Online Dynamic Asynchronous Audit Strategy For Reflexivity in the Qualitative Paradigm

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The trustworthiness of a qualitative study can be increased by maintaining high credibility and objectivity. Of utmost importance to these factors is the reflexivity of the researcher. Standard journaling techniques are frequently used to maintain an audit trail and document tentative interpretations of a study. One of the major limitations to paper-based reflexivity is the lack of regular audit feedback. Online blogging tools can facilitate reflexivity and subsequent auditing with ease. Blogs are potentially cost-free, and only a rudimentary understanding of a web browser and word processing program are necessary for effective use. Moreover, blogs provide a simple, contiguous interface for an effective auditing process. An analysis of a reflexivity blog and subsequent audits is examined here. Findings indicate that the multiple perspectives of the auditors gave additional insights and that might not normally be considered by a researcher, providing a multi-arrayed perspective to interpretation of a study data set. Key Words: Reflexivity, Blog, Data Audit, Qualitative Inquiry, and Case Study

Qualitative research is based on the nature of ill-conceived problems: there is an open-endedness to the field of study (Kleinsasser, 2000). Since qualitative research focuses on interpretation and emerging design, there is no predetermined format for design and data collection (Merriam, 1998; Russell & Kelly, 2002; Stake, 1995). Depending on the nature of the research question, various models of study can be employed. For example, a case study might be appropriate for focused site-specific study on literacy strategies used in the classroom of a primary school teacher, while a phenomenological study might examine general practices that inhibit or enhance school effectiveness. Moreover, an ethnographic approach might be more relevant for a broader study of children's language development and use in different cultures. However, there are underlying methodological techniques that underpin the qualitative paradigm. Therefore it is critical for researchers to be mindful of trustworthiness when conducting a study.

In order to maintain high trustworthiness in a qualitative study, Krefting (1991) suggested four criteria to ensure valid interpretation of data: truth value, applicability, consistency, and neutrality. In the qualitative approach, truth value is measured by credibility: having an adequate engagement in the research setting so recurrent patterns in data can be properly identified and verified. Applicability is established with transferability: allowing readers to be able to apply the findings of the study to their own situations. Transferability is different than generalizability, as a qualitative researcher is often unlikely to make blanket application of research findings to larger populations. Consistency in a study is enhanced by dependability: knowing that the patterns and themes that emerge from data are repeatable and replicable. Finally, neutrality ensures

confirmability. This is not necessarily researcher objectivity but rather an external verification of findings. Since a qualitative researcher's perspective is naturally biased due to his or her close association with the data, sources, and methods, audit strategies can be used to confirm findings (Bowen, 2009; Miller, 1997). It is critical that the researcher engage in robust and diverse strategies to audit emerging data, both through self-reflective and external audits (Rodgers & Cowles, 1993). Therefore, trustworthiness of (a) interpretations, and (b) findings are dependent on being able to demonstrate how they were reached (Mauthner & Doucet, 2003).

One of the key tenets to trustworthy qualitative research is high quality reflexivity. Reflexivity, as defined by Schwandt (2001), is "the process of critical self-reflection on one's biases, theoretical predispositions, preferences," an acknowledgement that the "inquirer is part of the setting, context, and social phenomenon he or she seeks to understand . . . and a means for critically inspecting the entire research process" (p. 224). Often taking the form of a handwritten journal, reflexivity is the opportunity for researchers to understand how their own experiences and understandings of phenomena affect the research process (Morrow, 2005).

Reflexivity is connected to action and a part of the interpretive process in which participants and the researcher are engaged. Since knowledge does not correspond to an objective reality, but rather is socially constructed within the community of practice, reflexivity is intersubjective because it develops from the interaction between researchers and the sources and methods of data (Colombo, 2003). Therefore, trustworthiness increases when researchers delineate how findings reflect their own personal milieu (Hall & Callery, 2001). Reflexivity provides the rigor that makes data more transparent.

Reflexivity encourages researchers to determine their positionality, identifying personal and theoretical commitments that can be critically examined and evaluated. Quality reflexivity identifies intentions, mistakes, and new learning and simultaneously creates physical evidence of personal and theoretical pathways (Kleinsasser, 2000). There is evidence that reflexivity leads to an unlearning of preconceived personal and theoretical commitments because of the emerging trends in data that lead to new connections (Behar, 1996; Rosaldo, 1989; Shalinsky, 1991).

