the research's context, objectives, questions, and design; theoretical underpinnings; data collection and analysis methods; findings; conclusions; and careful alignment. Thus, qualitative research and the quantitatively oriented natural sciences use different indicators, and so do different qualitative methodologies.

There is an increasing call for the qualitative research community to create and implement consistent mechanisms for the quality assurance of qualitative research. This article's approach to quality assurance has improved our understanding of quality assurance as a concept and points the way toward fruitful next steps. However, the debate over qualitative methods in education research also raises questions about the broader conceptualization of quality in qualitative research and the representation of different qualitative disciplines and paradigms. I propose creating a flexible framework for qualitative researchers to help define, implement, and justify quality research principles and rigor of the research process while reporting qualitative studies.

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