Reflecting on Participatory Research in Environmental Education: Some Issues for Methodology

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Abstract

We reflect on methodological issues arising in two of our own research projects as a form of practice, as a way of engaging in a praxis of project research. The projects chosen for this purpose are themselves concerned with teacher education and curriculum development in environmental education: they include participatory "reflective practice" processes in exploring issues relating to formal education in schools and informal education in communities and are grounded in the specific contexts of developing countries. We discuss issues in participatory research such as:

- *Whose research agenda gets to be explored?*
- *The importance of project partnerships*
- *Participants' preconceptions about the nature of research*
- *What is "rigor" in participatory research in environmental education?*
- *The Colonialist Dilemma: Avoiding the "package or perish" mentality*
- *The Bigger Picture: Technocratic Rationality and Participatory Research.*

Résumé

Nous présentons dans cet article un ensemble de réflexions d'ordre méthodologique qui ont émergé de notre propre praxis de recherche, en nous penchant davantage sur deux projets que nous avons menés dans un contexte de coopération internationale. Ces projets concernent le développement curriculaire et la formation des enseignants et animateurs en éducation relative à l'environnement ; ils se caractérisent par un souci de contextualisation et par l'adoption d'un processus participatif de pratique réflexive associé à l'exploration de problématiques relatives à l'éducation formelle en milieu scolaire et à l'éducation non formelle en milieu communautaire. A la lumière de ces projets, nous abordons les questions suivantes qui ont trait à la recherche participative en éducation relative à l'environnement:

- *le partage des pouvoirs dans le processus de recherche : qui décide quo et pourquoi?;*
- *le rôle et la signification du partenariat de recherche;*
- *les conceptions initiales de la recheche chez les participants : un défi de changement;*
- *la notion de « rigueur » : à la recherche de critères;*
- *l'enjeu colonialiste du « dumping » de matériel de formation;*
- *une problématique globale : la rationalité technocratique et la recherche participative.*

Towards a Praxis of Research in Environmental Education

At various times we have advocated the adoption of reflective practice in professional development in environmental education (Robottom, 1993, 2000; Robottom & Kyburz-Graber, 2000; Sauvé & Orellana, 2002). We have been involved in projects that seek to promulgate such an approach. We believe that reflective practice is especially important in the field of environmental education, which is "doubly idiosyncratic": the subject matters of environmental education are socially constructed and tend to be highly political in nature; and this in turn poses pedagogical and curricular difficulties in a field whose early history tended to favour the more "objective" subject matters of (environmental) science content. In environmental education, the subject we are engaging educationally is not the environment *per se*, but the web of relationships among people and the environment (between persons, their social group, and the environment) (Sauvé, 2001). The complexity of the task calls for a deep psycho-social transformation, for the development of complex reflexive and action competencies, while most often addressing very complex socio-environmental issues which are inevitably shaped by human beliefs, values, and interests. It is the inevitable presence of these human beliefs, values, and interests in the subject matters of environmental education that imposes a special need for a reflective form of professional practice.

In this article we wish to reflect on two of our own recent research projects as a form of practice—to engage in a praxis of project research. The projects that we have chosen for this purpose are themselves concerned explicitly with teacher education and curriculum development in environmental education. We will then consider a number of issues we have experienced to a greater or lesser extent in these projects.

Australia/South Africa Institutional Links (AusLinks) Project[1]

Background

The project, "Educating for Socio-Ecological Change: Capacity-building in Environmental Education, focussing on South Africa's tertiary educators," was funded by AusAID and administered by IDP Education Australia as one of its Australia/South Africa Institutional Links projects. This project took place in 1998 and 1999 within the social/cultural reconstruction context of immediately post-apartheid South Africa, and involved six South African tertiary institutions (Shingwedzi College, Tlhabane College, Tshisimane College, University of Venda, University of Stellenbosch, and Rhodes University) and two Australian universities (Deakin University and Griffith University).

