The Academy, Internet, and Indigenous Knowledge: Paradox of Integrating Technology and Tradition

SETH AGBO
Lakehead University, Canada

ABSTRACT This paper looks closely at the culture of the university and describes a model for integrating modern technology and Indigenous knowledge. The paper examines how university-based researchers can create new innovations in Indigenous research by encouraging various Indigenous cultural ideas and grafting them into technology in a way that pools all talents and resources together and allocates these talents and resources efficiently. The paper delineates how shared fundamental values of human rights and social justice can be utilized in a dialogical process for integrating technology and Indigenous knowledge. Specifically, this paper looks more closely at: 1) the origin of the Indigenous research problem; 2) the equitable engagement and fair allocation of responsibilities and resources; 3) participation in decision making and consensus; 4) the understanding of power relationships; 5) the prospects for collective learning; and, 6) how technology can be mediated and defined in terms of culturally structured and shared values, beliefs and symbols. The findings indicate the possibility of dialogical integration of technology and Indigenous knowledge by creating a boundary of learning where there is the need to go beyond Eurocentric technical traditions and culture and to encourage a cross-pollination of insights, practices and mental archetypes of Indigenous knowledge and cultures with technology. The paper concludes that the university-based researcher and indigenous community relations can be mediated and defined in terms of a system of culturally structured and shared values, beliefs and symbols about learning in a participatory research model and, for a meaningful and relevant research in Indigenous communities there is the need for mutual exercise of control and power between the university-based researcher and placing Indigenous knowledge in a conspicuous place in academic research.

Keywords: Culture of the university, Internet, tradition, technology, Indigenous knowledge, social justice, dialogical integration, constructionist epistemology

Introduction

Relatively, little attention is given in the more strictly research literature to the significance of technology in Indigenous societies and the significance of Indigenous knowledge in technology. Neither the vast body of work in technology nor in Indigenous research, have yielded much in the way of thoroughgoing analyses of interception between Indigenous epistemology and technology. Such gaps are particularly remarkable seeing that the pervasiveness of technology in contemporary times provides us with a ready-made conceptual tool for the exploration of the integration of all kinds

of knowledge including Indigenous epistemology. The concepts, 'academy', 'Internet', 'tradition', 'technology', and 'Indigenous knowledge' that bear the title of this paper carry the usage of a paradox as they seem uneasy bedfellows (Gratani, et al., 2014). These concepts are embedded with contradiction and also linkage between different procedures. The processes of the academy, Internet, and technology are inevitably interrelated. However, they are distinct from tradition and Indigenous knowledge. Tradition and Indigenous knowledge have not been compatible with academic knowledge generation (Coombes, et al, 2014; Roy, 2014). Contemporary scholarship has demonstrated that Indigenous worldviews approximate important attributes of sustainable development (Bahr, 2015; Briggs, 2013; Friesen & Friesen, 2002; Gratani, et al., 2014). In this context, Indigenous epistemology is a crucial component in the selection of the criteria for sustainable development and the formulation of corresponding goals for sustainability in a global economy (Bahr, 2015; Gratani, et al., 2014). It is therefore important to realistically assess and devise strategies for integrating contemporary technology and Indigenous knowledge.

Social informatics scholars (Kling, 1999, 2000; Star et al., 2003; Bishop et. al, 2003; Van House, 2004) argue that technology and the social are inseparable and mutually constituted and that responsive, well-designed technologies empower users. When digital systems are used in Indigenous societies for educational purposes, models need to be negotiated, and their implementation tested against the needs of the local inhabitants (Tomaselli, 2014). When conventional Eurocentric models fail to measure themselves against the development needs of the people for whom they are intended they become abstract, erudite concepts entirely removed from the practical issues of the everyday lives of people (Van House, 2004). This paper highlights the significance of the complex relations between technology and Indigenous knowledge, the problems with which they come to grips, and demonstrates that technology and Indigenous knowledge can be integrated when mediated by dialogue, problem posing and social justice (Gratani, et al., 2014). Using a community-based project as a point of reference, this paper explores alternatives to contemporary thinking about the role of Indigenous knowledge in academic research. The paper argues for research in Indigenous societies to move in the direction of a more inclusive, social justice approach to research that integrates Indigenous knowledge with technology in ways that knowledge becomes important to social living (Simonds & Christopher, 2013).