Reflexivity is designed to be a self-critical method for determining the impact of previous experiences and knowledge. It allows the researcher to acknowledge the influences of a variety of genres and styles of information. The challenge for the researcher is to avoid bias of preconceptions, personal interests, or limits (Sullivan, 2002). Reflexivity increases sophisticated understanding of research methodology. It allows for the development of a thorough, concise, and elegant conceptual framework with a systemic, yet flexible, and potentially emergent, research design (Marshall & Rossman, 1999). Reflexivity increases trustworthiness because it helps to clarify thinking, values, purpose, and beliefs (Watt, 2007).

Bogdan and Biklen (2007) classify the content of reflexive actions into six categories: (a) reflections on analysis, where researchers speculate about what is being learned, as well as the emerging themes, patterns, connections between data sources; (b) reflections on method, where researchers examine procedures and strategies, decisions about study design, and problems with data sources; (c) reflections on ethical dilemmas and conflicts; (d) reflections on the observer's frame of mind, where researchers provide interpretations of the preconceptions associated with a study and its evolution; (e)

encounters that occur that provide new ways of thinking about prior assumptions; and (f) points of clarification. Common to all categories is the understanding of the relationship of the researcher to the sources of data and the evolution of the interpretation and analysis. Effective reflexivity allows researchers a unique frame of reference through an ongoing record of experiences, reactions, and emerging awareness of assumptions or biases (Morrow, 2005).

Ultimately, the effectiveness of reflexivity is dependent on confirmability. Confirmability is enhanced by audits conducted by external reviewers. Russell and Kelly (2002) state, "Reflexivity requires that we suspend our judgment, our propensity for foreclosed inquiry, and our enthusiasm for the early answers that usually seem to present themselves" (p. 10). While researchers use reflexivity to keep an ongoing record of experiences, reactions, and emerging awareness of assumptions or biases, consulting with auditors allow an outside source to serve as mirrors, devil's advocate, or muses for potential alternative interpretations (Hill et al., 2005; Hill, Thompson, & Williams, 1997; Morrow, 2005). Both metacognitive and external review of reflexivity provide an open, yet systematic, manner to examine discursive possibilities as ideas and concepts emergence from data. Reflective writing does not only record thoughts, but promotes more critical thought (Raven, 2006; St. Louis & Barton, 2002). The written form allows for both self and external evaluation for the purpose of further manipulation and interpretation of data.

The content of reflexive documents should demonstrate that the researchers are both active participants in and responsible for the research outcomes of a study. To verify potential outcomes, researchers can and should use a community of practice to engage in critical discussions and discourse (Rossman & Rallis, 2003). For that reason, multiple readings or interpretations of reflexivity from various sources can provide researchers with the necessary, critical feedback to enhance and elucidate emerging data themes.

A Novel Approach to Reflexivity

The challenge for the researcher is to develop reflexivity strategy that is simple and easily accessible, both to the researcher and external evaluators. I make an epistemological assumption that reflexivity is based on the researcher's situated intellectual and emotional reactions to others which therefore constitutes knowledge construction. This assumption is based on a theoretical framework of situated cognition learning (Brown, Collins, & Duguid, 1989) where the social construction of knowledge occurs best in a community of practice. Therefore, conducting a qualitative study not only requires the interaction of the researcher and subject, but necessitates critical feedback with compatriots knowledgeable in the study's theoretical and conceptual framework as well as the methodology.

I have a personal bias towards the positive effects of using web technology to advance intellectual pursuits and therefore chose to use a blog as a reflexive journal. A blog, or weblog, is a personal chronological online journal record of thoughts, beliefs, and activities that has interactive commenting features for both the writer and readers. I have frequently used web tools like blogs and wikis as part of my instructional tool bag when teaching and working with students. Although many researchers approach

reflexivity from a handwritten journal, there are potential advantages for utilizing an online electronic medium.

I conducted an overarching research study utilizing a multicase qualitative approach organized within a situated cognition framework (Brown et al., 1989) that examined cognitive structures associated with the development of ideas (problem finding) of students conducting open inquiry science research projects (LaBanca, 2007). These high-performing high school students were recognized for their outstanding science and engineering research both at the state and international level. They served as models to extrapolate the creative behaviors and strategies used for determining effective, relevant problems for study. As part of the problem finding study I engaged in reflexivity utilizing a blog (LaBanca, 2009) as the writing medium. As a follow-up, I decided to examine my own personal reflective behaviors that occurred within that study.