Geographical and Socio-political Context

The significance of the project needs to be viewed against the immediate history of South African social life that existed for several decades through to the early 90s, just before the beginning of this project. This period of South African history saw a minority white government, through the policies of apartheid, systematically oppress and deny educational opportunities for people of colour. Education itself was used as an instrument in developing and maintaining a set of power structures and relationships in which people of colour were severely disadvantaged. The AusLinks project was constructed with a view to addressing and perhaps in part redressing some of these historical inequities in a small way in the particular field of environmental education. It was for this reason that participatory, critical approaches to educational research were adopted as the theoretical underpinning of the project. It was felt that an approach to research that was characterized by the principles of contextuality, responsiveness, and critical praxis was required in order to create the opportunities for previously disadvantaged people to generate their own vision of education and to construct their own curriculum in accord with this vision (LeGrange, Makou, Neluvalani, Reddy, & Robottom, 1999).

Guiding Principles

The project was explicitly grounded in ideas emerging from the period of methodological debates referred to earlier. Instead of following a single defined process of professional development or adopting and adapting a single set of existing environmental educational materials, the approach was to simply work flexibly within a set of principles concerning professional development that were developed in response to the methodological debate. These principles were that professional development should be:

- *contextual*: that professional development respects and relates closely to the particular workplaces and workplace issues of participants;
- *responsive*: that the issues explored in the professional development processes are those of interest and concern to participants themselves;
- *emergent*: that the professional knowledge that carries most weight in discussions about how to improve professional practice is that which emerges from the case study work lying at the centre of the professional self-development process;
- *participatory*: that participants are involved directly and as equitably as possible in all dimensions of the professional development process (for example: identifying issues to be addressed; collection and analysis of case study data; development and dissemination of materials and reports);
- *critical*: that the processes of professional development look beyond the surface layers of activity at the levels of policy, organization, and practice to

identify and appraise the values, assumptions, and interests that inform and justify this activity; and

- *praxiological*: that processes of professional development proceed through and are mediated by *praxis*—defined in this project as a reflective interaction between personal professional theory, personal professional practice, and the professional settings within which these are intelligible (Robottom & Kyburz-Graber, 2000).

Main Processes and Representative Activities

The overall focus of the AusLinks project was on the professional development of new and existing environmental education staff in participating tertiary institutions. The part of the project being reported here sought to enhance research and professional capacity by working with colleagues in a process of workplace-based participatory research aimed at the development of original case studies of changing environmental education practice.

The process by which the project was enacted is explained in a paper presented by project participants at the 1999 annual conference of their national professional association (the Environmental Education Association of Southern Africa): essentially, it involved participants in the development of illustrated case studies of environmental and environmental education issues of interest and concern to them as professionals in the field. The process of development of these case studies comprised a series of workshops in which participants progressively constructed, critiqued, and revised their illustrated case studies. A feature of these case studies is their diversity and contextuality (LeGrange et al., 1999).

This participatory research project resulted in several valuable outcomes, including:

- greater capacity and confidence on the part of many project participants;
- the greater availability in South Africa of materials and resources from the Australian context;
- the development by South Africans of new, contextually relevant materials in South Africa for South Africans;
- the establishment, extension, and deepening of collegial and intellectual networks; and
- overall a greater sense of what can be achieved through collaborative collegial work involving representatives from a range of tertiary institutions across South Africa.

Linkages have been established among a wide range of South Africans, and the participating Australian partners, in a field where such linkages did not exist before the project, enabling all the outcomes mentioned above, but also enabling the less tangible benefits of enhanced formal and informal professional

and academic conversations among colleagues. Importantly, since the conclusion of this project, a number of South African project participants have advanced to positions of responsibility in the fields of curriculum development and professional development in South African environmental education.

The EDAMAZ Project [2]

A University Partnership for Community-Based Environmental Education and Research

EDAMAZ (Environmental Education in Amazonia) is a university partnership project, which associates the Université du Québec à Montréal with three Latin-American institutions: the Universidad Gabriel-René-Moreno (Bolivia), Universidade Federal de Mato Grosso (Brazil), and Universidad de la Amazonía (Colombia). The main phase (1996-2001) has been financed by CIDA (the Canadian International Development Agency), in the framework of the AUCC's (Association of Colleges and Universities of Canada) University Partnership in Cooperation and Development Program. With the purpose of assisting Amazonian populations develop competencies that promote critical involvement in the resolution of socio-environmental problems and in ecodevelopment initiatives, the project consisted of creating programs for the professional development of professors, teachers, and other educators in the field of environmental education, paying particular attention to the gender issue.