In the minds of many, university-based research is associated with the objective, scholarly account of concepts entirely detached from the real world and traditions of society (Roy, 2014; Stronach & Adair, 2014)). Indigenous people have resented academic research because they consider the researcher as a person whose chief interest is to couch theory, regardless of whether the theory has any useful significance to Indigenous worldview (Coombes, et al., 2014; Stronach & Adair, 2014). The greatest error that researchers can make is to assume that research is an isolated or secluded establishment to be contested and interpreted and decide on which knowledge is legitimate to be considered as authentic (Kovach, 2009). Because research is an agent of the wider culture that creates and promotes it, the conflicts, confusions, pressures, and counter-pressures that pervade that wider culture are bound to appear also in research. The manifestations of anti-intellectualism that permeate Indigenous epistemologies are therefore manifestations that affect, overtly or covertly, the attitudes and practices of researchers in Indigenous societies (Agbo, 2010; Regmi & Fleming, 2012). Indeed, in various ways, research in Indigenous societies has become the storm centre of research in that university-based research in Indigenous societies has been under attack that it is encapsulated in positivistic, objective principles, which in retrospect, do not tally with

the needs of the Indigenous societies (Coombes, et al., 2014; Ebijuwa & Mabawonku, 2015; Regmi & Fleming, 2012; Simonds & Christopher, 2013). These attacks have resulted in the resurgence of what has become known as the 'Indigenous methodology' (Wilson, 2001). Advocates of Indigenous methodology argue that elements of positivism in which researchers deal with Indigenous societies from a position of superior knowledge, status identities, and detachment indicate the absence of a working model or conceptual design to guide researchers in understanding Indigenous knowledge (Innes, 2009; Wilson, 2001). Moreover, research is conducted on bases of power and is not actualized for purposes of community action and change (Regmi & Fleming, 2012). However, there is very little agreement among the advocates as to the forms of research they believe will advance and strengthen research in Indigenous communities. The perennial uncertainty about research has been the question of the researcher's relation to the researched (Innes, 2009; Tomaselli, 2014). Not only this is one of the oldest questions in the annals of research, but it is also one of the most debated in research. Today, there are several approaches to that question, particularly in reference to Indigenous societies. The question in Indigenous societies is not about empiricism versus interpretation or if you may, objectivism versus relativism, but rather, the question relates to whether the researcher is an 'insider' or 'outsider', and, 'colonizer' or 'decolonizer' (Coombes, et al., 2014; Innes, 2009). This has produced a compelling desire in Indigenous scholars to propound Indigenous methodologies and laws stating necessary and unvarying relations between who should, and who should not undertake Indigenous research (Wilson, 2001). My purpose here is neither to contest the Indigenous methodologies nor to add to the Indigenous methodologies. The thesis of this paper is that there is the need for the critical examination and reformulation of beliefs about research and Indigenous knowledge.

The Academy and Knowledge Differentiation

Since the university's beginning in Italy and France in the 12th century to its extension into contemporary developing countries, the university maintains academic traditions that are resistant to change in spite of the exponential changes taking place in society (Perkin, 1984; Altbach, 1992). Traditionally, elite institutions such as the university are reluctant to break the air of mystery surrounding their existence and the codes of behaviour built over time (Tomaselli, 2014). By tradition, the university commemorates particular kinds of intellectual content and certain types of performance in carrying out its missions (Agbo, 2010; Palmer, 2000; Regmi & Fleming, 2012). The university attempts to remain a protected academy from external meddling by maintaining some form of social differentiation with some types of knowledge more valued or rewarded than others (Agbo, 2010; Quinnan, 1997). The degree of such differentiation and its significance for the way knowledge is perceived varies dramatically across disciplines and within academic departments (Agbo, 2010). Moreover, there are many different bases or criteria for such differentiation. Some of the commonest criteria for differentiation are whether knowledge has been couched in theory or in practice and whether knowledge is objective or subjective (Palmer, 2000; Regmi & Fleming, 2012).

In the perspective of Indigenous knowledge, the approach to knowledge differentiation has its positive and negative aspects. Positively, it supports the leading assumption that Indigenous knowledge is sufficiently different in its rudimentary structures and potential abilities to reach a vastly higher level of social development, self-reliance, and achievement than elitism has thus far typically offered (Briggs,

