ICT education practices in marginalized rural schools in South Africa: considerations for adequate sensemaking and practical immersion

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ABSTRACT

In this paper we put forward a basis for a debate on adequate and self-reflexive sensemaking in ICT4D social situations. To portray the idea (our value judgement) that everyone (researchers and research participants) needs development, self-reflexivity and practical immersion are discussed as concepts that should form part of ICT4D social inquiry. We build on Bourdieu's critical views on ÷adequate sensemakingø and ÷practical immersionø in social situations, but also draw from work on hermeneutics, Phronetic social research, ethnography, critical reflexivity, and a view on social linguistics to firstly construct our argument for alternate methodological considerations that prioritizes virtuoso expertise that is aligned with the critical paradigm, above analytical scientific knowledge and technical knowledge or know-how. Secondly, we test these emerging ideas with self-reflexive and self-conscious conversations presented in the form of narratives (demonstrations of virtuoso expertise) about our involvement in a rural marginalized high school in a remote district in the Eastern Cape province of South Africa. We focus specifically on the sensemaking context created by our presence in the community and we argue that for ICT4D social inquiry to truly matter (i.e., to be adequate), it should stop valuing attempts to try and mimic natural sciences and appeal for methodological accountability only. We further argue that adequate sensemaking and social inquiry cannot be divorced from seeking some form of experientially-based immersion on the part of the researcher. Based on the research, we recommend increased attention to local context, particularly community tensions; researcher use of conscious sensemaking through reflexivity; people-orientation along with experiential learning; all of which should be considered for future ICT4D work in developing environments.

Keywords: Self-reflexivity, ICT4D projects, Virtuoso Expertise, Critical Research

INTRODUCTION

The purpose of this paper is to put forward a basis for a debate on adequate and self-reflexive sensemaking in ICT4D research. Education is used as an originating disciplinary point of departure, because it is generally assumed that in education situations, everyone needs development (education) and not just the so-called ₌developingø group. We also believe that ICT4D, a sub-discipline of Information Systems (IS), is about social change and therefore some form of activism applies to it (Steyn, 2015). We thus draw from critical theory to help us understand how to apply ICTs to do ₌4Dø (for development) that is about socially relevant change and about making the world a better place (Steyn, 2015; Desouza, et al., 2007; Walsham and Sahay, 2006; Avison et al., 2008). To portray the value that everyone needs development, even those outsider researchers and practitioners who may be assumed to be ₌developedø and who may be doing the developmental work, self-reflexivity and practically immersed learning are discussed as concepts that should form part of adequate sensemaking. We further unpack the idea of adequate sensemaking by drawing from Bourdieuøs critical lineage. We argue that sensemaking is not adequate if it does not also require some form of practical immersion, self-reflexivity, and self-learning (development) on the part of the researcher-practitioner. In line with a critical orientation to knowledge, we also argue that sensemaking in ICT4D situations often entails dealing with different worldviews (Walsham and Sahay, 2006), and therefore sensemaking will benefit and be more adequate if different worldviews (especially those of the researchers) are incorporated and interrogated as part of self-learning and self-reflexivity (Stahl, 2006; Krauss, 2013). Using Gee (2008), we equate adequate sensemaking in ICT4D situations to both *acquisition* and *learning* on the part of the researcher; that is, to both *socializing into* (acquisition) the ICT4D social situation and *conscious self-reflexivity* (learning) about the social situation, i.e., self-reflexivity in the sensemaking context. Finally, drawing on Flyvbjergøs (2001) work on Phronetic social research, we suggest that virtuoso expertise and value rationality, aligned with the critical agenda, should be prioritized above analytical, scientific knowledge and technical knowledge or know-how; i.e., for ICT4D social inquiry to truly matter (i.e., to be adequate), it should stop valuing attempts to mimic natural sciences.

The gist of our contribution, however, originates in a debate among critical researchers on what constitutes a critical research methodology in IS, and especially work by Myers and Klein (2011), Cecez-Kecmanovic (2011), Avgerou (2005), and McGrath (2005). In Cecez-Kecmanovicøs (2011) argument or quest to pin down a critical research methodology in IS, she says, citing Neuman (2006), that; õDemonstrating that the critical research paradigm can be characterized by a distinct critical methodology is important given that methodology is one of major determinants of the identity of a research paradigmö (p. 441). Cecez-Kecmanovic (2011) cautiously also notes that methodology in the critical philosophy is more than method and should be õunderstood as an overall strategy of motivating, conceptualizing and conducting an inquiry, engaging with studied phenomena and subjects/objects in their contexts, as well as constructing and

justifying socially relevant knowledge claims.ö (p. 441). Although Cecez-Kecmanovic (2011), Myers and Klein (2011), Walsham (2005) and others argue that critical research is agenda driven and that that agenda prioritizes emancipation, empowerment, values, ethics, and so forth; none of them have explicitly suggested abandoning the subconscious belief that for critical research to be considered a fully-fledged and accepted research paradigm in IS, like Positivism and Interpretivism, it has to demonstrate methodological accountability. All of them have hinted toward the idea though; a notable example is where Avgerou (2005) questions McGrathøs (2005) emphasizing of methodological accountability in critical research to the detriment of researchersø õtacit knowledge, emotions, and moral and political convictionsö (p. 103), noting that doing so may inhibit criticality. Whether she realizes it or not, Avgerou (2005) is quite close to arguing along the lines of Phronesis and value rationality (Flyvbjerg, 2001). Our view is that Phronetic social science as Flyvbjerg (2001) presents it, offers critical researchers the liberty to break away from ÷paradigm templatesø established by Positivism, Interpretivism, and natural sciences, to truly be more agenda driven (i.e., prioritizing criticality, interests, and practical value rationality) and use methodological guidelines as õcautionary indicators of directionö (Flyvbjerg, 2001: 129) to support the agenda; something echoed also in Myers and Klein (2011). Interestingly, Myers and Klein (2011) highlight Foucault as one of the key critical theorists to consider in critical IS research, while Flyvbjerg (2001) notes that his work is considerably sparse regarding methodological considerations and guidelines; so maybe one should look at the ÷paradigm templatesø offered by him and other critical theorists to guide the establishment of an identity.

The setting in which we test these ideas is a series of self-reflexive conversations about our involvement in a rural marginalized high school in a remote district in the Eastern Cape province of South Africa. In this setting, we reflect on the considerations introduced above and on how our engagement in ICT education in this community unfolded in practice. Hence we reflect on the collective experiential-bases that we brought into social inquiry and on how we changed and adapted our practices (learned and acquired) as a result of engagement.

The background purpose of this study was to teach high school learners computer applications and technology as conceived by the South African education requirements. The purposes of this particular research were, in the teaching context, to determine the nature of local tensions and their effects on our engagement; to make sense of classroom interactions through self-reflexivity and sensemaking activities; and to seek to develop effective responses for the teachers in their paying attention to the tensions and their understandings of classroom experiences. These issues are important from a theoretical perspective in that sensemaking research found to date does not address developing country, rural teaching contexts; we thus extend the discourse relating to sensemaking in ICT4D and education.

Our research therefore aims is to understand how adequate sensemaking and practical immersion should take place given the context of ICT education in rural marginalized schools and communities in tension in South Africa. Three research questions follow:

1. How does the Phronesis argument allow us to more adequately explain sensemaking practices in critical ICT4D research?

2. How does practical immersion and virtuoso expertise aligned with a critical research agenda assist in adequate sensemaking?