The purpose here is to discuss my reflexive behaviors that occurred during the overarching problem finding study and the benefits associated with the use of the blog as a reflexivity tool. This subset of the original study is a single case study representing an analysis of my own reflexivity. Being a self-reflective examination of the reflexive process, it is thus metareflexive in nature. The analysis is intended to be explanatory in nature and seeks to explore and better elucidate the value of reflexive blogging. Through the analysis of the reflexive documents, this strategy identifies potential and "plausible causal networks" that shape and inform reflexive behaviors (Marshall & Rossman, 1999).

By design, a blog posts entries in reverse chronological order. Therefore, the most recent entry appears at the top of the blog's webpage, with subsequent entries below. Each entry has a descriptive title followed by body text which describes the nature of the concepts explored. At the bottom of each post, the blogging software automatically stamps the time and date of the post and provides a hyperlink for comments. The auditor clicks on the comment link, a new window opens, which provides the reader with a text box to add a written comment. The auditor types a comment, clicks the submit (or similar) button, and his or her reply immediately becomes live, assuming the blog originator has settings permitting immediate posting. Subsequent comments are arranged chronologically for each entry on the same page. Comments are entry-specific, so each blog entry has its own unique set.

For the problem finding study, the online reflexivity journal blog consisted of 37 author-generated posts and 27 audit responses over the course of two years. These units of data were subsequently examined to better understand the reflexive process. The auditors were all members of the community of practice of educational teacher-researchers formally trained in both quantitative and qualitative methodologies. Each was engaged in a research project and was a practicing K-12 teacher. At intervals, auditors were invited to provide feedback to generated posts.

Content analysis and axial theme recognition was conducted on the posts and the subsequent audit feedback content analysis. From the analysis, four major themes emerged: (a) describing tasks, (b) concept building, (c) decision points and interaction, and (d) metacognitive actions.

Describing Tasks

One key feature of reflexivity is the need to develop thick, rich, descriptive insight into the attitudes, beliefs, concerns, and motivations of both the researcher and the subjects. Since there is a commensurate, ontological relation between researcher and subjects based on necessary interaction, there is a horizontality of knowledge and perception. The perceptions of the researcher take place in a system that moves with respect to other systems.

In order to best understand this interaction, it was critical to describe tasks, events, and actions. Since the study took place over an extended period of time (approximately two years), there was a need to clearly articulate the unfolding processes of the study as they occurred. The blog provided a simple, elegant audit trail which provided good consistency and dependability. Even the auditors' comments are catalogued, and chronologically organized.

Concept Building

As data began to emerge from the analysis of the blog posts, it became evident that much of the reflexivity was centered upon a theme of concept building which related subject behaviors to theoretical constructs. During pilot study interviews from the original problem finding study, it became very apparent that a situated cognition framework was an appropriate lens for study. Students engaged in high-quality authentic science and engineering research assumed the role of a neophyte scientist as a precursor to determining an appropriate and relevant topic for study. What was seemingly more striking was my perception of the embedded concept of cognitive apprenticeships, where students model the thinking and behaviors of the practicing scientist or engineer. In essence, the emerging data appeared to interweave with situated cognition learning theory (Brown et al., 1989). Within a reflective blog post, I wrote:

> I noted a very important element that both [students] thought were critical to their success: the opportunity to learn techniques, mess around, learn equipment, BEFORE actually conducting a study. Both students were given these opportunities by their mentors before a formal project was in place. Both thought the process was critical to their success because they had developed the necessary expertise to conduct a sophisticated project.

> This leads me to think about Brown et al., (1989) and the situated cognition model. In situated cognition, students learn best in an authentic setting working on real problems. OK, no problem, I thought this theoretical model was a fit with [this study] . . . But what stands out is the "cognitive apprenticeship" aspect. In order for students to be truly successful in a situated session, they must advance from neophytes or novices, to some level of expertise. (Frank LaBanca)

This development was reinforced and confirmed by the auditors. Since their responses were available to each other, there was a compounding of information and

ideas that occurred. They were able to build on each others' ideas, while providing their own specific expertise, to provide a more substantive, holistic analysis. Responding to the post above, the auditors offered diverse feedback to further refine the cognitive apprenticeship concept. Below are five different audits to the original post. Note that each subsequent audit has access and is able to read the previous comment(s), therefore there is relatively little repetition of ideas from different auditors and a robust collection of complimentary comments develop.