2013; Bahr, 2015; Gratani, et al., 2014). Or still, more relevantly, the capacities of Indigenous knowledge for appreciating the requisites of sustainable development are now proving to be, not merely a pleasant sentiment, but a demonstrable expectation that is supported even by scientific recognition that Indigenous epistemology is embedded in sustainability (Bahr, 2015; Gratani, et al., 2014; Simonds & Christopher, 2013). The problem is thus one of charging these capacities with the kind of recognition that no longer conceals or warps attributes of Indigenous knowledge, but rather reveals and translates Indigenous knowledge into Western ways of knowing (Fielding, 2014; Simonds & Christopher, 2013). Negatively, however, academic research has largely failed to cope with just this problem of translation. For the most part, academic research has neither asked nor answered forthrightly the crucial question of how to integrate Indigenous knowledge into academic ways of knowing so that academic potentialities may flower to the maximum (Bahr, 2015; Regmi & Fleming, 2012; Coombes, et al., 2014). In the degree of its concentration upon the positivistic aspects of research to the neglect of the subjective and cultural, research theory becomes thus far an irresponsible theory (Fielding, 2014; Regmi & Fleming, 2012). Research theory has not clearly recognized but rather has evaded the direct and logical consequence of its own priceless contribution, namely, the double necessity at once to differentiate among some forms of knowledge and to create knowledge generation arrangements according to whether knowledge is couched in theory or in practice (Palmer, 2000; Wilson, 2001; Henderson, 2011). As research theory has frequently rendered conscious or unconscious support to misunderstanding rather than understanding, to collective acquiescence rather than pursuit, the 'otherness' of Indigenous knowledge creates a conflict as to whether Indigenous knowledge can apply scientific evidence to the solution of important problems (Roy, 2014; Fielding, 2014).

The University-based Researcher and Indigenous Research

University-based researchers have long been interested in research in Indigenous societies, not merely from idle curiosity, but as a duty to secure and utilize the resources available to carry on the research agenda of the university (Agbo, 2010). Certainly, university-based research is at a crucial period as many of the methods, designs, and procedures were developed to cope with challenges of another period (Roy, 2014). Indigenous knowledge is subjective and practical and to the academic it is ultimately not an expression of worthy knowledge of the academy (Humphrey, 2013: Roy, 2014; Tomaselli, 2014). The academic recognizes Indigenous communities as significant "Others" who live within the fringes of academia. Quinnan (1997) describes significant "Otherness" as "a nameless, faceless attribute forced on disadvantaged groups different from the majority …" (p. 33). Perhaps, the clearest and most striking description of "Otherness" and the academy's or Western notion of Indigenous knowledge have been provided by hooks (1990):

> No need to hear your voice when I talk about you better than you can speak about yourself … only tell me about your pain. I want to know your story. And then I will tell it back to you in a new way. Tell it back to you in a way that it has become mine, my own. Re-writing you, I write myself anew. I am still the author, authority. I am still the coloniser, the speak subject, and you are now the centre of my talk. (p. 153)

The above quote indicates that researchers do not avoid Indigenous knowledge altogether, but most of them manage to avoid systematic or searching examination of its meaning and role and few carefully distinguish Indigenous knowledge from their favourite category of academic knowledge (Tomaselli, 2014). There are many signals that the supremacy, and surely the suitability of research traditions thinking and method in university-based research in Indigenous societies are coming to an end (Agbo, 2010; Hall, 2010). It is nevertheless evident that positivistic research traditions are being resisted and replaced by a different, almost undoubtedly a participatory emphasis and therefore by a different approach, however indistinct and uncertain the search for methodical accuracy may still be currently (Whitinui, et al., 2015). Recent changes in the knowledge-based society demand a new sociologically based appraisal of research functions and a more comprehensive consideration of relationships between researchers and Indigenous societies, which may incidentally guide the reformulations of the boundaries of research in Indigenous communities (Whitinui, et al., 2015)). The main purpose of this paper is to clarify how research in Indigenous societies can dedicate itself to integrating Indigenous knowledge with modern technology. If however, this objective can be realized, the initial duty is to realistically assess, and devise strategies for surmounting the current inherent obstacles in Indigenous research. The first obstacle is the argument from some Indigenous scholars that because meaning and understanding are beyond words, Indigenous research must follow the experience of 'insider' Indigenous people (Maina, 2004; Coombes, et al., 2014). This 'insider' point of view exerts vast influence upon who conducts research in Indigenous communities; indeed, it has slowly become the most single compelling adversary of decisions by scholars to conduct research in Indigenous communities. This quite basic postulate of the 'insider'-'outsider' argument (see Blix, 2015; Innes, 2009; Maina, 2004), which in itself makes assumptions about racial, tribal, and linguistic appropriateness of Indigenous research and no assumptions about ideological orientations of the 'insider' and no assumptions about basic fundamental values of human rights and social justice, probably applies more accurately to the past than the present (Innes, 2009; Blix, 2015). As Blix (2015) reminds us, the focus on the 'insider'-'outsider' argument only partially reflects evidence of sustaining academic style beyond the terminal point of the *actual* relevance of research in Indigenous communities.