3. How does adequate sensemaking unfold in multi-worldview research situations?

To answer this research question, we present our argument as follows: In the next section, we provide a short overview of the ICT4D project background and rural ICT education in remote South African contexts. We then unpack the concept of sensemaking and the role of critical theory in defining sensemaking that is adequate. Thereafter we introduce our position (and a basis for further debate) with regards to adequate sensemaking in ICT4D social situations and what we mean by virtuoso expertise. Then, in line with the rationale of the Phronetic argument, two narratives are presented. In the first we present the idea of a school in tension as the sensemaking context we encountered; we reflect on the effects of the nature of tension on our engagement and sensemaking endeavors, and our strivings to find a balance. In the second narrative we present an example of how our self-reflexive conversations, our primary sensemaking and learning activities, unfolded in practice. We conclude with lessons learnt from this study and considerations for the ICT4D research community and for critical ICT4D research.

PROJECT BACKGROUND

Alabama (a pseudo name) is an isolated ghost town approximately 80 kilometers away from the nearest economic center. Although previously a thriving farming community, very little economic activities are left to stimulate growth and development. The Alabama project started in June 2013, with initial purpose of exploring how the Department of Information Systems, Rhodes University, could assist Computer Application Technology (CAT) teachers at Alabama High School with refresher training in HTML and Microsoft Access. At the end of April 2014, two CAT teachers were trained by the first author. Outcomes addressed during this training included; to engender self-learning, peer-learning, knowledge discovery, and information literacy, and to teach teachers how to develop lessons and exercises for teaching HTML and Microsoft Access.

As a result of this first engagement, the teachers and school Headmaster expressed a further need for tailored Microsoft Excel training for all of the school's teaching staff. An Introduction to Microsoft Excel course for teachers was facilitated between the months of June and November 2014, and a total of eleven teachers were

trained in Microsoft Excel. As with the first training courses, course aims included; skills in self-learning, peer-learning, knowledge discovery, and information literacy. The 30th of January 2015, saw a ÷certification ceremonyø where Rhodes University acknowledged the training teachers received. Although the training is not certified or accredited, it assisted teachers with hands-on practical experience in Microsoft Excel with the purpose of integrating ICTs into their teaching and administrative activities, and ultimately into their culture of doing things. The ICT training provided to teachers have proven successful as noted in a reference letter from the Headmaster:

> õEducators are now able to present their classes and school administration in electronic form. Mark schedules are processed electronically. The department has introduced an electronic programme called SA SAMS and expects electronic submissions of data henceforth. The courses assisted to prepare educators and admin staff for use of SA SAMS in the administrative and management activities of the school.ö

Our twelve-month engagement at Alabama (February 2014 to January 2015) has developed into a relationship of trust and collaboration where we are seen as part of the school and participators at the school. This has taken care of the community entry phases of the project (De Vos et al., 2007; Myers, 2009; Krauss, 2013) and gave us further opportunities to build into the community.

During 2015 we introduced a research component to the project and the involvement of the second author as a PhD student. During the month of February 2015, the second and third authors took responsibility for four weeks of CAT classes for Grade 10, 11 and 12 learners; this was while the current CAT teacher was on sick-leave. This gave us an opportunity to further explore the impacts of different teaching methods on marginalized high school learner engagement and performance. Our overarching objective, during this time, was to explore transformative ICT education practices which provide knowledge relevant for developmental needs and realities.

ICTS AND RURAL MARGINALIZED EDUCATION SITUATIONS

Rural school education in developing countries is considered important because of its role in shaping and strengthening the child as an individual in relation to his or her fellow people, to nature, and to the world as an environment (Mbogo et al., 2014). High school education is also supposed to build capacity for life-long learning in individuals, to develop knowledge, skills, and attitudes which may contribute to the general development of the communities where children come from (Lemon, 2004; Gudmundsdottir, 2010). Although South Africa, a developing country, has set the goal of achieving universal primary education (Chisholm, 2004), studies have shown that despite high investment in education (Engelbrecht, 2006), there is low participation, high dropout rates and under-education of learners in many cases (Van Der Berg, 2007, 2008; Ginsburg et al., 2011). These issues and resultant high dropout rates also impose serious constraints

on national development as it undermines national human capital and community development efforts (Archambault et al., 2009; Tikly, 2011).

In most rural and marginalized communities of South Africa the irrelevance of education to the life experience and immediate realities of learners is an enduring problem (Archambault et al., 2009). Many attempts have been made to adjust educational content so that it becomes relevant to local conditions, where education attempts to foreground a narrative of local environment that is attuned to the particularities of where learners actually live and that is connected to global development trends that impact local communities (Omolewa, 2007; Perin, 2011).

One way to overcome the challenges (highlighted above and in following sections) that ICT education in particular is facing is to understand the root causes, which lie in high school education in general. This also requires exploring critical concerns and the alignment of high school educational knowledge to community realities. Community practices cannot be divorced from the practical realities of education, nor from the political reality that schools themselves are concrete historical expressions of the relationship between education and society (Freire, 1993).

The communities of the Eastern Cape Province in South Africa face particular challenges, such as low levels of community development, high unemployment, high crime rates, lack of knowledge of tertiary education opportunities, and the need for small business development (Armstrong et al., 2008; Chitiga-Mabugu et al., 2014); many of these which stem from national educational programmes which are geared more closely to urban contexts (Bantwini, 2010). The communities, while seeking to address these challenges through high school education, have failed, and this has implications for the communitiesø livelihood in the Eastern Cape (Mncube & Harber, 2010; Kenea, 2014). Communities, however have expectations from learners and schools. For example, parents put forward the resources, and expect their children to gain knowledge that will make their lives better after learning and to plough back knowledge to communities (Chopra et al. 2009). However, this is not the case as current learning practices focus on an oppressive exam-driven educational system (Gee, 2008; Kress, 2011) and only on what is to be tested; this is also the underlying reason for high schools not providing context-based learning and teaching (Perin, 2011; Hismanoglu, 2012). Although some efforts have been made by the National Department of Education to address these problems, for example, by reviewing teacher training programmes, introducing curriculum reform and developing new approaches to school organization (Fleisch et al., 2012; Van Der Berg, 2007), these changes tend to be piecemeal (Letseka, 2014). The deployment of ICTs in education has followed similar patterns and even though large amounts of resources have been channeled to rural and marginalized black schools, the school system largely fails in mobilizing poor children into the labor market or tertiary education; (Van Der Berg, 2007; Modisaotsile, 2012; Cooper and Subotzky, 2001; Scott et al., 2007).

Case (2008) highlights the need to consider the broader social context of education ó how it hinders or supports learning ó and the important role of studentsø growing identities or the lack thereof. Kress (2011), reflecting on USA education contexts for example, suggests that õh[H]istorically, schools as institutions have served to ‑deculturalizeø or strip non-white, non-English as a first language, non-Christian Protestant, and poor students of their cultural identities.ö (p. 7). In South Africa the Apartheid legacy has left us with a situation where poor working class and middle-class distinctions were superimposed along racial lines (Krauss, 2015) with the result that the vast majority of non-white school-leavers never participate in any form of tertiary education (Ndebele et al., 2013; Cooper and Subotzky, 2001; Scott et al., 2007; Krauss, 2015). Moreover, the Eastern Cape Province is one of the poorest provinces in the country, with some of the lowest success rates nationally, in primary education (South African Department of Basic Education, 2013; Statistics South Africa, 2012).

Given the situation presented above, we reflect on our practical attempts to understand ICT educational practices in a remote marginalized rural high school of Eastern Cape of South Africa. We report on reflexive conversations and observation notes we took during our participation in four weeks of Computer Application Technology (CAT) teaching and on our attempts to make sense of what we encountered as a result of participating.