Three types of programs were developed:

- an international program for the members of the four university teams participating in the project, to develop competencies in curriculum design, program management, and research in the field of environmental education;
- university on-campus programs for educators who wish to become pedagogical or socio-cultural leaders—or facilitators—in the field of environmental education; and
- distance education programs (in different rural and poor urban zones) for teachers who wish to integrate environmental education into their daily practice.

These three types of programs are closely related: the members of the university teams set up the conditions for the pedagogical or socio-cultural leaders (or facilitators) to engage in professional development; the facilitators in their turn accompany the teachers in the process of integrating environmental education in their own "school-community" context. What is learned at any level of this integrated process is thus reinvested in the other levels. In terms of quantitative results, the EDAMAZ project developed 7 programs and reached more than 900 professors and 11,450 children, their parents, and other members of their community.

Guiding Principles

The main guiding principles for this project are presented, recognizing the different dimensions of the project:

- EDAMAZ as an internal cooperation initiative;
- as a professional development process; and
- as a research project.

EDAMAZ as an international cooperation initiative adopts the main following principles:

- the endogenous character of the project: the desire to promote environmental education came from the Latin-American partners—the project was collectively designed;
- the process of learning partnerships rather than one of experts delivering training;
- the importance of valuing the multicultural, multidisciplinary, multilingual context of the project, as a rich diversity and as a crucible for the emergence of knowledge, understanding, and know-how;
- the importance of promoting solidarity in sharing responsibilities; and
- the long lasting effects and impacts of the project outcomes.

EDAMAZ as a professional development process implies the adoption of the following integrated main approaches:

- An *experiential learning* approach, which implies learning about curricular, pedagogical, or strategic aspects and issues of environmental education by assuming the reflexive task of conceiving and experimenting with environmental education projects. The assumption is that an endogenous and contextually appropriate theory of environmental education can emerge from a reflexive stance in and on action, as a form of praxis.
- A *collaborative* approach: because of the complexity of the environmental issues and because of the need for interdisciplinary work, professional development in environmental education calls for a collegial process, in which participants combine their talents, experience, and knowledge, so as to help each other to develop competencies in the field of environmental education.
- A *community* approach: environmental education implies opening the school towards the community and inviting community members to work together to solve environmental problems or to conduct eco-development projects. It is a matter of strengthening the cultural identity and sense of belonging to community and place, and of enhancing the ecological as well as the economical conditions of the shared "home of life." In this perspective, educators become community leaders for environmental reflection and action.
- A *critical* approach toward the social, environmental, and educational realities of the project's own milieu, so as to identify the possibilities and limits

encountered in transforming problematic situations. Particularly, there is a need to identify and appraise the deep roots and concrete manifestations of oppression and inequity, so as to adequately address these issues.

EDAMAZ, as a research project, aimed at enhancing participant universities' capacities in educational research, adopts the following interrelated guiding principles:

- Research to be integrated with professional development and teachers' education activities, and with field educational intervention. Four main types of research were conducted: diagnosis research, action-research, development research, and evaluative research;
- Research to be participatory, conducted collaboratively by the main actors of the situation (in this case, professors, teachers, and other educators) as co-researchers (Heron, 1998; Lammerink & Wolffers, 1998);
- Research to be community-based, addressing community issues and inviting community members to participate in the research activities, so as to ensure their relevance, enrich the results, and optimize the outcomes; and
- Research to be critical, essentially intersubjectivist, dialectical, and dialogical, oriented towards the transformation (improvement) of the conditions of persons, social groups, and situations (Robottom & Hart, 1993).