Another resistance in the path of research in Indigenous communities is the hard realization of the ethics of research. Although there has been a secular historical trend in improving the ethics of research in Indigenous communities, this improvement has been generally limited (Coombes, et al., 2014). Maintenance and speeding up of such a trend would move Indigenous research in a better direction by allowing the formation of partnerships with less alienating undertones, better enabling university-based researchers and communities to work together (Coombes, et al., 2014). This clearly suggests strategies of research concerned with social justice and fundamental human rights, with the prismatic role of researchers in terms of conceptions of what is considered knowledge. Without such considerations about knowledge, no viable attempt at discussing research in Indigenous societies seems possible other than an analysis of the extent to which any one group of scholars justifies the expectations that they choose to set for themselves and their operational concepts. A key element in such consideration must be a sharp focus on the relations between knowledge and sustainable development. A great majority of cultural theorists have consistently pointed out the attributes of Indigenous knowledge in an explicit respect (Coombes, et al., 2014; Friesen & Friesen, 2002; Tomaselli, 2014). As Friesen and Friesen (2002), for example, write: "First Nations have an immensely formidable selling job to do, to con-

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vince the Canadian nonNative public that unless we gain respect for the planet Earth, there is no future for the human race" (p. ix). The recent revival of Indigenous methodology based on racial, tribal, and linguistic orientations will make an inadequate contribution to the advance of Indigenous research unless the concrete as opposed to the purely analytical relations between the highly atomistic and mechanistic premises of academic knowledge and Indigenous knowledge are squarely faced. Here, the issue becomes philosophical. That is to say, it becomes one of *meaning*--in this case, the meaning of the term, 'knowledge' itself. In order to clarify the significance of 'knowledge', scholars should desist from risking oversimplification of what constitutes knowledge and instead examine knowledge in terms of its contribution to the sustainable development of society (Agbo, 2010). The way in which I have reformulated the concept of Indigenous epistemology vis-à-vis academic knowledge and technology is such as to make the attributes of Indigenous knowledge central to research in Indigenous societies. In what follows, I discuss the dialogical research approach that considers community cultures and protocols in equal terms with the research agenda.

Methodology

The research design for this study drew on participatory action research and Freire's (1970) concepts of dialogue and problem posing. The use of the term *participatory action research* is akin to Cacari-Stone et al.'s (2014) notion of community-based participatory research:

 Community based participatory research is an orientation that emphasizes
 'equitable' engagement of partners throughout the research process, from
 problem definition through data collection and analysis, to dissemination
 and the use of findings to help effect change (p. 1615).

The dialogical integration of technology and Indigenous knowledge is based on Freire's (1970) concepts of dialogue and problem posing. According to Freire:

> Since dialogue is the encounter in which the united reflection and action of the dialoguers are addressed to the world which is to be transformed and humanized, this dialogue cannot be reduced to the act of one person's 'depositing' ideas in another, nor can it become a simple exchange of ideas to be 'consumed' by the discussants. (p. 77)

In the dialogical integration of technology and Indigenous knowledge perspective, Freire's (1970) approach to dialogue basically supports the participatory research methodological assumption that the validation of research in Indigenous societies consists in the categorization of aspects of social interaction in terms of communication. "Without dialogue, there is no communication and without communication, there can be no true education" (Freire, 1970, p. 81). Thus, the dialogical integration of technology and Indigenous knowledge changes the structure and orientation of existing modes of epistemological analysis and attempts to integrate or dissolve them in terms of social justice. Probably one of the major points of significance about the dialogical integration of technology and Indigenous knowledge in the present context is that it brings the problem posing principle to the forefront of research in Indigenous societies, so pushing the previously dominant positivistic principle into the background. As Freire writes of problem-posing:

> Problem-posing education, as a humanist and liberating praxis, posits as fundamental that men subjected to domination must fight for their emancipation. To that end, it enables teachers and students to become

> Subjects of the educational process by overcoming authoritarianism and alienating intellectualism; it also enables men to overcome their false perception of reality (p. 74).

An important consequence of these processes is that the power of the university-based researcher is partly replaced by power sharing with the community. In fact, social justice and shared fundamental values of human rights in conceptualization and collaborative decision-making and equitable engagement tendencies are all prominent features of the intellectual uses to which the dialogical integration concept has been put.

