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AN ASSESSMENT OF TEACHERS' CONCERNS, TEACHERS' LEVELS OF USE AND THE SUPPORT THEY ARE GIVEN IN THE IMPLEMENTATION OF THE PRIMARY SCHOOL ENVIRONMENTAL SCIENCE CURRICULUM IN ZIMBABWE: A CASE STUDY OF SHURUGWI DISTRICT

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ABSTRACT

The purpose of the study was to evaluate the implementation of the primary school Environmental Science (ES) Curriculum in Zimbabwe with specific reference to Shurugwi district. It focused specifically on evaluating the extent to which teachers are implementing the curriculum, the concerns of teachers with respect to the ES Curriculum and the support given to teachers in the implementation of the ES curriculum.

The research design used was the survey. Data were collected by means of:

- i. an interview with teachers to ascertain the level at which they were teaching using a branching format (Loucks et al, 1975);*
- ii. a stages of concern (SoC) questionnaire; and*
- iii. a questionnaire about support for implementation.*

The Regional co-ordinator Better Environmental Science Teaching (BEST) and the education officer (Science) were interviewed using a separate interview schedule. The sample was made up of 60 teachers, 20 heads of schools from twenty schools, the BEST regional co-ordinator and the regional Science Education Officer.

The findings indicated that many heads (60 %) and teachers (62,7%) had self concerns, with a large number of teachers(41,7%) being non users; all of the heads (100%) and (38,3%) of the teachers being mechanical users. It was also found that the Ministry of Education, Sport, Arts and Culture and schools were not giving adequate support to teachers implementing the ES curriculum. On the other hand, it was found that ' O ' level science education and BEST training had a positive effect on teacher use.

The recommendations put forward were that there was need to put in place, large scale strategies such as networks, cadres, radio programmes and teacher

magazines, establishing cluster resource centres, providing 'O' Level science education to those who do not have it and BEST training to those who have not been subjected to it. It would be good for the Ministry of Education, Sport, Arts and Culture to provide sufficient funds for coordinators of BEST so that they can visit schools and advise on problematic aspects of the ES curriculum.

Introduction

Since the 1980s researchers have acknowledged the necessity of establishing stages of concern of those implementing an innovation (Loucks and Hall, 1979; Kasambira, 1993; Sergiovanni and Starratt, 1993).

Loucks-Horsely (1996) states that if we do not establish stages of the implementers' concerns, we will be focusing on student learning before we establish whether teachers are comfortable with the materials and strategies of teaching. Establishing levels of use of an innovation has also been found to be of paramount importance by Hall and associates in their Concern Based Adoption Model (CBAM) of the 1980s. Knowledge about concerns and levels of use can give change facilitators a guiding framework within which to plan support activities and other interventions (Vaughan, 2002).

Researchers on the implementation of a new innovation have also pointed out the importance of giving assistance to teachers responsible for implementing an innovation. Huberman and Miles (1984) point to the importance of giving assistance when they state that '...large scale change bearing innovations lived or died by the amount and quality of assistance that their users received once the process was under way.'

Most evaluations of the implementation of innovations in Zimbabwe do not address the above issues. Shumba (1999, 2000) and Shumba, Voss and Zilg (1997) who evaluated and monitored implementation of the ES curriculum in primary schools, concentrated on components of the ES curriculum which teachers were finding difficult to implement as intended, i.e., innovation configurations (Hall & Loucks, 1979), and innovation and user profiles (Leithwood, 1982). Only a few aspects of support were looked at. Shumba (2001) who evaluated how teachers' colleges were preparing teachers for ES teaching found that they were not preparing the teachers very well. Stages of concern and levels of use of these teachers were not established in his study.

It was against the above background and two other additional issues namely; the prominence that was given to science as leading to economic development in the Nziramasanga commission (1999), and the withdrawal of German support for the Better Environmental Science Teaching (BEST) programme in 2000, that this study was undertaken. The study was undertaken in Shurugwi District in the year 2004.

Statement of the problem

There is a problem of the implementation of the ES curriculum in Zimbabwe (Shumba, Voss & Zilg, 1997; Shumba, 1999; Shumba, 2000). The purpose of the study was to evaluate the implementation of the ES curriculum in 20 primary schools in Shurugwi district in the Midlands province in Zimbabwe. The investigation limited itself to teacher implementation of the ES curriculum in grades one to seven in the primary school.

Sub-Problems

- 1) To what extent was the ES curriculum being used by teachers?
- 2) What were the teachers' concerns in implementing the ES curriculum?
- 3) What degree of support was provided to teachers?

