THE PARADOX OF PEDAGOGY TRANSPOSITION: Learning From Inhibitors to Teacher Change: Lessons from a Zimbabwean Research Project in Environmental Education

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Definition of *paradox* used in this paper is "a person or thing conflicting with a preconceived notion of what is reasonable or possible" (Allen 1990:862).

A belief that a pedagogy developed and proven in *one* context may generalize or exist comfortably in *other* contexts, may have a base in a simplistic view of the importance of teaching and learning environments. A case study of transposition of a Northern pedagogy to rural Zimbabwean teachers questions the preconceived notion that such transposition was possible or appropriate within the new context. Further, paradox can be observed in the facilitation process itself.

WHY IS ENVIRONMENTAL EDUCATION INTERESTED IN TRANSPOSING PEDAGOGY?

The recommendations of UNCED in 1992 put a heavy emphasis on education, especially in Chapter 36, where the principles of the 1977 Tbilisi Inter-governmental Conference on Environmental Education were used as the basis for the UNCED proposals. One of the recommendations stressed that the educational component of implementing Agenda 21 should "promote proven educational methods and the development of innovative teaching methods for educational settings" (Agenda 21, 1992:3).

The question of just what are the *proven* methods mentioned in Agenda 21 and in *what context* they should be used are not explained in the document. Proven methods in a Northern context may be assumed by some educators to be appropriate for generalisation to new environmental contexts. The global involvement of environmental education leads naturally to the use of theory and pedagogy that have been developed in entirely different contexts from southern Africa. This is especially true of approaches to teaching/learning that may involve problem-solving and action components (Meadows, 1989; Stevenson, 1987). For example, the Tbilisi Principles provided a base for the rationale of pedagogical transposition by stating,

> Environmental education should ... utilise diverse learning environments and a broad array of educational approaches to teaching/learning about and from the environment with due stress on practical activities and first-hand experiences (UNESCO, 1977 as quoted in Irwin, 1991:23).

UNESCO documents and other environmental education writings have for the most part evolved from Northern perspectives of educational change. While environmentalists in different parts of the world might agree with the problem-solving approach to environmental education advocated by Benedict (1991), actual implementation of new styles of teaching within traditional colonial education systems is a recent activity. It follows on the heels of other imported Northern "contents, practices and methods" (Hawes, 1979:25). Uncritical borrowing continues according to Hungwe due to its "access to a socially valued qualification ... a maintenance of standards ... [giving Africans] comparable access and quality" (Hungwe, 1994:87).

What is Wrong with Transposing?

The transposition of education practices involves moving something from one *context* to another. The meaning of context for this

writer is greater than a simple geographical change - it includes viewing the school as "part of a wider education system. An education system is part of a political, social, and economic framework ..."(Hawes, 1979:10). Vulliamy (1987) warned that the transposition of environmental education teaching approaches from North to South, would encounter 'major constraints'. He based his argument on previous attempts to transpose programmes and pedagogy from Europe, and the documented difficulties these attempts encountered.

Hungwe argues that the reality of transposing northern pedagogy is "like new wind in old wineskins" (Hungwe, 1994:88). This he maintains is in spite of dressing up the new pedagogy or supposedly 'contextualising' it to fit the local environment. If the new pedagogy is not fitted into the post-colonial/traditional one it may come up against conflicting and strongly held beliefs of government and community. These beliefs relate to what education is for and how it should or can be done.

WHAT DIFFICULTIES (INHIBITORS) DID THIS RESEARCH SHOW?

This paper is based on research into teacher change from traditional style to a problem-solving style using science process skills. The epistomological base of the transposed pedagogy was that of *constructivism*, following mainly the writings of Harlen and Driver. The change in teaching style was to occur within the primary Environmental and Agricultural Science curriculum in Zimbabwe. Expected change in teaching style did not occur on a sustainable basis or with the ease that researchers expected. Qualitative, intersubjective and critically reflective research involving a group of collaborating teachers and this researcher, was done in response to a need to identify and understand both inhibitors to change, and the change process as part of teacher development. The results of the research process have been reported as a thesis (Stiles, 1995). The following identified inhibitors to change were developed by the collaborative group, based on earlier observations of the researcher during a period of eighteen months. Teachers engaged in vigorous dialogue with one another and separately with the researcher. The following inhibitors are listed from the discussion and writings of the collaborative group. The most important of these factors are discussed in further detail in the discussion section.