Dialogical Integration of Technology and Indigenous Knowledge

I began this discussion by highlighting the methodological structures and processes that constrain the perceived direction of research in Indigenous societies. There are minimal objective conditions that must be met before research can begin in Indigenous societies. Notably, there must be a socially based openness between the researcher and the community. Behind this lies the requirement of a fairly high degree of collaboration so that there is a minimally pervasive sense of participation in the project. What is of utmost importance in research in Indigenous communities is community participation and engagement and what Breen and Darlaston-Jones (2010) term "constructionist epistemology that embraces methodological pluralism" (p. 71). Breen and Darlaston-Jones (2010) define constructionist epistemology as "the notion that phenomena, including psychological phenomena, are interrelational, multiple, and dynamic, and that meanings are derived through our engagement with the social world and, as such there is no one objective truth to be found" (p. 71-72). This constructionist epistemology involves extensive inquiry into the relations between the university-based researcher and the Indigenous community. The process of research and practice in Indigenous communities is so understated, and the relationships in the process are so fragile that it is only a careful analysis of community engagement that can bring all the loose ends together and sustain a logical process of inquiry with Indigenous people. Much work in community research has hinged on taking away from the community without giving anything back (Agbo, 2010). What is crucial at this juncture is community participation with respect to what occurs in all the phases of research. The idea of community participation is both compelling and complex involving " 'equitable' engagement of partners throughout the research process" (Cacari-Stone, et al., 2014, p. 1615). The purpose here is to outline the grounds for participation. A simple hypothetical conception of community participation in research emphasizing the university-based researcher and community participation is diagrammatically sketched out in Figure 1.
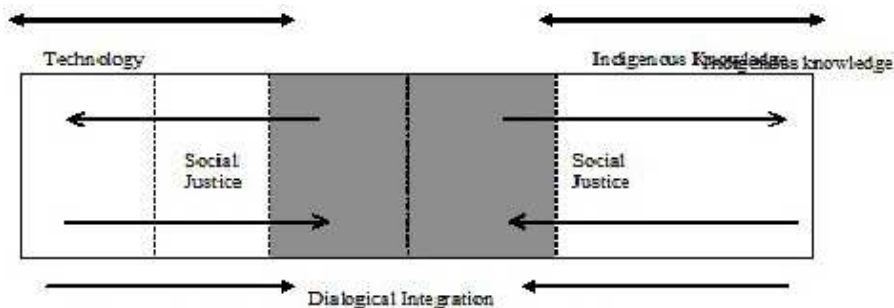

Figure 1: Dialogical Integration of Technology and Indigenous Knowledge

Figure 1 depicts a participatory research model of university-based research in Indigenous communities indicating the links between the community and the university-based researcher. Conditionally, the dialogical integration of technology and Indigenous knowledge can be imposed on the technology-Indigenous knowledge variable by a simple diagram:

Figure 1 represents the frontiers and borders of the dialogical integration of technology and Indigenous knowledge. I will attempt to define the boundaries at each end of the dialogical integration more precisely and rationalize the position of the dialogical integration across the centre of the technology-social justice-Indigenous knowledge variable.

Figure 1 shows that the borders or boundaries between the technology, social justice, and Indigenous knowledge dialogical integration are gaps rather than links, indicating a continuum in the dialogical integration. In intellectual situations, the borders between technology and Indigenous knowledge are in fact 'guarded' by social justice. Thus in the dialogical integration, it is possible to speak of border crossing in this context. This means that the dialogical integration unites complete positive components of association as well as complete negative components of dissociation. The central role of the social justice sector in positive association is bridge-building, that is of providing a continuous and trustworthy span between the two shores of technology and Indigenous knowledge; sound negative components limit themselves chiefly to social justice considerations. Thus, each of technology and Indigenous knowledge is connected with dialogical integration by the two cables of social justice. In the empirical ordering of this contradiction may be found the key to many of the pre-conditions that govern research in Indigenous communities.

An Indigenous knowledge orientation is border crossing towards the right, in the form of strong identification with social justice and Indigenous culture and knowledge. The temporal divisions in the dialogical integration (Figure 1) provide the analytical phases of pre-research and post-research. The ordering of information by participants and the resulting actions and processes in the dialogical integration can justifiably be explained in the context of leading to, or departing from the actual dialogical integration itself. By taking the dialogical integration as vital to the analysis, time period can be stipulated in relation to the state of social justice that governs it. In this way we can also define technology and Indigenous knowledge more closely. At the core of university-based research lies a foundation embedded in the positivistic concept view of research, underpinned by a particular characterization of objective values, goals and norms that are, in the context of the present analysis, technology-oriented. Thus it is for the technology-oriented legacy of the dialogical integration that makes it necessary to make comparisons (associations) to positivistic research tradition as a value referent. Where technology empowers users, it moves towards social justice hence dialogical integration. In general, it can be stated that Indigenous knowledge-oriented situations, in their view of positivistic research orientation, tend to move from association to dissociation emphasis while technology situations tend to move the other way, from dissociation to association emphasis, but both are mediated by social justice orientations. In technology-oriented situations, when digital systems are used in Indigenous societies for educational purposes, models need to be negotiated, and their implementation tested against the needs of the local inhabitants. Conventional Eurocentric models that fail to measure themselves against the development needs of the people for whom they are intended may be inadequate and lack dialogical integration.