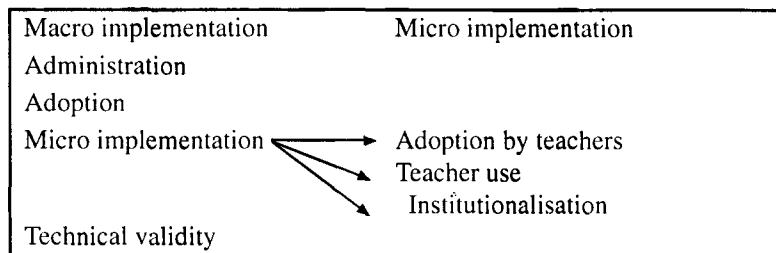
Literature Review

Implementation

Implementation of a programme is a complex process (Fullan, 1983). Implementation involves teacher motivation, skills, know-how and commitment (Fullan, 1994; van den Akker, 1988). Fullan (1983) refers to implementation as a process of putting into practice an idea, programme or a set of activities which is new to people attempting to bring about a change. Bringing about a change does not occur at a point in time as a result of a profound decision, legislative act or cataclysmic event (Rutherford, Hall & Huling, 1983). Berman (1981) views educational change as an implementation dominant process. Berman (1978) also identifies two levels of implementation, namely macro and micro implementation. Micro implementation entails adoption by teachers, teacher use of a new curriculum and institutionalisation of the curriculum, and macro implementation entails administration whereby a policy decision leads to a programme and adoption which entail adoption at national or regional level.

The relationship between different implementation levels can be shown as indicated in figure1.

Figure1: The implementation process (Taylor, 1988:10)



This study concentrated on the teacher use aspect of micro-implementation. Teacher use refers to when an adopted curriculum is taught at classroom level by front-line implementers (Berman, 1981). It is the phase when administrators attempt to overcome resistance to change engendered before, during or after mobilisation/adoption. During this phase, it is crucial that attention be paid to teachers' concerns; to ascertain the level at which they are using/teaching a new curriculum; and the level of support that they are provided with.

Evaluation of primary school ES implementation in Zimbabwe

Shumba (1999, 2000) monitored and evaluated the effect of the BEST programme in the implementation of components of the ES curriculum and the support given to teachers. The monitoring and evaluation revealed that the BEST programme had a positive effect on the way components were addressed, but found that implementation was not very effective in most of the schools visited and that it was affected by poor resource provision, supervision without the use of recommended instruments, and little support at cluster level, among other things. Shumba, Voss and Zilg's study (1997), on the effect of the BEST training on ES teaching, also found that BEST training had a positive effect in the manner teachers interpreted the ES syllabus, and their teaching methodology. Therefore, there is need for BEST training to be provided to all teachers implementing the ES curriculum.

The present study wanted to investigate the effect of the BEST programme in relation to teacher's stages of concern and levels of use, support that they were provided with, and the effect of BEST training and science training on stages of concern and levels of use of the teachers.

Shumba (1995, 2001) studied how teachers' colleges were preparing teachers to teach ES. The studies established that colleges were not adequately preparing teachers for ES teaching because lecturers were not fully equipped for the task and the syllabuses of colleges and schools were not in tandem and lacked integration. These studies provided information on the nature of the teachers who were produced by the colleges but their stages of concern and levels of use were not established.

In a general study on the support that heads of primary schools give regarding implementation of subjects at primary school level, Shumba (1994) found that primary school heads lacked confidence in providing school instructional leadership in more than half of the subjects comprising the primary school curriculum. This study wanted to establish the amount of support that heads give to teachers and the heads' stages of concern and levels of use which would probably determine the amount of support they would provide their teachers.

A model of evaluating implementation

Hall and associates (1979) developed the Concern-Based Adoption Model (CBAM) to evaluate curriculum or programme implementation. The Model views implementation as a highly personal experience and that, therefore, there are identifiable changes and levels of the change process experienced by individuals. The Model views the teacher as the focal point in school improvement efforts. The three variables in the CBAM are: stages of concern, levels of use and innovation configurations. The concept of concerns relates to the feelings, perceptions, motivations and attitudinal dynamics of individuals as they first become aware of an innovation and gradually become increasingly confident in its use. Hall et al; (1979), Loucks-Horsely (1996) and <http://www.nas.edu/rise/backg4a.htm> distinguish seven stages of concern as follows: 0. Awareness, 1. Informational, 2. Personal, 3. Management, 4. Consequence, 5. Collaboration, and 6. Refocusing. The seven stages and an expression of each stage are shown in Table 1 below.