CRITICAL RESEARCH AND ADEQUATE SENSEMAKING

Critical research is agenda driven, because it aims to change the status quo especially if it is about overcoming social injustices and promoting emancipation and empowerment (Stahl, 2006). Critical research in essence is ethical, because of õthe implicit vision of the good life in a desirable societyö (Stahl, 2006: 99). Critical research is based on values and guided by value judgements (Stahl, 2006; Walsham, 1993; Myers and Klein, 2011). Critical research in essence is reflexive in nature (Stahl, 2006; Cecez-Kecmanovic, 2001, 2011) and therefore; it is not only critical of unjust social situations, but also of its own biases and assumptions brought into the act of social inquiry. It is at this point that we contribute as we reflexively emphasize our biases and cultural assumptions as a precursor for follow-up ICT4D work. In line with Stahl (2006) and Krauss and Turpin (2013) we argue that what we, individually or collectively, see as emancipatory, moral, or an improvement of a situation might not be equally valid in another culture and specifically the culture of the ICT4D teaching situation we had to deal with.

Sensemaking as a general concept is the structuring of stimuli into a framework that makes sense of them and enables comprehension, understanding, explanation attribution, extrapolation, and prediction (Starbuck & Milliken 1988 as cited in Weick 1995). The need for sensemaking relates to the degree to which an environment is ambiguous or uncertain or when the current state of the target environment differs from its expected state (Weick et al., 2005). In essence, someone notices something, in an ongoing flow of events

that is incongruent to expectations. The discrepant cues are spotted when someone looks back, retrospectively, over elapsed experience. Then, plausible speculations are offered to explain the cues. The speculator publishes or discusses them in a way such that the interpretations become subject to discussion and speculation of accuracy of interpretation (Weick, 1995). Thus, overall, sensemaking relates to the interplay of action and interpretation (Weick, et al., 2005). A key concept in sensemaking is that perceptions might undermine the ability to accurately depict and/or interpret sensemaking situations (Weick, 1995). As a result, not only the cues but the individualøs perceptions need evaluation to ensure that the cues evaluated are representative, legitimate, and objectively developed. We will elaborate more extensively on how we achieved this in practice in later sections.

Sensemaking in education mostly references collaborative sensemaking of teacher with students in complex cognitive situations (Knight et al., 2013). We could not find research that uses sensemaking for teachers other than initial school acclimation (cf. Everitt, 2013). Thus, this research extends sensemaking concepts by applying them to interpret anomalous cues from teaching experiences in a rural South African high school to better balance teachersø classroom structuring to learner needs and expectations. This paper focuses primarily on the sensemaking exercises and experiences while some of the outcomes are discussed in Conger et al. (2015).

In order to elaborate on what we mean by *adequate* sensemaking we draw from Bourdieuøs critical lineage, extracting core concepts that could guide us methodologically in ways that would prioritize the agenda of critical research, namely; practical immersion, developing ¬a sense of the gameø, and challenging ethnocentrism in outsider-researchers. Interestingly, and supporting our choice in this regard, Flyvbjerg (2001) also draws from Bourdieuøs work to make his claims about virtuoso expertise and even to highlight limitations in Foucaultøs arguments (which we will not elaborate on in this paper). We therefore find Bourdieuøs arguments a meaningful point of departure and a socially relevant match to assist us to deconstruct the notion of ¬adequate sensemakingø and put forward an approach that prioritizes the virtuoso expertise and a critical agenda above methodological accountability (Avgerou, 2005).

RESEARCH APPROACH

In defense of our particular approach to social inquiry and community participation, especially with regards to making overt upfront our collective experiential knowledge bases, historicities, and all the prejudices that come with that, we draw from several sources and construct our argument on how we know we made sense from what we experienced and participated in. We firstly draw from Flyvbjergøs (2001) views on Phronetic social science to argue why we prioritize virtuoso expertise and criticality above methodological accountability; we draw from principles of critical social research and critical self-reflexivity (e.g. Myers and Klein, 2011; Cecez-Kecmanovic, 2001, 2011; Stahl, 2006; McGrath, 2005; Avgerou, 2005); we draw on

principles of critical hermeneutics (e.g. Myers, 1997; Klein and Myers, 1999; Thompson, 1981) and double hermeneutics (Ginev, 1998; Flyvbjerg, 2001; Myers, 2009); guidelines on doing fieldwork and fieldnotes (e.g. Emerson et al., 2001; De Vos et al., 2007; Myers, 2009; Hammersley and Atkinson, 1983); and from Geeøs (2008) social linguistic theory on Discourse (the ÷Dø deliberately capitalized) as a way of being in education.

Phronetic social research

Building onto the Aristotelian concept of Phronesis, Flyvbjerg (2001) explains that õ*Phronesis* goes beyond both analytical, scientific knowledge (*episteme*) and technical knowledge or know-how (*techne*) and involves judgements and decisions made in the manner of a virtuoso social and political actorö [original emphasis] (p. 2). His argument is that in a quest for social research to mimic natural science and to reduce it to the level of techne and episteme, virtue is lost and a õreflexive analysis and discussion of values and interestsö (Flyvbjerg, 2001: 3) are set aside for methodological rigor and rational accountability instead. We thus argue, using Flyvbjerg (2001) as a starting point that if social inquiry is not sensitive to values and ethics, and does not prioritize virtuoso expertise, one must ask whether the research is relevant in the first place.

Moreover, using the Dreyfus model of skills acquisition to argue that social scientists should aspire to virtuosity and relevance in social inquiry, Flyvbjerg (2001) shows that to understand adequately during social inquiry one should aspire to achieve a õlevel of genuine, human expertise í characterized by effortless performanceö (Flyvbjerg, 2001: 17). Experts according to the Dreyfus model, õoperate from a mature, holistic well-tried understanding, intuitively and without conscious deliberation. Intuitive understanding comes primarily from experiences on oneøs own body and is in this way at one with the performer.ö (Flyvbjerg, 2001: 18, 19). In this study, we apply the concept of virtuoso expertise in the Flyvbjergian sense to the critical paradigm and suggest that it also implies developing effortless performance that is intuitively aligned with the critical agenda and value rationality; and therefore is associated both with developing experience in *doing* ICT4D, ICT teaching in particular, and *participating* in social inquiry (sensemaking).

Bourdieu's critical lineage

Bourdieu, someone whom Myers and Klein (2011) highlight as an important critical theorist to draw guidance from to do critical IS research, is particularly adamant about *seeking immersion* as a way of constructing adequate knowledge during social enquiry. Bourdieu says that a subjectivist and ÷immersedø viewpoint has at its core, practical mastery of thought, beliefs, desires, emotions, judgements, and ultimately, worldviews. He says that the outsider-observer, apart from reflecting on his own position, also

needs to *develop a sense of the game of social interaction.* It is one thing to decode and analyze (model) a social situation that is completed and things are in the past, but it is something else to be in the moment and to know how to react to unexpected occurrences in the situation. This requires a deep sense of the game in order to know how not only to model but also create and innovate according to ±a sense of the gameø (Bourdieu, 1977, 1990, 1998). In this study we brought in our own intuitive experientially-based background into social inquiry, but we also emphasized that our understanding is incomplete and ethnocentric (Harvey and Myers, 2002); hence our emphasis on self-reflexivity and self-critique.