Technology and Indigenous knowledge thus become contingent orientations

from which the dialogical integration may be reached and into which a dialogical integration may develop (see arrows in Figure 1). Integration itself provides the focal point of analysis and in course of time, both before and after, a view of it may shift to more technology or Indigenous knowledge orientations. In Figure 1, the integration of technology and Indigenous knowledge can be viewed as operating horizontally in two directions: towards Indigenous knowledge in the far right, and towards technology in the far left. Instead of viewing dialogical integration simply as importing technology attributes or alternatively as a conflict between technology and Indigenous knowledge, the creating of a boundary of learning where there is the need to go beyond Indigenous traditions and culture and promoting a cross-fertilization of insights, practices and mental archetypes of technology, becomes the central focus of what has become known in this context as dialogical integration. The notion of technology already implies a particular characterization of technical, Eurocentric values, goals and norms. However, the most convenient and realistic characterization of the preferred research situation is dialogical integration (see shaded portion of Figure 1). At this stage of investigating the dialogical integration, however, the problem of how and in what form technology is integrated with Indigenous knowledge may be more crucial, especially in any comparative and theoretical approach. The un-shaded right portion of Figure 1 shows complete uncontaminated Indigenous knowledge in the dialogical integration beyond the confines of the influence of technology.

Figure 1 also indicates the pathways of interaction of the university-based researcher with the indigenous community. The interaction is informed by a dynamic symbiotic relationship in which the university-based researcher is represented by technology, and the community represented by Indigenous knowledge. The researcher and the community co-exist in a collaborative process tied to social justice. In this participatory model, the indigenous community (Indigenous knowledge) originates the research problem, defines the problem and then requests the university-based researcher (technology) as a participant. The university-based researcher may have assumptions regarding the existence of the research problem in the community and puts oneself out to be requested by the community as a research partner. This putting of oneself out to be requested by the community may be done in several ways including volunteering in the community school, attending conferences with community participants, presenting keynote speeches, and so on. In doing so, all activities and practices are guided by principles of equitable engagement, fairness, equitable participation in decision-making, and the sharing of the fundamental values of human rights and social justice (Cacari-Stone, et al., 2014). Guided by principles of fundamental values of human rights, the community and the university-based researcher lay out the functions that university and community researchers should play in the process; the strategies to be adopted; the understanding of power relationships; the prospects for collective learning; and, the production of knowledge that is linked to action.

Guided by social justice principles of equity and fairness, the community and university-based researcher become a complementary and a connected whole that leads to a participatory research relationship. The participatory research relationship acts like a new kind of enhanced intellectual and social ground that leads to knowledge integration; a kind of reciprocal learning that is transferred back to the community and the university-based researcher. Thus the goal of the participatory research concept is to provide essential infrastructures for what will lead to a collaboration that will eventually transform indigenous communities, aid the development of the communities, improve living conditions for community residents and enhance the university-based researcher's understanding of the phenomenon under study and the researcher's work

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as a whole. The particular characteristics of the collaboration are that the university and the community differ in all aspects, but they are highly interactive, each tending to mold and shape the other. The interdependence of the university and the community means that a significant change in the community would result in some adaptation in university-based research and vice versa.

The Indigenous Knowledge Sector

The indigenous knowledge sector in Figure 1 embodies the Indigenous community and its immediate natural environment (Bahr, 2015; Regmi & Fleming, 2012). As Bahr (2015) argues, "The [Indigenous] environment is not perceived as something that needs to be brought under human control but as an extended, inclusive set of relationships in which all beings are to be respected and cared for" (p. 71). Similarly, Regmi and Fleming draw a parallel between Western scientific knowledge, and Indigenous knowledge stating that "Unlike Western scientific knowledge that is based on reduced and simplified structures, indigenous knowledge is based on more complex and interconnected systems" (482). In the dialogical integration model, the community should be the origin of the research problem (Agbo, 2010). At first sight, there remains the difficult task of casting the indigenous community in new roles and fashioning structures for research. Most people in indigenous communities do not have even nodding acquaintance with university-based researchers, let alone inviting and working with them on research projects. For effective research in indigenous communities, it is required that the research problem should originate from the community (Agbo, 2010). This conception of the bottom up process of research introduces the notion of simultaneously connecting the university to the community as a mechanism self-adjusting to receive information and give information, from, and to the university and the community respectively.