External Inhibiting Factors

The collaborative group of teachers decided that external factors inhibiting transposition of pedagogy were from two areas:

Government Education System-Related
Community and School Context-Related

External inhibiting factors were those "we cannot control ourselves ... they are caused by forces outside" (Collaborating teachers, 1994). They saw a group of government-directed inhibitors (described below) as being at odds with the new pedagogy, or in other cases providing reinforcement to traditional methods. Other external inhibitors originated from the social-economic aspects of the local and national environment.

Government Education System Related Inhibitors

School administration, curricula, national examinations - are all centrally administered with little allowance left for the individual classroom teacher. Teachers decided that the following factors negatively influenced implementation of the *activity based, child centred, constructivist, problem-solving teaching* advocated by the project.

- National Syllabus
- National grade 7 examination
- Time - requirements and restrictions

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- National grade 7 examination
- Time - requirements and restrictions

- Student writing and recording
- Language of instruction

Community and School Context Related Inhibitors

These inhibitors were directly related to the African rural environment and the socio-economic situation - in this case one of poverty and marginalisation.

- Economic - material limitations nationally and locally
- Economic and social - class size and organisation
- Relationship between school, teachers and community

Internal Inhibitors

Teachers saw these inhibitors as coming from within themselves. Through the writing of autobiographies they began to understand the source of these constraints as coming from their background, and relating to their past and present environments.

- Lack of subject-matter knowledge
- Pedagogical differences as inhibitors
- Language

Inhibitors Related to the Facilitation Process

Teachers discussed their perception of the methodology used in facilitating pedagogical change. The discussion related to both in-service and support structures. Within the project these were sometimes called the silent or non-visible inhibitors. Though they directly related to the facilitators and teacher-educators, they were often unspoken and/or unrecognised.

Some of the identified factors:

- The teacher-educators and support personnel were not themselves familiar with or at ease using the new pedagogy.
- The paradigm within which the teacher-educators worked was often positivistic/ evolutionary and was thus at odds with the paradigm they were advocating the teachers to should accept into their belief system.
- Failure to involve teachers in participatory teaching/learning experiences.
- Focus of the teacher-educators on the teacher as an instrument of change.

CONCLUSIONS OF THE COLLABORATIVE GROUP

There are three conclusions reached by the collaborating group of teachers and this researcher. The first conclusion involves the transposition of pedagogy from one context to another very different context. Inhibitors to sustainable change within the classroom were very strong, and in many cases not effectively addressed by the project. Inhibitors that were of government-directed nature were identified, as were those originating from the social-economic situation of the immediate and national environment. *It was the conclusion of the collaborative group that without attention to these factors, sustainable and appropriate implementation of the transposed pedagogy would not be possible.*

Secondly, teachers acknowledged that inhibitors due to their limited environmental science subject-knowledge base were more important than they had first understood. As they began to spend time in researching and preparing lessons for other teachers, they began to understand more fully, and to more easily admit, the limitations of their environmental science knowledge. This limitation, coupled with a lack of experience with the new pedagogy or the epistemology it was based on, posed difficulties for teachers that could not easily be solved.

The third conclusion reached by the collaborating group involved their perception of the methodology used in facilitating the change in pedagogy. As they became more assertive they were more vocal in criticism, and more vocal in understanding which methods were most

'helpful'. In general they decided that methods that "involved us [teachers], and considered our ideas as important ... that used the *constructivist* theory the researchers wanted us to use" were best. Further, they agreed that the closer relationships formed among themselves and with the researcher in the collaborative group actually helped in their self and group understanding. The use of narrative and autobiography was seen by teachers as helpful, especially helping them to engage in self exploration and to express professional thoughts.

DISCUSSION

The qualitative research conducted here has attempted to provide some understanding of the complex interrelationships of external, internal, and project-related factors that affected expected change in teaching style. By focusing on the process of teacher change within environmental science, this researcher was able to identify inhibitors to change that were subsequently critically reflected on by the teachers themselves. As Fullan and Stiegelbauer (1991) and Vulliamy (1990) have noted, it is by

> concentrating on the 'phenomenology of change' [that] qualitative research strategies have a vital role to play in contributing to our understanding of the processes of educational change in developing countries (Vulliamy, 1990:20).