Table 1: Typical Expressions of concern about an innovation

Stages of Concern	Expression of Concern
6. Refocusing	I have some ideas about something that would work even better.
5. Collaboration	How can I relate what I am doing to what others are doing?
4. Consequence	How is my use affecting learners? How can I refine it to have more impact?
3. Management	I seem to be spending all my time getting materials ready.
2. Personal	How will using it affect me?
1. Informational	I would like to know more about it.
0. Awareness	I am not concerned about it.

Adopted from Loucks and Hall (1979, Implementing Innovations In Schools: A Concerns-Based Approach. A paper presented at the annual meeting of the American Educational Research Association San Francisco, April 12 p 4).

The Model holds that people considering and experiencing change evolve in the kinds of questions they ask and in their use of whatever the change is. In general, the early questions are more self-oriented: What is it? How will it affect me? When these questions are resolved, questions emerge that are more task-oriented: How do I do it? How can I use these materials efficiently? How can I organise myself? and why is it taking so much time? Finally, when self and task concerns are largely resolved, the individual focuses on impact. The following questions are asked: Is this change working for students? Is there something that will work even better?

From: Hord, S.M., Rutherford, W.L., Huling-Austin, L. & Hall, G.E. (1987, *Taking Charge of Change*, Washington DC: Association for Supervision and Curriculum Development: 549).

A beginner would normally implement a new programme at the mechanical use level. Effective use of an innovation really occurs at the routine level and higher. According to Rutherford, Hall & Huling (1983), implementing curricula in schools takes time and an innovation that is complex will continue for more than two years before implementers get to higher levels of use. The concept of levels of use alerts administrators and change facilitators to the fact that change is a long and demanding process and that teachers need assistance and support to implement change as intended.

The above information was used in the establishment of levels of use of the teachers and heads.

Innovation configurations refer to the variations or different patterns of the innovation which occur when it is put into practice by users (Hall & Loucks, 1978). They represent the operational patterns of an innovation that result from adaptations of the innovation by different individuals in different contexts (Heck, Stiegelbauer, Hall & Loucks, 1981). It is important to determine whether a configuration deviates to such an extent that it is no longer acceptable. In order to determine this, a checklist can be used to enumerate components of a new programme and their variations with respect to each component.

Based on this, an evaluator can construct a structured interview schedule that can be used to assess the levels of use of an individual user. Data on innovation configurations can be used to target teachers' needs more directly through in-service programmes. The evaluative data from innovation configurations can be used to plan supportive and facilitative actions and interventions to promote implementation (Taylor, 1988).

Support given teachers implementing a programme

Most researchers on implementation include facilitative actions or interventions in the total framework of implementation. Van den Berg (1981) and Durrant & Holden (2006) distinguish the following large scale strategies for supporting complex innovations: developing local cadres, supply of materials which are either largely self-using and/or closely linked to the helping agents, peer multiplier approach, turnkey trainers, resource centres, demonstration sites, networks and clusters.

Hord and Hall (1984) referring to game plan component level intervention state the following interventions as being appropriate:

- * developing supportive organisational arrangements, that is, hiring new staff, seeking and receiving funds and providing innovation-related equipment;
- * training, which entails holding workshops, modelling and demonstrating use of the innovation;
- * providing consultation, and reinforcement, that is, holding brief conversations about how an innovation is progressing, facilitating a problem solving group and providing comfort and caring sessions;
- * monitoring and evaluation;
- * external communication which entails informing and gaining support of individuals or groups outside the school, for example, parents through presentations at conferences; and
- * developing a public relations campaign, dissemination through teacher and learner materials, descriptive brochures, teacher magazines, articles, radio programmes, charge-free demonstration kits and training.

Hord and Hall (1984), referring to strategy level interventions, distinguish a series of workshops for users in the first year, change facilitators working with individual users and on-going training sessions. They also distinguish tactic level interventions, namely, publishing a newsletter and classroom visits. Incident level interventions are also distinguished: a casual suggestion, a visit by an educator for a few hours, a facilitator visiting a teacher to collect a sample of work and a conference in which a facilitator providing feedback to a user, and collaboratively planning a way of improving use.

The above information was used in this study, to gather information on support that was given to teachers in relation to the implementation of the ES curriculum.

Research Methodology

The study involved a survey on concerns of teachers regarding implementation of ES curriculum using the stages of concern (SoC) questionnaire developed by Hall, George and Rutherford (1979). This questionnaire was validated for this purpose in eleven cross-sectional and longitudinal studies of process and product innovations in America (Hall, George & Rutherford, 1979 :56). The study also had a survey on levels of use of teachers of the ES curriculum using a focused interview which was tape recorded based on a branching format developed by Loucks, Newlove and Hall (1975). Finally, the study wanted to find out the kind of support provided to teachers regarding the implementation of the ES curriculum based on a facilitation checklist of Taylor (1988).