Social Justice

A conclusion to be drawn from Figure 1 concerns the range of options available at each level of research. Clearly, it is greatest at the social justice level that acts as a conduit between Indigenous knowledge and technology. Social justice provides the patterns of resultant research behaviours between different levels, different roles and between levels and roles. I am, thus concerned here with the major developmental attributes arising out of different levels of collaborative research, especially the extent to which the experiences of researcher and community can be identified and 'typed' in accordance with fairness, equity, and fundamental values of human rights. Thus in my discussion of dialogical integration, I utilized the example of community-based participatory research concept and its relevance and saliency in enhancing learning of researcher and the community. It is the patterns of orientations and the relations that actually define the dialogical integration of technology and Indigenous knowledge. The community-based participatory research situation imposes functions of research, learning, and action that differ from those in traditional, typical traditional university-based research both in quality and the degree to which researchers and communities become autonomous, independent partners in research and learning.

Dialogical Integration

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Dialogical integration is a practical approach to university-based research in indigenous communities. By dialogical integration, I mean an alternative vision to traditional positivistic research. Although the term "university-based researcher " is often used, the researcher in the indigenous community does not consider oneself as an adept university-type researcher ready to demonstrate a list of research skills to which researcher and partners must aspire. Rather, in contrast to the traditional role of the university researcher stressing the notion of objectivity to which researchers must strive to become, the researcher attempts a dialogical integration that underscores the primacy of interpersonal reasoning and reflectivity (Maina, 2004). The phenomenon I refer to, as dialogical integration is first, the collaborative educational goal-setting aspects of community-based research, and, secondly, the non-power aspects of the university-based researcher. Thus the common ethos of the dialogical integration in indigenous communities described above consists of a positive attitude towards the community with an emphasis on building a collaborative research community, and a desire for collaborative action, valuing Indigenous knowledge as well as technology. There are actually qualitative differences between organized traditional research and those forms of contact the university-based researcher makes in dialogical integration. On the one hand, the latter involves the building of a collaborative partnership from which both researcher and the community derive meaning (Agbo, 2010; Hall, 2010). These meanings affect the partners but they can establish closer ties with dialogical integration more directly than traditional research. Thus, the learning contained in dialogical integration penetrates the minds of community members in a way that is less discursive and more direct and purposeful. Dialogical integration also includes the current investigation of the relations between researchers and their research assignments including power relationships, collaboration on the elements that bring development to the communities, flexibility and adaptation, and transmitting to communities the meanings of the elements and thus subjecting communities to sustainable development. In short, the difference between traditional research and dialogical integration refers to what has been planned for carrying out research, as opposed to what has not, although the latter is perhaps structured in a form more directly related to contextual and situational circumstances. In dialogical integration, the influence of the university-based researcher and the community must be viewed as operating prismatically in two directions; externally towards the other (that is, researcher to community and vice versa), and internally against institutional socio-cultural and political obstacles. Simply, dialogical integration involves the creation of a new concept of community research that debunks the existing structures of university research in place of research for sustainable development.

Implications

The theses of this paper carry implications for research in Indigenous communities. First, for successful participatory adaptation of modern technology for educational purposes in Indigenous societies, Indigenous communities must become co-decision makers with researchers at every stage of the strategy. Too often, technological design and evaluation are characterized by features that are detrimental to the education of those outside of the social, Eurocentric mainstream (Warschauer, 2003). Secondly, the findings support the notion that technological and curricular designs need to support community determination, flexible cultural interpretations, and adjudication of cultural values across social boundaries. Digital environments hold the promise of richer curricula, enhanced cultural pedagogies, more effective organizational structures, stronger

links between institutions of learning and community, and the empowerment of disenfranchised learners and groups (Trotter, 1998; Bishop et al, 2001; Behrmann, 1998). Thirdly, it is important to consider traditional concepts as a viable knowledge source for theorizing and conceptualizing research in Indigenous societies. The study also implies that doing research *with* and not 'for' Indigenous people means research should be dialogic and include the shared experiences of all stakeholders, privilege all forms of knowledge and above all share skills and knowledge between and among the participants.

It follows that the integration of Indigenous knowledge and modern knowledge requires concerted formulations of research arrangements designed on social justice and fundamental human rights (Gratani, et al. 2014; Simonds & Christopher, 2013). This means the denunciation of certain institutions of university-based research practices such as the rejection of objectivism in favor of relativism to which Indigenous knowledge belongs. This implies a normative conception of Indigenous research. A normative conception of Indigenous research requires a research agenda based on a larger degree of a collaborative enterprise between the university-based researcher and the Indigenous community. Equally, a normative conception of Indigenous research should repudiate practices that exploit Indigenous communities for the benefit of university-based scholars, practices that fail to give equal powers and rights to Indigenous communities, and practices that deny the full resources of community knowledge to community people (Freire, 1970; hooks, 1990; Tomaselli, 2014; Stronach & Adair, 2014). That is to say, dialogical integration requires concern with the goals of social justice, fundamental human rights, and social goals of Indigenous communities just as concrete and magnetic as the research goals of the university-based scholar.