Bourdieu in fact relates the *ethnocentrism of outsiders* to the devices that they use to keep their distance (i.e., to remain objective) and to make a virtue of keeping that distance. Using the analogy of forced conversation he warns that it may create within the outsider a false sense of the game. People (researchers) strain themselves to almost artificially keep the conversation going, while they subconsciously maintain the position (objectivity) of being able to retreat to the safe ground of exiting the game. There is a difference in understanding between those inquirers that play the game of social interaction in order to be carried away by the game and those who simply play the game as a game to leave it later to tell stories about it (Bourdieu, 1990). Therefore, to understand the social situation adequately, it is not sufficient to only objectively (and retrospectively) model the situation, but one also needs to elaborate on the situation, context, and timing in which the model manifests (Bourdieu, 1990). Subjective practical immersion and participation during social inquiry therefore became desirable and valued in our case, especially in terms of ensuring relevance and self-emancipation (adequacy).

Using narrative

We need to note that a key aspect of the Phronetic argument is that where science (episteme) does not reach in terms of portraying virtuoso expertise; art, literature, and narrative will help comprehend the reality in which we live (Flyvbjerg, 2001). Moreover, Flyvbjerg (2001) does not present an either-or scenario, but rather an appropriate prioritizing of Phronesis above episteme and techne. Therefore, although our findings and the analysis of data could be represented using rational/analytical techniques such as thematic analysis or grounded theory (i.e., episteme or techne), we deliberately, and in line with the Phronetic rationale, use narratives to help comprehend and represent our ±research findingsø and to elaborate on situation, context, and timing (Bourdieu, 1990).

Acquisition and learning

Flyvbjergøs (2001) arguments are that at the level of intuitive decision making, the separation between object and subject disappears. õExperts operate from a mature, holistic well-tried understanding, intuitively and without conscious deliberationö Flyvbjerg (2001: 18). Flyvbjerg explains, however, that the Dreyfus

model does not portray an either-or scenario, that is, *either* conscious rational decision-making *or* intuitive decision-making; the two are considered along-side each other, in the same way in which Gee (2008) explains that adequate learning (in our case learning about the social situation) implies both *learning* and *acquisition* (or socializing into).

> õAcquisition is a process of acquiring something (usually, subconsciously) by exposure to models, a process of trial and error, and practice within social groups, without formal teaching. It happens in natural settings which are meaningful and functional in the sense that acquirers know that they need to acquire the thing they are exposed to in order to function and they in fact want to so function. This is how people come to control their first language.ö (Gee, 2008: 169-170).

> õLearning is a process that involves conscious knowledge gained through teaching (though not necessarily from someone officially designated a teacher) or through certain life experiences that trigger conscious reflection. This teaching or reflection involves explanation and analysis, that is, breaking down the thing to be learned into its analytic parts. It inherently involves attaining, along with the matter being taught, some degree of meta-knowledge about the matter.ö (Gee, 2008: 170).

We argue that the experience we as researchers bring into the social inquiry situation is not to be ignored or discarded, but rather, brought into the analysis. Prejudices and historicity are necessary starting points for sensemaking in both the Interpretive and critical traditions (Weick, 1995; Walsham, 2005; Klein and Myers, 1999; Myers and Klein, 2011). Acquisition (apprenticeship in terms of understanding the context of Alabama High School and the worldviews associated with the context) should precede learning and conscious reflection (Gee, 2008). We therefore argue that bringing in our collective historicity, prejudices, and experiential knowledge (intuitive decision-making and acquisition) into social inquiry should precede our more conscious reflections (rational decision-making and learning) about what we did. Further, we define ÷worldviewø as

> õ a socially accepted association among ways of using language and other symbolic expressions, of thinking, feeling, believing, valuing, and acting, as well as using various tools, technologies, or props that can be used to identify oneself as a member of a socially meaningful group or ÷social network,ø to signal (that one is playing) a socially meaningful ÷role,ø or to signal that one is filling a social niche in a distinctively recognizable fashion.ö (Gee, 2008:161)

Like Gee (2008) suggests, the act of sensemaking should mean juxtaposing our different worldviews, the interpretations that followed from that, and subsequent intuitive responses to social situations (Flyvberg, 2001), for comparison and contrast. This reflection process, which we did mostly retrospectively, allowed us to ÷escapeø our ethnocentrism and thinking of own views and approaches as the most sensible (Harvey and

Myers, 2002). It allowed us to reflect on our experiential knowledge inadequacy, especially in terms of making sense of context and culture.

Using Hermeneutics and critical reflexivity

We sourced further guidance on how to deal with reflexive conversations and the unstructured qualitative data generated inductively, by referring to literature on hermeneutics and critical reflexivity. Hermeneutics is the underpinning philosophy to human understanding, a mode of analysis of qualitative data, such as text and transcribed speech (Klein and Myers, 1999; Harvey and Myers, 2002; Myers and Avison, 2002). We applied the principle of multiple interpretations from Klein and Myers (1999) and examined the influences of social context on participants by seeking out multiple viewpoints as well as reasons for them. õThe analysis of reasons may include seeking to understand conflicts related to power, economics, or values. Moreover the researcher should confront the contradictions potentially inherent in the multiple viewpoints with each other, and revise his or her understanding accordinglyö (Klein and Myers, 1999: 77).

Furthermore, critical hermeneutics realizes that the act of interpretation is never closed (Harvey and Myers, 2002), because interpretation is driven by an emancipatory agenda (Howcroft and Trauth, 2005); i.e., value judgements are made during the interpretation process (Myers, 2009; Myers and Klein, 2011). The critical hermeneutic constantly seeks possible alternate explanations and in doing so researchers are aware that interpretations may be influenced by political or socio-economic constraints or power distance (Myers, 2009; Thompson, 1981).

Applying critical hermeneutics also implies being aware of double-hermeneutics (Myers, 2009; Flyvberg, 2001; Ginev, 1998). Double-hermeneutics has two dimensions associated to it; the first is about the self-understandings of the people in the research setting in relation to the context; the second is about the researchersø own self-interpretations (Ginev, 1998; Flyvberg, 2001). Double hermeneutics assume a layered context.

> õJust as the people studied are part of a context, research itself also constitutes a context, and the researchers are part of it. The researchersø self-understanding and concepts do not exist in a vacuum, but must be understood in relation to this context. Context both determines and is determined by the researchersø self-understandingö (Flyvberg, 2001: 33).

In this paper we emphasize our self-examination and self-understanding (the second dimension), showing how we sought to understand how our own prejudices and historicity might have affected sensemaking (Klein and Myers, 1999; Harvey and Myers, 2002; Stahl, 2006; Myers, 2009).

During our conversations we were both reflective and reflexive; the two concepts are interrelated. Following Hibbert et al. (2010) and Alvesson and Sköldberg (2000) we see ÷reflectiveø as õa mirror image which

affords the opportunity to engage in an observation or examination of our ways of doing. When we experience reflection we become observers of our own practice.ö (Hibbert et al., 2010: 48). During reflection, the emphasis is on understanding and sense-making. ‑Reflexivityø, however, pays closer attention to ‑selfø, learning about yourself, i.e. self-reflexivity, and leaving the person doing reflexivity changed as a result of doing it. Reflexivity suggests a õcomplexification of thinking and experience, or thinking about experience. Thus, we regard reflexivity as a process of exposing or questioning our ways of doing.ö (Hibbert et al., 2010: 48).

Furthermore, critical reflexivity as a methodology was used to critique the relevance of our own fieldwork and teaching approaches. Critical reflexivity involves self-conscious criticism (Cecez-Kecmanovic, 2001) where researchers

> õexplore their own ontological and epistemological assumptions and preferences that inform their research and influence their engagement with a study. By intentionally expressing, questioning, and reflecting upon their subjective experiences, beliefs, and values, critical researchers expose their ideological and political agendas.ö (Cecez-Kecmanovic, 2001: 147).