Main Strategy and Activities

In its core international cooperation process as well as in the different professional development programs, EDAMAZ adopted the main macro-strategy of the learning community. This strategy essentially involves structuring a working group and creating conditions for learning together around a common project that has significance for the participants and relevance for the context and is aimed at change: changes among the participants' practices and/or in their professional or institutional conditions (Orellana, 2002; Sauvé & Orellana, 2002).

The main activities of the numerous and diverse learning communities (considered also as research communities) developed in the context of EDAMAZ are workshops and group discussions concerning for example the eco-diagnosis of the milieu, the critical analysis of social, environmental or educational issues, the conception, implementation and evaluation of professional development or environmental education projects and programs, and finally, communication so as to diffuse, share, and discuss the results of their reflection and work.

Issues in the Conduct of Participatory Research

Nothing is easy in participatory project research; in part, it is a matter of balancing opportunities and constraints while operating flexibly within a set of guiding principles based on certain epistemological, ontological, and ideological

assumptions which themselves need to be subject to continuing appraisal. In this section we intend to reflect on the experiences of these projects and to present some of the issues we have found to be associated with participatory, collaborative research.

Whose Research Agenda?

One of the distinctive features of participatory research is its focus on issues of interest and concern to participants themselves. Perhaps unlike some other forms of educational research whose claims for rigor depend in part on conscious attempts to retain a de-politicized perspective in the operations of the research, participatory research is unavoidably political and necessarily politicized. Participatory research proffers itself as an agency for "inside" project participants to address existing power relationships that may be perceived as inequitable in one sense or another. Participatory research has an interest in internalizing the locus of control over the research agenda by encouraging participants to direct the research towards issues of interest and concern to themselves (Hart, Robottom, & Taylor, 1994). A relevant methodological question concerns how to ensure a focusing of the research on issues of interest and concern to participants.

In the Auslinks project, a link between South African researchers and Australian researchers was actually initiated by the South African environmental educators with a view, in part, to strategically base the project on the principles of participatory, community-based research. Firstly and most importantly, this was an opportunity for environmental education research to attempt (in some small way) to actively engage and perhaps partly redress some of the effects of a recent and very obvious history of oppression—namely the historical denial of opportunity for people of colour to develop and shape their own educational materials and experiences. In a very secondary sense, it was an opportunity to "test" the appropriateness and adequacy of socially-critical research within a self-evidently socially and politically charged context of post-apartheid South Africa—this amounted to a test of the idea of coherence between research methodology and the substantive issues being explored in the research.

The use of cameras as a device for participants to capture images of issues of relevance to them was consistent with the principles of participation and responsiveness; in the event, the issues that were explored through the participant-developed case studies were selected totally by participants and explored by them in response to perceptions about local community needs. A clear example of this was the choice in the North-West Province of the issue of AIDS/HIV in the mining community at Rustenburg. This issue was of crucial importance to members of that community (there was a very high infection rate) and the political character of the issue is equally clear when it is seen that the project succeeded in developing an educational curriculum on this topic where none had existed under the previous educational provision.

In the EDAMAZ project, as stated above, the initial idea of an environmental education project arose from a meeting of UNAMAZ (a web of universities in the Amazonian region) who invited our team from UQAM to share experience and resources with three institutions of the Amazonian region in the process of conceiving and implementing professional development programs in this particular field. Since the very first discussions with the partners, it became clear that to be relevant, environmental education should be community-based and that EDAMAZ would be conducted in a participatory research process, grounded in the project activities.

The first step was to work on a participatory diagnosis (Le Boterf, 1981) of each of the specific regional environmental, social, and educational contexts of the participant universities so as to conceive contextually appropriate professional development programs and to orient our research questions. The process of this diagnosis was collectively constructed and was the first opportunity to discuss and learn together. The idea of promoting the learning community as the basic dynamic of our project emerged from this first step. Thus, we experimented at our inter-university team level the same experiential, collaborative, reflexive, critical, and community-based process we propose in the different programs we developed for teachers and other educators. One of the main characteristics of this process is to associate professional development with research activities about, in, and for environmental education interventions so as to develop progressively a contextually appropriate and coherent environmental education theory and practice.