Furthermore, this study implies that the required norms of research in Indigenous communities should consider whatever ingredients of community experience may be compatible with scientific premises of university-based research, and incorporating such qualities of Indigenous people's epistemology, hope, and reverence as seen essential to the ability of realizing the expectation of university-based research (Ebijuwa & Mabawonku, 2015; Tomaselli, 2014). Such qualities would expectedly express a deep need in university-based scholars for identification with a larger, more encompassing whole than can be found in the transitory surroundings of the academic world.

Conclusion

The order in which the analysis proceeded was, inevitably, arbitrary and therefore concealed some fundamental connections. These may now be clarified. I began this paper by pointing out the shortcomings of the academy and the university-based research in indigenous communities. Few theoretical works in the field have indicated the significance of Indigenous knowledge as such and only a few appear to have systematically incorporated the impact of Indigenous knowledge on technology (Briggs, 2013; Gratani, et al., 2014; Simonds & Christopher, 2014). Scholars in Indigenous methodology too have neglected the problem, having become increasingly concerned with the deep-rooted 'insider'-'outsider' underpinnings of Indigenous research. When for example Indigenous knowledge has been studied, the tendency has been to concentrate on its socio-cultural constituency rather than the actual uses of Indigenous knowledge to benefit society as a whole in contemporary times (Friesen & Friesen, 2002; Gratani, et al., 2014). In this context, I tried to show that the analytical theory of research in indigenous societies must be placed in a culturally subjective context. I also illustrated that the distribution of power among university-based researchers and communities is of

central importance. A study of indigenous communities that excludes power analysis between the researcher and the community provides at best a fragmentary hypothesis of the research. In this context, community-based participatory research helps to transform university-based community research into a dynamic prescription of social justice. I introduced the community participatory research as a dialogical integration model that leads to social justice as a core referent in the analysis of community-based research. In this outline of the dialogical integration model, I have designated participation in decision-making and consensus, social justice and shared fundamental values of human rights as the key elements in research in indigenous communities. I would strongly urge that the notion of dialogical integration should be firmly divorced from any conceptions of Indigenous research in a prescriptive sense, and more particularly should be divorced from any automatic association with the concepts of Indigenous methodology—in whatever way the latter may be defined; it must also be divorced from consensus based on pseudo consultation.

Thus I advocate the shrinking of the concept of dialogical integration to encompass merely the process that involves a change over from a university-based traditional research to an interface with indigenous communities based on genuine participation and reciprocal learning and girded by social justice and fundamental human rights. The most obvious tendency to note at this point is the frequent argument—sometimes implicit, sometimes explicit--that it is difficult to see the extent to which the university-based researcher could belong to a single and relatively homogeneous group and accept and tolerate multiple and other perspectives. What then, is distinctive about the present analysis is that within the context and through the facilities of effective networks, the university-based researcher and indigenous community relations can be mediated and defined in terms of a system of culturally structured and shared values, beliefs and symbols about learning in a participatory research model. But this mediation is usually constrained by the mystic allegiances and social differentiation conflicts overtly manifested in the university (Bahr, 2015; Stronach & Adair, 2014). There is, therefore, the need for a simultaneous plan of action to attain the proposed dialogical integration. Such a plan borrows from Indigenous epistemology. At the same time it involves socio-cultural, political, and academic strategies capable of overcoming the obstacles between the university-based researcher and the Indigenous community and of powerfully consolidating the relations between them in behalf of dialogical integration of Indigenous epistemology and Western knowledge (Simonds & Christopher, 2013).

Finally some comments on the scope of the dialogical integration model may be needed. As I have already shown, the dialogical integration model provides symbiotic learning opportunities for university-based researchers and indigenous communities. The model portrays the condition of an all-inclusive research process embracing all the elements involved in social justice and shared fundamental values of human rights. Dialogical integration should invoke a seamless web of research that prepares university-based researchers to develop a kaleidoscopic view of research. The questions posed by the processes of research in indigenous communities will not go away and may continue to move back toward the top of the university-based research agenda. Since Indigenous communities are the nexus of sustainable development, this millennium may be a time for some profound and widespread changes in community-based research. In many cases, there are reasons to be optimistic and to continue working on the nuts and bolts of alternative research frameworks for sustainable development. Certainly, dialogical integration through collaboration should be on the agenda of university-based research and that researchers should desist from being miserably

obsessed with *rationality and objectivism* rather than with *knowledge integration and meaning making.*

Correspondence
Dr. Seth Agbo
Lakehead University
Orillia, Ontario Canada
Email: sagbo@lakeheadu.ca

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