We argue that a strength of our contribution is that we as researchers, come from very diverse backgrounds and experiential bases, and therefore contrasting and contradicting worldviews. This was brought into and made explicit in the sensemaking process and practice situation. We explicitly foregrounded our contrasting prejudices and historicities (Klein and Myers, 1999; Myers, 1997) as a way of enriching the hermeneutic situation. We followed Geeøs (2008) counsel that in learning situations where worldviews conflict (in this case our own worldviews), one should relate the worldviews that we are attempting to acquire and understand to self and society. Learning, or self-learning in this case, requires that we juxtapose our different worldviews, and subsequent intuitive responses to social situations for comparison and contrast (Gee, 2008). This was our learning (hermeneutic) strategy.

Who we are

Collectively, we have a considerable experiential knowledge-base to draw from. The first author had done a three-year critical ethnography in a deep rural Zulu community and previously project managed two UNESCO-funded ICT4D teacher training projects in rural South African communities. This ethnographic exposure amongst deeply rural Zulu people, doing research in various other rural African settings (see Fourie and Krauss, 2010, 2011; Krauss, 2013; Krauss and Turpin, 2013; Matthee and Krauss, 2010; Krauss, 2015), and working as academic at four different institutions in the South African context since 2000, offered him a considerable experiential knowledge-base to draw from throughout the Alabama project. His interest in critical theory in particular sensitized him to the realities of worldview collisions ó especially

collisions between traditional African and industrialized Western values ó in education settings where emancipation and empowerment is needed.

The second author, a Malawian citizen, had been involved in various developmental activities under the umbrella of World Vision in Malawi. This involved eight years (2005 to 2013) of experience in training rural people in Malawi in the use of ICTs; mainly in using Microsoft Office and the internet. His historicity and the fact he grew up in rural Malawi, offered him the unique ability to relate his experiential knowledge-base with what he encountered at Alabama High School and to look deeply into this issue of school culture and its impact on childrenøs learning processes.

The third author is a visiting professor from the US. Her research is functionalist in nature; often action research in areas such as software engineering, program design, ICT pedagogy, IT services, and others. After 15 years in industry, where she was an IT consultant and helped companies innovate both with technology, practices, and organization structure, she moved to academia. In her teaching she draws from over 40 years of experience in different academic settings. Her teaching approach seeks to maximize hands-on or experiential exercises that are most beneficial to lasting learning. As a result, she is always trying new ideas, approaches, and technology in the classroom. For her, the goal in Alabama High School was to move from once-a-week lab sessions to daily hands-on activities and, eventually, to introduce case-based and gamified learning practices to the teachers by demonstrating them with the learners and then formally teaching the methods to the teachers.

Research practices

Our project approach initially involved simply seeking opportunities to situate ourselves in the particular context of Alabama High School, to build relationships of trust ó an essential aspect of this was to show commitment at different levels (e.g. relationships, tasks, etc.), to keep promises, and not to create false expectations or hope ó and to respond to expressed needs. This õmessyö and unstructured time of community entry, relationship building, and topic discovery (Krauss, 2013; Chughtai and Myers, 2014; Myers, 2009; Whyte, 1996; De Vos et al., 2007) often placed pressure on us to support the school while also having to deal with our own responsibilities as academics at Rhodes University. Therefore, although we would like to present ourselves as diligent, rigorous and critically open in doing fieldwork, we have to acknowledge that the results were õexperientially contingent and highly variable by setting and personö (Van Maanen, 1988: 4). For example, we found that our gender, nationality, background, personalities, and historicity offered us different types of opportunities and roles in fieldwork and sensemaking (Walsham, 2002; Weick, 1995).

We started out inductively, meaning that we allowed the social situation, our experiences, reflections, and observations ó to inform our understanding of the problem situation and our response to the educational

needs at hand. Data generation for this paper, which was done during February 2015, involved daily reflection conversations amongst ourselves on our teaching experiences and observations and the generating of fieldnotes and recordings. Using the principles described earlier, the first author would typically facilitate the conversations by initiating reflexivity on possible alternate interpretations of important data moments, such as situations, events, cue, or stories that could indicate, for example, a communication breakdown, a misinterpretation, a contrasting point of view, or a situation where cultural-power or another position of power could distort or repress adequate education. Our value judgements were guided by what we sought through our project objectives, namely, that we want to inspire, motivate and seek relevancy of educational practices, such as that ICT teaching and integration practices should not be decontextualized from the realities of being a community in tension (Kress, 2011; Krauss, 2015), education practices should not involve deculturalizing the students, i.e., stripping them from their cultural identities (Kress, 2011) or that we should not subconsciously enforce worldviews through ICTs (Walsham and Sahay, 2006; Thompson, 2008).

In line with the double and critical hermeneutic, we questioned our own assumptions, beliefs, understandings, and ideologies and opened them up for debate (Stahl, 2008) during the reflexive conversations. Also, questioning the possible implications of our own knowledge-base and prejudices, we intentionally expressed, questioned, and reflected on our subjective experiences, our beliefs and values and how possibly it could affect our interpretations and how it shaped research participantsø (teacher and learner) understanding in the process (Alvesson and Sköldberg, 2000; Cecez-Kecmanovic, 2001).

Our fieldnotes focused on two aspects. The first is that we recorded events that happened, what people did and what they said in response to how activities evolved. The second was fieldnotes based on our interpretive reflections on the events and conversations. A key aspect of this second type of fieldnotes emanated from our daily conversations ó which we recorded ó where we compared notes and contrasted approaches and interpretations. We started off with a fieldnotes ÷templateø where we recorded the follow aspects of our engagement:

- Fieldnotes on what happened (what we did, actions and decisions, activities, what people said and did).

- Fieldnotes of reflections on what happened (i.e., what did I interpret, observe, understand, think about, and how does it possible relate to readings and theory).

- Fieldnotes on the researchersø activities (what did Sue/ Kirstin/ Clement do, say, etc.).

- Fieldnotes of reflections on the researchersø conduct, activities, how that possibly relate to theory.

- Observations and reflections on worldview collisions (between teachers and children, researchers and teachers, researchers and researchers).

This, however, was used primarily as a tool to get our reflective conversations going, rather than something that dictated how we did things. Hence, the fieldnotes we generated, more often than not, did not follow the template; we considered it as a tool to help us remember. Since we emphasized the acquisition of virtuoso expertise and immersion, our collective experience and our self-reflexive interpretations as a result of that was our primary data. We considered ourselves as research instruments and leveraged our experience (Schultze, 2000). In addition, we reflected on how we as research instruments were calibrated (Myers, 2009; De Vos et al., 2007). In the next section, we discuss the local context, in terms of tensions present, that impacted classroom behavior and attention.

A COMMUNITY IN TENSION

Alabama is a community in tension with detrimental effects on the school, on teacher morale, stress levels of teachers and learners, and the possibility of any fruitful education taking place at the school. For example, just before we started our four-week engagement in February 2015, there were severe acts of vandalism at the school committed by some of the school's own learners (see Figure 1). Typically, progress reports are handed to parents and children, during the first week of the school year. However, the ongoing spiral of weak and dysfunctional education and many children failing their 2014 academic year ignited anger and protests amongst the parents, many of whom have very little formal education themselves. Some insisted on their children moving on to the next grade and as a result a blame-game erupted between parents and teachers. When we arrived there late in January 2015, the Headmaster told us that the situation was so severe that the police were sent to protect the teachers, and him in particular, because of threats made by parents and other people in the community. More recently (10 September 2015) 'chaos erupted' as the community protested against local government (see Figure 2) and the lack of employment opportunities.