The "acid test" for participatory research is that the issues that come to be the focus of the research are those of interest and concern to participants themselves—issues which have meaning within particular social, environmental, cultural, and educational contexts. The methodological issue for participatory research is to find ways to ensure that this happens.

The Importance of Project Partnerships

Most of the examples of participatory research we have been associated with have been collaborative in nature. They have been collaborative in the sense of involving a collective of people in as many different aspects of the research as possible, partly as an alternative to the more usual division of labour that occurs in research (where "researchers" are disjoined from the "subjects-as-objects" of research), and partly because group reflection on practice can be more powerful than individual reflection (Robottom, 1987) and has a greater potential for production of contextually relevant knowledge. But in each of the projects described earlier, the collaborative work engaged in during the project continued beyond the life of the project itself. Networks of colleagues established during the project have, to some extent, attained a life of their own that has continued to serve project participants well in both intellectual and political terms. In the case of the EDAMAZ project, these networks are being maintained

resulting in continued professional linkages and exchanges among the many participating countries; the project has reinforced the regional and national leadership of our partners in environmental education. In the case of the AusLinks project, the continuing network of former project participants has been partly responsible for the advancement of several people to positions of greater responsibility within the South African educational system. In this latter case, the "track record" of productive work has also served former project participants well as they sought positions of changed responsibility within their professional arena.

Participants' Preconceptions About the Nature of Research

Participatory research by definition involves the collaboration of research partners in as many of the phases of research as possible. However, different participants come from different backgrounds—for example participants in the community-based projects come from a community development background rather than from a formal educational research background. In our experience, it can never be assumed that participants come to the project with a common "default" construction of what counts as research in environmental education. Some participants approach a project with the expectation that the research is of an "accountability exercise" kind, in which university-based researchers seek to measure the achievements of other participants against a set of independently-existing and externally-derived set of criteria. Many assume that the very word "research" entails the employment of quantitative applied-science research designs. It has been important to recognize these prior assumptions about the nature of research and to engage them directly very early on in project discussions, and for the evolving methodology-in-action to be the subject of open and continuing negotiation. This is one of the reasons why it usually takes time to build a research culture within any new project community.

What is "Rigor" in Participatory Research in Environmental Education?

In the 70s and 80s, research in environmental education, in North America at least, was dominated by a "ruling discourse" of applied science research, where objectivist, behaviourist, and quantitative approaches were represented and uncritically reproduced within the field, not least by the editorial policy of the *Journal of Environmental Education* whose editorial policy seemingly constructed "research" in terms which favoured almost exclusively forms of research which conformed to accepted criteria of applied science approaches. The assumption in this context that research was almost obliged to be positivist in nature was relatively unchallenged until 1990.

At the 1990 conference of the North American Association for Environmental Education (NAAEE), a symposium organized by Paul Hart, Rick Mrazek, and Ian Robottom titled "Contesting Paradigms of Environmental Education Research" was conducted, the proceedings of which were subsequently published under

a different title (Mrazek, 1993). One of the outcomes of this colloquium was the realization that environmental education research—and the reporting of such research—needed to be regarded as problematic (as "contested") and in need of deliberation and critique.

Partly in response to this realization was the organization of another symposium at the 1997 NAAEE conference titled "EE Research: Guidelines for Excellence," whose stated aim was: "EE research has been criticized for lack of rigor and educational merit of reported findings or results. This workshop will introduce research methods and designs and provide guidelines intended to improve the status of EE research and reporting of findings." The intention in the symposium was thus the instrumentalist one of improving the rigor of environmental education research by actually *providing* guidelines for improving the status of research. This was duly done: the conference organizers (the North American Commission on Environmental Education Research—NACEER) tabled a number of documents and statements relating to research in environmental education (see Smith-Sebasto, 2000), but all these tabled documents were perceived by workshop participants as being drawn from quantitative research traditions. Rather than accepting these "provided" guidelines, the workshop participants decided to develop their own sets for qualitative approaches. The resulting draft set of guidelines was published in 2000 (Smith-Sebasto, 2000).