> I like the cognitive apprenticeship concept. It describes a learning process, which seems ideal for scientific inquiry. It also clearly relates to learning principles of prior knowledge access, as well as the constructivist approach. (Auditor 1)
>
> Antecedent knowledge of methods and tech uses would construct the foundation for and scaffolding of subsequent inquiry. An old saying comes to mind: "If all you know how to use is a hammer, then you will look at all your problems as though they were nails." Prior experience with apparatus and methods could promote thought along unique lines of inquiry as well as providing more efficient methods in conducting research. (Auditor 2)
>
> The successful results described by the students remind me of the experiments done by J. D. Gallagher (1998) and R. J. Stiggins (1994) where students were found to score better on tests that start out being easy and then increase in difficulty. . . The negative impact on the students' feelings of self-efficacy with tests that start by being extremely difficult is reflected in their sense of futility and unwillingness to try. Logically, the lack of effort leads to lower achievement. This scenario would be typical of students who felt overwhelmed when prematurely confronted with a tremendously challenging project. Conversely, it appears that during a cognitive apprenticeship, the students' perceived sense of self-efficacy (Bandura, 1977) is enhanced . . . According to Bandura (1986), one way in which efficacy information is gained is from experience. Therefore, when conducting a sophisticated project after having had some prior experience through opportunities to learn techniques, coping behavior will be initiated, and effort will be expended and sustained over time allowing the successful results so noted to occur. (Auditor 3)
>
> Learning from "masters" of the trade is a timeless practice that has been implemented throughout the ages in many societies. This model reminds us that many learners construct knowledge through engagement in authentic learning experiences (in situ); however, we also know that an additional component of learning is the need for scaffolding. The cognitive apprenticeship model allows a student to work with a known "expert" in an authentic environment. The responsibility for learning is gradually relinquished from the expert to the novice through a variety of

> scaffolding techniques . . . Great model for scientific inquiry and problem solving. (Auditor 4)

> And at the same time that the student is becoming familiar with equipment and techniques, he or she is also seeing how others working in the lab (grad students, post docs) are using same. Very important. (Auditor 5)

There is agreement among the responses which provides good confirmability, while at the same time, additional connections to alternative learning theory are provided to consider other perspectives. For example, Auditor 3 has a specific interest in social learning theory and self-efficacy. Her comments reflect the connection of her research to mine. All comments certainly help reduce researcher bias, which improves neutrality leading to more credibility. For example each auditor connects concepts of apprenticeships to learning: using scaffolding, increased learning through self-efficacy, relationships with mentors, and relationship with peers. Although these are unique concepts presented by each auditor, their collective wisdom provides a body of evidence that is more detailed, holistic, and networked well with the underlying idea that I discover about cognitive apprenticeships. Under these circumstances, the reflective process allowed for more social construction of knowledge. This socially-generated knowledge increases trustworthiness, because my ideas emerged and then were validated or rejected by multiple individuals.

Decision Points and Interaction

Certainly, the influence of others' comments leads to decision making. Alternative perspectives provided by those with similar expertise and understanding of the concepts being examined allows for the evolution of ideas. One of the frequent features to many audits were *agree and consider* comments. The auditor would agree with an idea, reinforcing its trustworthiness, but then would provide a point of consideration, which, in turn, widened my frame of thinking. This expansion of thought is critical, because it allowed opportunities for further reflection, now structured in a social-constructivist context. A powerful discussion emerged and continued beyond the scope of the written responses.

This process was further expounded upon when I considered how certain student behaviors are evident when they try to determine an idea for study. I generated a list of qualities, sorted under three axial headings, but an auditor suggested I expand my ideas by more systematically categorizing them. This suggestion was important, because it led me to a deeper examination of the data, resulting in a more comprehensive analysis. She writes:

> Your list seems to have the major components, but I would break each of them down, especially the student expertise area: management ability, organization of details, answerer. Also, I think the parts not dealt with in the final project become grist for thinking; they may arise later as a formal idea for a project. (Auditor 1)

By examining the data from different perspectives, especially ones that I had not originally conceived, but valued, I was able to maximize potential for neutrality. It was just as important to receive feedback that was ultimately rejected, because it still allowed for more in-depth reflective analysis. For example, an auditor wrote:

> Great idea for grouping data! Did any of the students' comments reflect their approaches (creative or task) as a step process? It would also be interesting to look at the words they used to describe themselves as reflective of their thinking process: circular, sequential step, or happenstance? (Auditor 2)

When I evaluated this comment, I reexamined the original data and decided that the students' comments were not reflective enough in nature to support the suggested categorization. Ultimately, he feedback provided, whether accepted or rejected, does not become an audit that takes place at some later point in the study, but actually occurs real-time, so ideas, concepts, and biases can immediately be examined. There is a feedback loop that occurs because of interactions with auditors. Emergent themes reflect interpretations that have been constructed socially.