Figure 1 – Vandalism; a school in turmoil

At the school itself, we found that teacherøs schedules were absolutely fully booked. There was no time for innovating with new ideas or preparing for lessons in the ICT lab; there is low staff morale, chronic absenteeism, and no privacy or space for teachers to work between lessons. Our feeling is that there is a general hopelessness and a lack of future vision amongst children and teachers, because of poverty, stress, low or no resources to try new things, and so on. This affected, for example, our ability to communicate with the Headmaster and with teachers via email; generally they do not respond and even when we introduce them to new innovative ideas, there was little response or capacity to deal with these new ideas. It was as if the teachers were in a survival mode, which led them to simply revert back to a teacher-centered power distance and a focus on learning characterized only by memorization of facts needed for national exams instead of treating learning as a process of knowledge creation (Naicker 2010; Nkula and Krauss, 2015). Reasons for reverting back to survivalist teaching mode in ICT education can be attributed to limited understanding of constructivist (as opposed to instructivist) teaching practices (Ertmer 2005, Van Braak 2001, Naicker 2010, Sang et al., 2010), lack of access (as opposed to availability), limited time to plan lessons, and so on (Li, 2007; Chen, 2008; Nkula and Krauss, 2015).

Figure 2 – Alabama protests, a community in tension

Family disruption and personal trauma emerged as a further inhibiting issue. For example, during one of the lessons Sue encountered a very rude girl. When she enquired about the situation from one of the teachers, she was told that this girl had serious family issues. Issues such as these affected learning.

The way in which education is set up at the school inhibits teachersø access to technology and opportunities to engage and integrate ICTs into their education practices. The only time and place for teachers to work with ICTs was after school in the IT lab. We found, however, that since our teacher training activities during 2014, the impact on the school could be noted.

Generally, however, there is little capacity to deal with new ideas. Teachers canøt see how innovation fits into the government agenda if it is not already in their repertoire. The question was how will ICTs be useful and not at the same time get in the way of government goals? We therefore experienced a constant tension between trying to do something new and aligning with government goals or negotiating government goals and appealing to the learners. We interpreted this as an oppressive and dysfunctional power distance embedded in the social system. This had to be challenged through what we did, and consequently presented an added dynamic to our teaching and engagement strategies. Sue for example noted that she experienced a tension between worldviews and that for her personally there is a tension between teaching what is in the book, which is boring, and between õwhat I know they need to know to survive in the world in terms of computing.ö

Sue was also concerned about what the teacher would do when she left at the end of the month-long training. õWill Fadilah (a teacher) go on in the same way or am I sabotaging her future classes? Is she going to repeat it [the content I covered] and bore them [the learners] to tears? If I have covered it, what will she do? If it was me, I know that there would be pressure on me to now do something else.ö Sue was reflexive about the impact of her leaving; she placed herself in someone elseøs position through reflexivity.

One of the issues that relate to the teachersø ability to deal with new ideas is that teachers themselves do not know ICTs, they donøt have capacity, and they experienced computer phobia. As a result, we noted a knowledge gap in terms of practical ICT experience. While teaching MS Excel in 2014, Kirstin also noted that there was a distinct fear with which some teachers came to the training. His approach to dealing with both computer fear and the tension that the education system instilled in teachers, was to induce a hands-on enjoyable learning approach. For example, Kirstin started his teaching with a very simple Excel exercise (e.g. Figure 3) that had two aims; the first was to introduce basic Excel concepts (like cells, rows, columns, calculations, etc.) and the second; to negotiate possible computer-phobia. Similar to Clementøs approach (explained in the next section) and drawing from earlier exposure in doing ICT training with similar people-orientated teachers, Kirstin divided teachers into support groups. A culture of peer-learning and peer-accountability was established from the first moments of teaching engagement. This established a comfortable non-threatening learning setting where teachers could leverage a people-orientated value system that says ÷I am because you areø and subsequently look after each other.

Phiwe Nkomo					
	Term1	Term2	Term3	Term4	FINAL
Math	45	56	60	56	
English	50	83	54	70	
History	60	50	50	60	
Geography	80	70	20	90	
Biology	50	60	40	50	
Average					
Highest					
Lowest					

Figure 3 – An example of a basic introductory MS Excel exercise

Evidence of how a hands-on practical approach worked is how the Headmaster initially resisted the idea of coming to the MS Excel training himself. When Kirstin asked him whether he was coming to the first training, he said that he had a headache, which he thought was because of a high blood pressure and stress; he would rather go home. Kirstin, however, invited him just to attend for a few minutes, and he reluctantly agreed. After about an hour into the training he was still participating; totally absorbed in the process. Kirstin explicitly asked him how his headache was. The Headmaster noted that it was gone. Kirstin

attributed it to the fact that he ─lost himselfø in the training, and it subconsciously released some of the pressure that managing school placed on him. This experience-based enjoyable learning approach seemed to be a way of making learning fun and hence more successful in the end. The Headmaster subsequently attended all the follow up training events. Both Sue and Clement had similar experiences as they attempted ways to tap into the creative, learning by engaging, and so on; teaching people as opposed to subjects. In many cases the learners didnøt want to leave the computer venue when the classes ended.

In the next section we present an example of how our self-reflexive conversations led to adequate sense-making.

HOW REFLECTIVE CONVERSATIONS WERE FACILITATED

During one reflexive conversation (recorded on 23 February 2015), Sue and Clement discussed incidents of how they attempted to connect with the learners and get them to open up and to learn. It started with a discussion of how a particular girl (who we will name Callie) had a tendency to respond to Clementøs teaching by giving back (or providing feedback) examples of her own, as a way of following up (or responding) to whatever the teaching was about. The concept that Clement discussed during this particular teaching scenario was the difference between ─upgradeø and ─updateø The girl, related to examples from using her cell phone and ─updatingø WhatsApp. Clement argued that it was her way to show that she understood or that she was in agreement. Sue who knows Callie from her own teaching earlier the week, responded by asking whether Clement thinks that she was *showing that she understands* or whether she was *making sure that she understood*? Clement perceived that the girl was trying to be in agreement, while Sue assumed that she was trying to understand. Sue suggested that she mostly assumes that learners donøt understand what she is saying.

This difference between Sueøs and Clementøs perspectives, which is an example of a critical incident or a ─data momentø led the conversations to the question of why it is that Clement managed to get Callie to ─open upø while Sue found her to be quiet and unresponsive; in two days Clement succeeded in something that Sue couldnøt do in two weeks of engagement. Clement felt that it was because of his background experience in teaching rural people. Clementøs response was that; õIøm used to this type of teaching where I have to step to where students areö. Clement said that he gives learners freedom to ask if they struggle. He then went on to explain that he has a group teaching approach, where he gets learners to work at the same pace, work through the steps, and feel free to ask if they struggle with the steps. õThey work together as a groupö. õThey like and understand the idea of working togetherö. This was Clementøs intuitive experience-based approach.

As a result of this, Callie who was quiet and withdrawn with Sue, started talking and interacting with Clementøs teaching. Clement was naturally attentive to this due to his home-based African worldview which

made him create a sense of communion in his teaching. It was a natural response. He was attentive to the shy ones who fell behind and to help them to participate. õWhen someone is behind, you sometimes feel shy or neglected.ö Clement noted that he would typically say: õOk guys, letøs stop; letøs see how our friend there is doing. Can somebody go there and help himö. When Kirstin asked Clement whether his community orientated approach was conscious and whether he thought about it, he said ÷noø, it was intuitive and spontaneous (it was virtuoso expertise), driven by interests and a need for empowerment, but was made overt during the reflexive conversations.