The issue of the journal in which these guidelines were published, *Environmental Education Research* 6(1), includes articles appraising this draft set of guidelines. It is clear from these articles that this set of guidelines remains contested, and that the notion of rigor in environmental education research remains problematic.

Against this background, members of the University of Quebec at Montreal's (UQAM's) Centre for Environmental Education Research engaged in a seminar on the topic of rigor in environmental education research. The approach was simply to reflect on how "rigor" was constructed in the various research projects engaged in by Centre participants—that is to start with the concrete research practice gained in the 10 or so projects currently underway within the Centre in proffering ideas about the topic of rigor in environmental education research. Some of the perspectives advanced were:

- Standard dictionary definitions refer to such qualities as severity, strictness, harshness, fixity, hardness. Such standard definitions seem to reflect characteristics of quantitative research rather than those of the now broad range of research approaches;
- Integrity, honesty, and humility on the part of the researcher are part of what it is to be rigorous;
- Above the *a priori* quality of any particular research design, rigor calls *a posteriori* for methodological transparency (relating what really happened) and acknowledgement of the inherent and externally-imposed limits of the research;

- It is important to negotiate the research agenda with project participants;
- Ethics is essential part of rigor. In participatory research, to be ethical in part means to conduct research that is relevant to participants, to make sure results are collectively discussed and interpreted with participants, and to share with participants the act of research communication and diffusion, so as they are recognized as full actors of the research process and of the production of knowledge;
- Self-reflection of the practice of research is a component of rigor;
- Processes of iterative synthesis of research accounts add to the rigor of research;
- Processes of collaborative self-evaluation contribute to rigor;
- A questioning of the dominant discourse is an element of a rigorous approach;
- Internal coherence among the philosophical assumptions (epistemological, ontological, ideological . . .) underpinning the research is another element of rigor in research; and
- It is possible that the concept of "rigor" is fatally flawed through its historical construction within an applied science conceptual framework and that in fact we should be using a different term altogether to qualify desired characteristics of participatory research.

It is clear that continued careful reflection on the meaning of rigor, or an alternative notion for appraising the quality of research, is required in the field of qualitative approaches to environmental education research, particularly participatory environmental education research.

The Colonialist Dilemma: Avoiding the "Package or Perish" Mentality

The "colonialist dilemma" referred to here arises when central agencies seek to become involved in curriculum development. The dilemma faced by high profile international agencies is how to achieve their aims of producing materials designed for international dissemination without leaving themselves open to criticisms concerning the colonialist impact of these materials. Put another way, the dilemma is how to widely disseminate useful accounts of practice in environmental education without being seen in colonialist terms as privileging certain cultural subject matters (and the social contexts they are embedded in) over others (Dillon, 1999; Robottom & Kyburz-Graber, 2000).

One solution adopted by some authors in these circumstances is to base the accounts of environmental education practice on the outcomes of participatory research. Some of the projects in this category spend large amounts of resources on supporting high quality participatory research in selected communities to produce case studies of practice. They claim that the embedding of these centrally produced materials within a discourse of participatory research confers a degree of "cultural sensitivity" to the materials, and, further, that this quality justifies the more general subsequent distribution of the accounts of practice. But the problem is that "cultural sensitivity" is not a commodity that can

ever actually imbue materials that are still destined for universal dissemination; materials can better be said to be culturally sensitive when they are culturally embedded through being conceptualized, developed, and implemented *within* particular cultures. Attempts to disseminate the materials more generally, beyond the context of their development, compromises the necessary contextuality of environmental education curriculum.

Participatory research is essentially about research into issues of interest and concern to participants within a particular professional setting or community. It aims to improve the level of sophistication of the debate about those issues. The meaning and significance of the outcomes of the research are likely to be highly contextual, and of relevance and interest mainly if not only to the community within which they are generated. Participatory research does not seek to underwrite the generalizability of research outcomes, and in fact its underlying subjectivist epistemology makes claims to generalizability unsustainable. In participatory research, therefore, while there is certainly a phase of knowledge production and identification of new knowledge, there is no subsequent phase of dissemination of "universally applicable" outcomes for adoption elsewhere. This is not to say that it is inappropriate for the knowledge generated through participatory research to be published widely; it is just to say that the common practice of wide "adoption-focused" dissemination of "research-based" educational programs is not appropriate if the research on which such programs are based is participatory research.