Using Fullan's definition of teacher education as social change (1985), this research backs up Fullan and Stiegelbauer and Vulliamy in showing that failing to recognise and deal with how people actually experience change accounts for much failure of social change. The disappointing resistance to change first noted within the UZ Project has become a source of unexpected but potentially important illuminative understanding of teacher education and development in a non-western environment.

This discussion will review the collaboratively identified inhibitors and attempt to put them into the context of other research findings. Recent publications of related research will be used to help explain this researcher's critical reflection on two areas of inhibitors - teacher contextual inhibitors and those arising from the UZ project approach. Finally, recommendations for future in-service and pre-service education of teachers especially relating to introduction of new ideology in environmental education, will be presented.

Importance of contextual inhibitors

Most researched and documented classroom use of constructivist teaching has been undertaken in Northern contexts as seen for example in writings by Harlen and Osborne (1985), Robottom (1987 & 1992), Erickson (1991) and Harlen (1992). Research interest in Zimbabwe and other countries has focused on the child as learner, leaving the *educating* of the teacher to be done in more conventional ways. Recent recognition that constructivist praxis in the North was not sustainable in many instances, has led to evaluation of teacher education from a constructivist viewpoint (Ebenezer 1995). The problems and issues that have been voiced in this paper by the teachers, as inhibitors to use of the new pedagogy, are part of what Ebenezer calls the teachers' 'conceptual ecology' (1995:103). Ebenezer further contends that if teacher-educators are to implement a constructivist approach in education of these adults, they must put themselves into the place of the teachers, accepting and valuing their problems, before designing pre- and in- service programmes.

The contextual inhibitors for the rural teachers in this study, though ecologically valid only for this particular group, may also be useful as a starting point for other teaching/learning environments. The first inhibitors that teachers identified were those that came from the national directives of the educational system. National curriculum

and national examinations contributed to the administrative top-down system within which the teachers worked. These factors contributed to feelings of powerlessness associated with marginalisation. Cultural factors, such as use of English as both second language and a language of technology, were seen by teachers and researchers as strong inhibitors to the increased freedom within the classroom needed for the new pedagogy. Poverty was a powerful inhibitor which extended from the inability of the community to participate in children's education, to the schools' lack of resources. Poverty stood in the way of teachers' further professional development, just as it had shaped their lives so far. This was very evident in their autobiographical writing.

Teachers' personal backgrounds were also considered inhibitors and again were influenced by their socio-political and economic histories. Their degree of subject knowledge and roots in traditional pedagogy became easier to discuss as they became more familiar with the researcher and with their own ideas. The relatively unknown level of subject knowledge of the teachers seems to have been a greater inhibitor than expected. From the limited research done within the UZ Project, it is evident that there may be many more basic misconceptions than imagined by the researchers and in-service teacher-educators.

A process of enabling teachers to uncover their own conceptual frameworks had not occurred until late in the project. As teachers explained, "we really didn't know what you meant or what we were doing for the longest time" [collaborating teachers, 1994]. Thiesson reports that there is a tendency in many projects in the North to "concentrate on developing students while ignoring the complex connections with teacher learning" (1992:85). The importance of a shared understanding and shared commitment cannot be underestimated, as explained by both the collaborative teachers here, and those engaged in a research project in Canada:

> Now it seems clear that this time period of close to a year was necessary in order to negotiate among one another the unique personal meanings that underlie many of the terms that were used ... we were slowly and quite unconsciously forging a set of shared commitments about how best to think and talk about the instances of classroom practice ... without realising it, we were ourselves engaging in a form of constructivist learning as we grappled with the problems of initially communicating our thoughts and actions to each other and later to other educators ... (Erickson, 1991:233).

The *way* in which in-service education/training is implemented, is a subject that teacher-educators need to address, if we are to work with teachers to ultimately share ideology.

Pre- and in-service teacher education - what can be learned from research

Transformation from a conventional to a constructivist approach to teaching should involve a progressive-personalistic approach to teacher education (Diamond, 1991). Current writing by educators such as Ebenezer (1995), Hand and Treagust (1994) and Erickson (1991) stresses the importance of the ideology of teacher-educators/researchers when setting up research that involves in-service programmes for of a new ideology such as constructivism. Two interconnected factors are involved: first, the approach to teacher education depends on the view of learning held by the teacher-educators; second, it depends on the teacher-educator/researcher's view of the learning environment and the role of the teacher within it, hence the importance of understanding inhibitors. The constructs/world views of the teacher educator/researcher's are therefore most important when considering any form of teacher education. However, as Hand and Treagust (1994) point out, there is very little

research so far on teacher or teacher-educator ideas.