Reflecting on her own engagement and teaching approaches earlier the month, Sue noted that she didnøt specifically follow a group approach. She tried to move with the slower people differently and let the fast people go ahead. She valued it when children started to work individually, which Kirstin interpreted as a more Western task-orientated teaching approach. She consistently sought ways to get learners to talk back to her, hence she found the rules and social system embedded in learners to be very stifling to growth and learning; õthe culture of ÷no talkingø, of order, and the teacher is focal point needs to be broken downö. õThe sign on the wall says ÷no talkingø My comment is: ÷I want to hear you!øö (Conversations held 10 February 2015) (See Figure 4).

Sue also had a way of creating a game-based environment where she resorted to getting learners to learn through playing with technologies. For example she introduced and used the Jeopardy PowerPoint template and Kahoot.it (www.getkahoot.com), a game-based review quiz to introduce a playful learning setting. Sue constantly told the learners things like õDonøt be afraid to try something; you canøt break the computer; you canøt break the internet.ö and õlearning technology is a contact sportö, to emphasize that learning should be experientially based and fun: õMy experiences says that learning by doing is always the most effectiveö.

Sueøs approach was subconsciously biased towards placing acquisition before learning (Gee, 2008); she created an environment where learners could playfully socialize into acquiring ICT skills, similar to what Kirstin did with his teacher training. õMy learning style says donøt kill yourself learning all the stuff until you need itö. The book though has five chapters on MS Word. She felt that there is no way in which she was going to labor through all the theory presented in the book. Sheød rather let them engage and learn in that way. It was only during our reflexive conversations afterwards, when Kirstin mentioned Geeøs (2008) theory, that Sue could identify that her virtuoso expertise built up through many years of experience was actually supported by a theory that explains it. Although concepts for explaining our actions emerged during reflexive conversations, it helped us to do a better job (i.e., fine-tune our practices) in follow-up engagement.
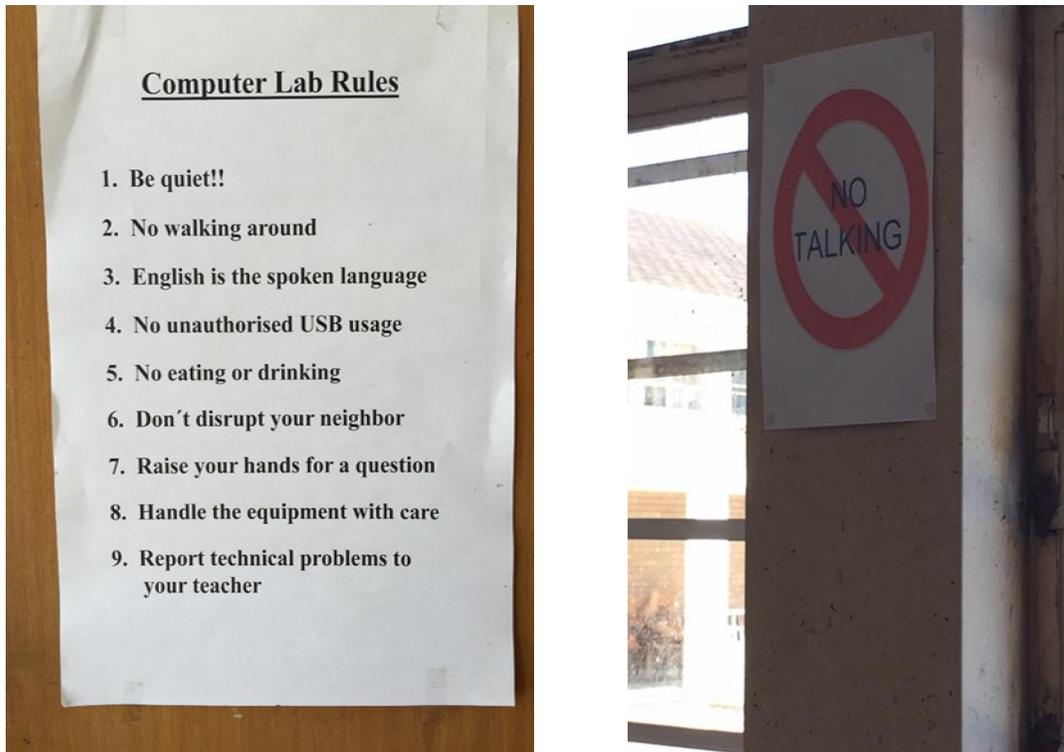
Figure 4 – A social system of 'not talking back'

Both Clement and Sue had a natural intuitive inclination to seek ways to connect to learners at a relational level and bridge power distance as a precursor to empowering them, albeit in different ways. Neither of them has any background in doing ethnography and were therefore not consciously aware of the importance of and many ways in which community entry is researched (De Vos et al., 2007; Myers, 2009; Whyte, 1996; Krauss, 2013; Chughtai and Myers, 2014). Sueøs approach was to talk about being one of nine children, coming from a fairly rural background, living in Texas, and about her choices in profession and education. She told the learners she did not want them intimidated by her title because, she was still a learner just like they were. Learners were told to call her whatever made them comfortable and, if they couldnøt think of anything, to call her ÷Dr. Sueø as her learners in Texas called her. She felt that she was able to relate to learners by recognizing the singer Rihanna on one learnerøs desktop background and discussing her music with the learner, by discussing web design with another learner, and by asking the Head Boy his opinion on the use of lectures versus practical exercises. These ways of establishing a relationship prompted learners to bring up topics to Sue as the first week progressed. She encouraged little snippets of sharing and ÷opening the kimonoø õI encourage learners to share some facets of themselves that they feel safe in sharing. You want them to be comfortable to say pretty much anything in classö; that was her view.

We are not sure how well Sueøs approach worked though. Clement for example felt that breaking down the power distance in this way might have been too much too fast for them, especially since culturally, older

people are typically shown much respect. Opening up might be too much and becoming too friendly might be seen as disrespectful. Both Clement and Sue were called ₌Sirø and ₌Madamø regardless of their attempts to connect and break the power distance.

Clement, in his way to connect and get learners to open up, did not explicitly tell stories from his own upbringing, but rather constantly (but subconsciously) related back to prior experience, in order to make sense of what he encountered during training and relationship building. He explained that he felt compelled to retrace the reasons behind learners behaving in certain ways and to replicate their thinking for himself.

Drawing from his ethnographic experiences in doing teacher training work among traditional Zulu people and experiential insight into how worldview collisions manifest in similar settings, Kirstin identified contrasts between Sueøs and Clementøs approaches and interrogated those as key *reflexivity moments* and critical incidents to talk about. He applied critical and double hermeneutics and guided the conversations in such a way that contradictions, conflicts, and contrasts were interrogated. As a group we sought alternate interpretations for what Sue and Clement observed and experienced (Klein and Myers, 1999; Myers, 1997; Thompson, 1981). This self-reflexive dialogical conversation was continuous and cyclic with Kirstin bringing in scenarios from prior work in similar ethnographic settings as well as examples of manifestations of African and Western worldview collisions in education situations to contrast, remind, interrogate, and clarify experiential understanding. As researchers, our different but collective perspectives and experiences (prejudices and historicities) were brought to the fore (made overt) for comparison and contrast (Gee, 2008). The aim was to nurture critical self-reflexivity and to reflect on the context that our presence in the situation created; i.e., according to the double-hermeneutic (Flyvbjerg, 2001; Thompson, 1981).