The Bigger Picture: Technocratic Rationality and Participatory Research

Environmental education seeks, in part, to be educative about environmental issues, including our own relationship with these issues. Research into this form of environmental education needs to acknowledge that methodological difficulties can arise as a function of the complex nature of the research contexts themselves. It is clear from the projects reported above, and from other projects (Robottom, 2003), that the contexts of both school-based and community-based environmental education programs share at least the following characteristics:

- They are complex in their structure;
- This complexity takes different forms in different contexts;
- They involve a wide range of stakeholders;
- These stakeholders express a wide range of values and interests;
- Their development requires negotiation and reconciliation, and these are usually difficult processes; and
- Environmental education programs are shaped and constrained by social, cultural, political, historical, and environmental elements.

As a consequence, a competent form of research itself needs to be capable of engaging these elements. As we have argued elsewhere (Robottom, 2003), the

characteristics of an adequate form of environmental education research would include contextual sensitivity, responsiveness, an interest in the subjective interpretive categories of participants, and a capacity to identify and appraise the social, cultural, political, historical, and environmental elements that shape and constrain perspectives on environment and environmental education.

However, words are cheap and practice is more difficult. One of the difficulties in attempting to manifest an approach to environmental education research that demonstrates these characteristics is the effect of the overall educational ethos within which environmental education takes place. For Peter Posch, the "father" of the long-running European "Environment and School Initiatives (ENSI) project (Posch, 1988), the prevalent cultures of teaching and learning are still attuned to a relatively static society in which the necessary knowledge, competences, and values are predefined and stored in curricula, tests, and accredited textbooks. According to Posch, the main characteristics of these cultures are:

- a predominance of systematic knowledge;
- specialization;
- a transmission mode of teaching; and
- a prevalence of top-down communication.

This discourages self-control and cooperation among students, and among teachers, and networking within and across school boundaries (Posch, 1997). In our experience, such top-down and centre-periphery organizational arrangements presuppose and reinforce hierarchical power structures and relationships that mitigate against the power-sharing aspirations of participatory research. In short, there is a prevailing technocratic rationality which constitutes a hostile milieu for participatory research.

This pervasive technocratic rationality poses a major challenge for participatory research in environmental education in that it sets up a number of philosophical incongruencies that researchers in environmental education must acknowledge and resolve if the research is to succeed in its participatory aspirations. We will use Posch's characteristics of prevalent cultures of teaching and learning as a framework to elaborate this point.

- *A predominance of systematic knowledge/emphasis on disciplinary knowledge.* Priority is given to well-established facts allowing schools to maintain a close relationship with the results of academic knowledge production. Low priority is given to open and controversial areas of knowledge and to personal experience and involvement.

Environmental education, through its engagement of environmental issues, thrives on the educative exploration of "controversial areas of knowledge" such as contested proposals for environmental change. Participatory environmental education research by definition involves stakeholders in environmen-

tal education in the processes of research—identification of issues of interest and concern, collaborative gathering and analysis of data, responding to contextual exigency, and reporting of outcomes. Owing to its praxiological nature—where knowledge generation is mediated by critical reflection on action and circumstance—personal experience and involvement are central to participatory research. Participatory research questions and critiques "a pre-dominance of systematic (disciplinary) knowledge" and "priority . . . given to well-established facts."

- *Specialization*. Knowledge is compartmentalized in subject matter fields which more or less correspond to the academic disciplines. Complex, real-life situations tend to be disregarded because they cross disciplinary boundaries.

Environmental education actually deals in "complex, real-life situations" which are nearly always "adisciplinary" in nature. Environmental education seeks to involve students in environmental problem-solving which rarely benefits from a disciplinary perspective. Environmental issues are one of the main subject matters of environmental education. Yet the specialized disciplinary structure of school curricula is not well suited to this work. Research in environmental education must challenge these institutional structures; the alternative is to conduct research in a way that takes these structures for granted, and to do this reinforces and reifies the structures themselves and the values informing them. Ironically, in attempting to explore issues posed by this dissonance, participatory research encounters and must deal with the conservative view that these structures are "part of schools and schooling" and that research should not support the critiquing of these structures of schooling.