The instruments were pilot run in two schools to establish how respondents understood the items. All sixty teachers and twenty heads that comprised the sample reacted to the SoC questionnaire and the facilitation checklist on support first and then were all subjected to levels of use interviews next. After the use of tables in appendices 4 and 5 to process information from the stages of concern questionnaire, data regarding the stages of concern were interpreted in one way suggested by Hall et al (1979), namely peak stage score interpretation (See appendix 6). This form of interpretation was chosen because it is the simplest (Hall, George & Rutherford, 1979). The data regarding levels of use were interpreted by three raters. The Chi-square of the raters was used to establish the actual level of use of an individual. Data on support were presented in tables and the information was analysed.

Sample

The sample for the study consisted of 60 teachers in grades 1, 4 and 7 from twenty primary schools of the 58 primary schools in Shurugwi (34,48%), 20 heads of schools of the twenty schools and 2 education officials, namely, the Regional Programme Co-ordinator for the BEST Programme and the Regional Education Officer responsible for Environmental Science. The schools were randomly sampled using the hat or fish bowl method. In cases where grades 1, 4 and 7 in a school had more than one teacher the hat method was used to pick one teacher. All teachers and heads were exposed to the SoC questionnaire, the facilitation check list and the levels of use branching format interview. The two Regional officials reacted to an unstructured interview.

RESULTS

In this section, we present data from the survey.

Stages of concern of teachers and heads with respect to the ES curriculum.

Table 3: Stages of concern of teachers and heads.

Forms of concern			
Post	Self: stages 0-2	Task: stage 3	Impact: stage 4-6
Teachers (n=60)	38(n)63,33%	2(n)3,33%	20(n)33,33%
Heads (n=20)	12(n)60%	1(n)5%	7(n)35%

Table 3 indicates that 63,33% (n=38) of the teachers have self concerns (stages 0-2); 3,33% (n=2) have task concerns (stage 3); and 33,33% (n=20) have impact concerns (stages 4-6).

Sixty percent (60%) (n=12) of school heads have self concerns and 35% (n=7) are at impact stage.

Table 4: Stages of concern in relation to BEST- Training

BEST training status	Forms of concern			
	Post	Self Stages 0-2	Task Stage 3	Impact Stages 4-6
BEST trained	Teachers (n=16)	6 (n) 37,5%	0 (n) 0%	10 (n) 62,5%
	Heads (n=15)	6(n) 40%	1 (n) 6,7%	8 (n) 53,3%
Not BEST trained	Teachers (n=44)	29(n) 65,9%	2 (n) 4,5%	13(n) 29,5%
	Heads (n=5)	3 (n) 60%	0 (n) 0%	2(n) 40%

Table 4 indicates that 62,5% of teachers (n=10) who were BEST trained had impact concerns three years after training. Forty percent (40%) (n=6) of BEST trained teachers had self -concerns. Fifty three percent (53,3%) of BEST trained heads (n=8) have impact concerns and 40% (n=6) had self concerns. Over sixty five percent (65,90%; n=29) of non-BEST trained teachers had self concerns and 29,5% (n=13) had impact concerns. Sixty percent (60%; n=3) of non-BEST trained heads had self concerns while 40% (n=2) had impact concerns.

Table 5 Stages of concern of teachers and heads in relation to the highest level of science passed.

Highest level of science passed	Forms of concern			
	Post 0-2	Self Stages Stage 3	Task Stages 4-6	Impact
Junior certificate	Teachers (n=5)	5(n) 100%	0(n) 0%	0(n) 0%
	Heads (n= 2)	2(n) 100%	0(n) 0%	0(n) 0%
'O' Level	Teachers (n= 43)	7(n) 16,3%	1(n) 2,3%	35(n) 81,4%
	Heads (n=12)	4(n) 33,3%	1(n) 8,3%	7(n) 58,3%
Not at all	Teachers (n=12)	9(n) 75%	3(n) 25%	0(n) 0%
	Heads (n=6)	6(n) 100%	0(n) 0%	0(n) 0%

Table 5 indicates that a 100% (n=5 and n=2) of Junior Certificate teachers and heads had self-concerns. The table also shows 81,4% (n=35) of teachers with 'O' Level science having impact concerns and 58,3%(n=7) of heads with 'O' Level science having impact concerns. It also shows 33,3% (n=4) of heads with 'O' Level science and 16,3% (n=7) of teachers with 'O' Level science having self-concerns. Seventy five percent (75%; n=9) of teachers who had not done science at all had self-concerns.