CONSIDERATIONS FOR ADEQUATE SENSEMAKING IN RURAL MARGINALIZED EDUCATION SETTINGS

From these brief experientially-based narratives we can propose a number of considerations for community engagement and for teaching technology in rural marginalized communities. Although our ₌findingsø or the **considerations** that we put forward draw from a particular case, we believe they may be extrapolated to other technology teaching scenarios in multi-worldview situations.

Negotiating tension is inescapably part of rural marginalized school education. Because of poverty, isolation, low morale, unemployment, crime, and other issues, many marginalized South African communities suffer from hopelessness, a lack of future vision, and an unfertile learning environment. Moreover, the education system has failed South African children (Van Der Berg, 2007, 2008; Archambault et al., 2009; Tikly, 2011; Modisaotsile, 2012; Cooper and Subotzky, 2001; Scott et al. 2007). Although there are success stories (Botha et al., 2014; Botha and Herselman 2013; Nkula and Krauss, 2015), conflict and contradictions affect research and engagement at more than one contextual level, i.e., the implications of the

broader context of marginalized communities and the context of a failing public schooling system that has embedded in it an oppressive power distance that mimics class distinctions and power distance in the greater society (Freire, 1993). No ICT education research in such settings is complete without some consideration of these contexts and it highlights the need for more critical ICT4D research. This consideration might lead to heightened teacher sensitivity to the situation while in other situations might lead to explicit discussion and collective resolution on how to deal with the tensions in that setting.

Sensemaking works better in a multi-worldview team. And it helps with escaping from ethnocentric thinking. We found that as we compared and contrasted our different approaches and perspectives, we could make overt our self-reflexivity and we changed as people. Contrasting and comparing our worldviews (our values, beliefs, assumptions, perspectives, observations, and practices) provided ‑data momentsø or critical incidents to be reflexive about. Collective self-reflexivity helped us to realize how our approaches and assumptions were possibly ethnocentric, inadequate, and ‑wrongø During the conversations we quite often realized that things we were doing were mistakes, disrespectful, ineffective, culturally insensitive, and so forth, and we could adapt and change for ongoing work. Drawing from Gee (2008), we argue that just as learners have to learn and acquire (socialize) into new disciplinary knowledge or a new worldview, we as researchers also need to learn and acquire knowledge about (i.e., make sense of) the social situations we are entering and participating in. Self-reflexivity allowed us to articulate meta-knowledge about this type of learning and to change and do things better afterwards. Our own immersed acquisition of the social situation we were studying allowed us to acquire new things at the level of virtuoso expertise, although we remained conscious of explicit self-reflexivity and the critical agenda. Hence we learned about different worldviews (of each other and of the situation we entered) and therefore can claim being agents of change to some degree (Gee, 2008). We can also claim to some degree, according to Bourdieuøs critical lineage, that finding practical immersion, not making keeping objective distance a virtue, and developing ‑a sense of the gameø allowed us more adequate sensemaking and self-emancipation. This consideration addresses the second and third research questions and highlights that guidance from Bourdieuøs critical lineage and bringing in our own biases, prejudices, and assumptions into the act of social inquiry (Stahl, 2006), can be used in the practice of adequate sensemaking.

Teaching in rural marginalized schools will benefit from both experientially-based learning (socializing or acquiring knowledge) facilitated through game-based learning and from following people-orientatedness. The first part of this consideration, namely the idea of learning through doing and playing is commonly known in education research (e.g. Gee, 2008; Kolb et al., 2001; Kiili, 2005). However, how to teach ICT skills in a people-orientated manner is not as well-known. Research shows that while the Western worldview is biased towards independence and critical autonomy (typically Sueøs approach to

motivation and engendering learning), in other cultures conforming to the group or community is more valued, and elders in a community are seen as key owners and disseminators of knowledge (Merriam and Ntseane, 2008; Diouf et al., 2000; Mkabela, 2005). Clement had a natural inclination to follow people-orientatedness by creating mutual responsibility among learners. This seemed fruitful, as the learners opened up and did not feel neglected or side-lined. Each approach had its benefits though; and if we take counsel from Gee (2008), Thomas (1993), Hammersley (1992) and other critical scholars, bringing ‑multi-worldviewnessø into ICT4D sensemaking will result in more possibilities for emancipatory social transformation and escaping from ethnocentrism; both approaches is more effective than either is alone. This consideration answers Research Questions Two and Three; because again it highlights the need to address ethnocentrism in outsiders through comparing and contrasting worldviews, to seek practical immersion, and to develop virtuoso expertise in *doing* ICT4D work and in *sensemaking* in ICT4D research.

Considerations for the ICT4D research community. Firstly, for ICT4D social research to truly matter, the research community should initiate an escape from valuing attempts to mimic natural sciences and prioritizing *episteme* and *techne* over virtuoso expertise and a õreflexive analysis and discussion of values and interestsö (Flyvbjerg, 2001: 3). Moreover, self-reflexivity, self-learning and self-development of researchers that are also valued by them should be intrinsically part of adequate social inquiry in ICT4D, or using Bourdieuøs reasoning; the ICT4D community should more explicitly and consciously reflect on the sensemaking contexts they encounter rather than to pursue un-virtuoso and distant objectivity (Flyvbjerg, 2001; Bourdieu, 1977, 1990). Also, adequate sensemaking and social inquiry cannot be divorced from seeking some form of immersion and participation on the part of the researcher, i.e., sensemaking in research implies both learning and acquisition (socializing) into the social situations researchers encounter (Gee, 2008; Bourdieu, 1977). This point of view has potential to liberate the researcher, and liberating the researcher may be seen as an important precursor for liberating the people they are researching (Krauss and Turpin, 2013; Bourdieu, 1977). This consideration therefore mostly answers Research Question One, as it shows that the Phronesis argument has value for sensemaking practices in ICT4D research.

Guidelines for critical ICT4D researchers. For critical researchers, two contributions are of note therefore. The first is that adequate sensemaking as we have portrayed it in this paper has the potential to emancipate the researchers, especially from their own ethnocentrism, because it explicitly prioritizes the critical agenda and sees methodological guidelines as õcautionary indicators of directionö (Flyvbjerg, 2001: 129) for supporting the agenda. Secondly, in critical ICT4D research, one must ask; is critical research not in essence Phronetic in the Flyvbjergian sense and should critical research therefore not more explicitly prioritize Phronesis (i.e., its critical agenda) above episteme and techne? Currently, the debates on establishing a critical research methodology seem to include the subconscious value judgement that methodological

accountability and analytical rigor is evidence of a sound and adequate research identity (see McGrath, 2005; Cecez-Kecmanovic, 2011). Flyvbjerg (2001), however, offers us a liberating toolkit to question the idea and relax our uncompleted debate on whether methodological accountability shows evidence of a maturing ÷paradigmø Maybe Phronetic accountability, which we have been doing all along, is the primary way in which we should define ourselves as critical researchers; and maybe it will then also challenge the ÷templatesø we use to present critical ICT4D research. This consideration therefore addresses Research Question One.

FINAL THOUGHTS

Our argument about (and evidence for) sensemaking at the level of virtuoso expertise aligned with the critical paradigm is not complete yet, and more should be done to test these ideas further within the ICT4D community. Right towards the end of writing this paper Sue self-consciously exclaimed: õI'm thinking that my worldview gets in the way in ways I don't really understand. I still worry that I learned more than the students, which to me, means I failed.ö We conclude, though, that everyone needs to learn and develop and for us this was a sign of a good start in adequate sensemaking; we as researchers first have to learn and liberate ourselves from ignorance, uninformed assumptions, ethnocentric distance, non-virtuoso expertise, and so on. Now we can go back and do things better.

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