- *A transmission mode of teaching*. This mode facilitates the retention of the systematic character of knowledge and its reconstruction by the student. It tends to discourage the generation and reflective handling of knowledge.

Participatory research assumes, encourages, and is mediated by reflective practice—"the generation and reflective handling of knowledge." Participatory research challenges the view that knowledge generation is the domain of centrally located authoritative experts, and supports the generation of new "community-based" knowledge through a process of critical reflection on practitioners' theories, practices, and the professional contexts within which these are made intelligible. Transmissive modes of learning are anathema to participatory research.

- *A prevalence of top-down communication*. This discourages self-control and cooperation among students, and among teachers, and networking within and across school boundaries

Participatory research usually begins with the establishment of networks of professionals, often across schools, educational agencies, and

regional borders. Participatory research seeks to build professional capacity—to create the conditions for professional self-development. Participatory research critiques rather than reinforces the power relationships immanent in top-down and centre-periphery structures.

Two other elements of technocratic rationality that are at odds with participatory research are its assumption of the centrality of the scientific tenets of objectivity, rationality and truth, and the division of labour built into such hierarchical processes as the common "Research, Development, Diffusion, Adoption" (RDDA) model of professional development and curriculum development in environmental education. Rather than adopting an objectivist epistemology and realist ontology, participatory research acknowledges the socially constructed nature of knowledge about environmental issues. Rather than reinforcing a division in the role of researchers and teachers, participatory research seeks to promote the concept of "practitioner-as-researcher."

It is our view, based on experience in projects such as those outlined earlier, that to be successful, participatory research in environmental education must be self-conscious about addressing (and redressing) each of these elements of an historical technocratic rationality in the field. We suggest that it is a common pitfall to attempt participatory research in environmental education where the broader instrumentalist framework is left substantially intact. For example, to apparently recognize and value localized, community-based, participatory environmental education (whether this be curriculum development, professional development, or research itself) while at the same time attempting to develop single-focus, highly visible, externally-funded curriculum packages for universal implementation is to fail to see the "big picture" of the pervasive role of technocratic educational processes and structures and to court "colonialist critique" of the kind proffered by Dillon (1999).

Conclusions

In this article we have reflected on methodological issues arising in two of our own recent research projects as a form of practice, as a way of engaging in a praxis of project research. The projects that we have chosen for this purpose are themselves concerned with teacher education in environmental education: they include participatory "reflective practice" processes in exploring issues relating to formal education in schools and informal education in communities; and they are rooted in specific contexts of developing countries, thus engaging post-colonialist educational and research issues. One of these projects was conducted in post-apartheid South Africa, the other in South America. In both cases, the authors were among research teams invited to participate in these projects by project organizers.

We then presented a number of issues arising in the conduct of participatory research. These issues included questioning whose research agenda gets to be explored, the importance of project partnerships, participants' preconceptions about the nature of research, what "rigor" is in participatory research in environmental education, the colonialist dilemma and avoiding the "package or perish" mentality, and the bigger picture of technocratic rationality and participatory research. Each of these raises more questions than are answered here; we hope that they form the basis for further discussion. However, in addition to addressing these more or less specific issues, we believe it is important to consider the broader context within which participatory research is located. It is our view, based on experience in projects such as those outlined earlier, that to be successful, participatory research in environmental education must be self-conscious about addressing (and redressing) the historical technocratic rationality in the field. We have suggested that it is a common pitfall to attempt participatory research in environmental education where the broader instrumentalist framework is left substantially intact.

Notes

1 Aspects of this project and its implications for professional development in environmental education have been described previously in Lotz and Robottom (1998), LeGrange et al. (1999), Robottom and Kyburz-Graber (2000) and Robottom (2003).

2 http://www.unites.uqam.ca/ERE-UQAM/EDAMAZ

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