Metacognitive Actions

Perhaps the most critical feature and outcome of high-quality reflexivity is the analysis of thought patterns. How is idea development influenced, confirmed, validated, or changed? For example, during a focus group audit of a set of study data from the overarching problem finding study, I noticed that a majority of experts concur with criteria that I have established for analyzing and categorizing information. There was general consensus and agreement, with very little dissention. However, I probed very carefully to ensure that the discourse was not being impeded by my own biases. The reflection indicated that although there was disagreement, the stronger consensus from the audit reflected the emerging idea. I simply state:

> All discussions about disagreements don't convince me to change anything. (Frank LaBanca)

I recognized that although some minor discourse occurred in the evaluation of data, there was no need to make any changes to the schema that had developed. Holistic data from the problem finding study, including the majority of the focus group supported the conclusions. The small variations provided by the focus group were determined to be trivial and inconsequential. I wrote about this as a blog post. Upon subsequent review of this schema, a reflexivity auditor provided comments that assisted in identifying that a thick description was necessary to clearly articulate the classification scheme that I had developed. Her comments indicated that my articulation for my concept lacked some clarity and required me to more extensively explain it, as indicated in the comment below:

> In great science you reach the "novel" solution level; in great art, "a masterpiece." What does this show? Levels of attainment? Levels of greater thinking? Allowing others to build upon this problem solving process? (Auditor 1)

Clearly the intentions for audit comments were to clarify my own reflexivity, however what is striking is how auditors also connected with their own interests and passions within the confines of my ideas. The influences and biases that affect their daily lives help them clarify their perspectives while providing alternatives for me to consider. For example, this auditor connects both his home life and critical thoughts to my examination of how students determine the value of a relevant problem to study. He states:

> [Nancy Drew] used a very logical approach to solving a mystery. To extend the metaphor even further (because I am reading the series with my daughter right now), we all approach problems and science like Nancy. Sometimes we are unsure of what the problem is unless it hits us over the head. Sometimes things seem chaotic until clues appear that help us put the pieces of the puzzle together. (Auditor 6)

Ultimately, the influence of external factors including past, present, and potential future experiences coupled with the socially-constructed knowledge provided by the interaction of the researcher and auditors, provided for a more focused analysis, which considered multiple perspectives of theory and practice. Metacognitive processes, especially those focused on looking for clarification, allow for effective process and change.

Benefits to Blog Reflexivity

A blog has many advantages for use as a reflexivity journal and thus is an effective tool for qualitative research. Blogs are available online, they are readily accessible, and are available from any Internet-available computer. Since they exist as an online journal, posts from the author as well as comments from auditors are accessible asynchronously. This provides a level of convenience for auditors, because they can access the document at any time, from virtually any location, provide feedback, which, in turn, becomes immediately available to the researcher, other auditors, and potentially, the virtual world at large. Since posted comments are visible to all, auditors have the ability to impact each other. Some auditors chose to elaborate thoughts from previous posts, and linked ideas from post to post. Blogs therefore promote diverse and connected thinking. A virtual research conversation can take place between many individuals.

Blogs are easy to use, are professionally attractive web pages, and only require rudimentary understanding of web browsers and word processors. There is no need for complex understanding of web programming. In addition, blogs are available at little to no cost to the user. There are preexisting blogging platforms that require only online registration. Those who host their own web pages can download free, mainstream software to power their blogs.

Since this study represents a single case, representing an analysis of my own thinking, those wishing to transfer this strategy should consider their predispositions to technology and their willingness to have self-reflective data available in an open format. Options do exist for levels of security to protect content from public access, however, I purport that an open format allows the most flexibility. Albeit, the nature of the research questions posed in the overarching problem finding study were more cognitive in nature and generally lacked sensitive or inflammatory information, especially at the synthesized reflexivity point. Therefore, there is a level of transparency with this form of reflexivity that is unparalleled since data and feedback are always available real-time. Ultimately, a researcher choosing to use a blog for reflexive purposes must evaluate the sensitivity level of the data and determine the precautions that are necessary to maintain appropriate levels of confidentiality. An open form of reflexivity that engages auditors at their own convenience is a sophisticated, meaningful strategy that promotes deep, thoughtful interpretation of ideas and concepts, leading to trustworthy interpretations.

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