In the UZ Project teachers were asked to do more than to use constructivist classroom techniques. They were asked to accept the constructivist view of learning and hence of teaching. In requiring this acceptance researchers should have expected an acceptance by teachers and their teacher-educators of the same view of learning. This should involve a process similar to that advocated for the learning environment of the teacher's classroom.

> If teachers are to rethink teaching and learning along [constructivist] lines ... they must have the opportunity to participate in a learning community with other teachers and educators similar to the one they are trying to provide for their students (Prawat, 1992:389).

Hand and Treagust found in their research that "Examining teachers' thinking is a very powerful means to begin the process of measuring change" (1994:111). Their work with teachers in in-service programmes using constructivist perspectives, brought them to the conclusion that the change process in teachers was complex and slow and that it involved starting with a focus on self-constructed understanding, before focusing on approaches to classroom practice. Their work backs up earlier writings of Erickson on constructivist in-service. Erickson again stresses the slow process, which he emphasizes, must include collaboration between teacher-educator/researchers and teachers. The result is a situation of "shared beliefs and values about how people learn" (Erickson, 1991:237).

Teacher education as transformation

Prawat, Beattie and Diamond use the term 'transformation' when discussing constructivist learning.

> To learn about professional practice and to develop as professional educators requires that we engage in the making of new forms, new relations and connections and by continually transforming what we know (Beattie, 1995:66).

Diamond (1991:8) explains what he means by 'transformation' as the goal of pre- and in-service education as "the critical retheorizing both of teacher's perspectives and of teacher education." He further explains his meaning of learning as transformation for teachers and other adults in this way:

> Perspective transformation ... involves helping beginning and experienced teachers to gain access both to their own and alternative meaning perspectives from which to interpret reality ... (it) consists in the reorganization or confirmation of cognitive structures in the light of experience. As a shift in world view ... or preferred way of perceiving reality ... (Diamond, 1991:16-17).

The process of perspective transformation, Diamond argues, is important because it provides a teacher who has altered an "initially non-reflective consciousness by emancipatory action," thus "enlarg(ing) first their awareness and then their capacity to direct it more fruitfully" (1991:17).

The question of *context* for transposition of pedagogy brought teachers and researchers to a further discussion of North-South context differences and their position "on the margin" (Kirby & McKenna, 1989). Besides the marginalisation related [Ed.] to their poverty, the teachers reported on here [Ed.] felt an inequality and powerlessness within their professional lives, including their present role in the research project.

The group discussed the importance of working together and "speaking together to the outside world". An opportunity to

"speak to those who make decisions ... to those who advocate new teaching style" (Collaborating teacher, 1994) was very important to the group. The rationale for use of teacher comments and autobiography came from this strongly expressed desire of teachers, as well as this researcher's belief, that looking at change from inside the marginalised community, the teachers, would be most appropriate to both understanding and action.

RECOMMENDATIONS

The recommendations of this writer to researchers and teacher-educators in environmental education are based on research findings and comparisons with other current research on the implementation of a constructivist pedagogy. It is recommended that in considering the transposition of a pedagogy from a western to non-western context, there should be in-depth consideration of:

- *the context or environment within which the pedagogy was developed* ***and*** *that in which it is to be transposed.* A broad definition of environment/context should be used. This consideration will involve questioning which contextual factors will affect implementation and to what degree. It may mean looking closely at traditional (including indigenous) communication and education systems - how they differ from the proposed pedagogy, their effectiveness, and their possible adaptation or inclusion.

- *whether this pedagogy is appropriate to the new context.* This will involve questioning the prevalent epistemological views, including both educational and socio-political views. Educators must be actively involved in the process of questioning, comparing and decision-making to ensure contextual validity. Again, as with the first recommendation, this will need to involve close comparison with traditional, indigenous ways of communicating knowledge and problem-solving processes.

- *the importance and form of implementation that is needed in pre- and in-service programmes.* The success of implementation will depend to a great degree on whether the teacher's learning has been addressed as carefully and in the same manner as that advocated for the students. The complexities of teacher learning must be addressed. This may mean broad changes to the current teacher-education pedagogy in many tertiary learning environments.

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