LEVELS OF USE OF THE ENVIRONMENTAL SCIENCE CURRICULUM OF HEADS AND TEACHERS

Table 6: Levels of use of Heads and Teachers

Post	Levels of use		
	Non use: Levels 0,I,II	Beginning use: Levels III, IVA	Effective use: Levels IVB,V&VI
Heads (n=20)	0(n) 0%	20(n) 100%	0(n) 0%
Teachers (n=60)	25(n) 41,7%	23(n) 38,3%	12(n) 20%

Data in table 6 indicate that 100% (n=20) of the heads and 38,3% (n=23) of teachers are at the mechanical level and routine level. Over forty one percent (41,7%; n=25) of teachers are non users and 20% (n=12) are teaching the curriculum effectively.

Table 7: Levels of use of teachers and heads in relation to BEST training

Levels of use				
Training status	Post	Non use Levels 0, I & II	Beginning use Levels III & IVA	Effective use Levels IV B, V & VI
BEST trained	Teachers (n =16)	0(n) 0%	3(n) 18,75%	13(n) 81,25%
	Heads (n =15)	0(n) 0%	15(n) 100%	0(n) 0%
Not BEST training	Teachers (n =45)	25(n) 55,56%	20(n) 44,44%	0(n) 0%
	Heads (n =5)	0(n) 0%	5(n) 100%	0(n) 0%

Table 7 shows BEST training and levels of use of teachers and heads. Eighty one percent (81,25 %; n=13) of BEST trained teachers have been found to be effective while all 100% (n=15) of the best trained heads are beginning to teach ES. This might indicate that BEST training has the effect of making teachers teach ES effectively. Fifty five percent (55,56%) of non -BEST trained teachers were at non use level and 44,44% (n=20) were beginning to teach ES. One hundred percent (100%; n=5) heads are beginning to teach ES.

Table 8: Levels of use of teachers and heads in relation to the highest level of science passed

Highest level at which science was passed	Levels of use			
	Post	Non use Levels 0,I, II	Beginning use Levels III	Effective Levels IVB, V, VI
Junior Certificate	Teachers (n=5)	4(n) 80%	1(n) 20%	0(n) 0%
	Heads (n =2)	0(n) 0%	2(n) 100%	0(n) 0%
'O'level	Teachers (n=44)	2(n) 4,55%	20(n) 45,45%	22(n) 50,0%
	Heads (n= 12)	0(n) 0%	12(n) 100%	0(n) 0%
Not at all	Teachers (n=11)	9(n) 81,8%	2(n) 18,2%	0(n) 0%
	Heads (n=6)	0(n) 0%	6(n) 100%	0(n) 0%

Table 8 shows the levels of use in relation to the highest level of science passed. Junior Certificate science seems to have little effect on the teaching of ES. Eighty percent (80%; n=4) of teachers are non-users. In the open-ended comments at the end of the questionnaire on stages of concern and support, some Junior Certificate teachers acknowledged that they were unfamiliar with content in the ES curriculum. 'O' level science seems to have a positive effect on the teaching of ES, for 50% (n=22) are effective teachers of ES and 45,45% (n=20) are beginning to teach ES.

The majority of those teachers who had not received any science education are non-users 81,8% (n=9). All heads who had not studied science are beginning to teach ES, perhaps signifying their having made an effort to get information on ES teaching, for they are supposed to supervise its teaching. In the open-ended comments on the questionnaire those who had not done science at all acknowledged that ES topics were unfamiliar to them.

Table 9: Support given by Heads to teachers

Indicator	Post	Not at all	Satisfactory	Much/ Very much
1. Continuous in service at school	Heads (n=20)	7(n) 35%	2(n) 10%	11(n) 55%
	Teachers (n=60)	17(n) 28,3%	21(n) 35%	22(n) 36,7%
2. Instilling knowledge of methods/ instruments to find out fidelity of implementation	Heads (n=20)	0(n) 0%	8(n) 40%	12(n) 60%
	Teachers (n=60)	15(n) 25%	17(n) 28,3%	28(n) 46,7%
3. Delegation of continuous monitoring to senior member of staff	Heads (n=20)	3(n) 15%	8(n) 40%	9(n) 45%
	Teachers (n=60)	29(n) 48,3%	12(n) 20%	19(n) 31,7%
4. Continuous monitoring of attitudes & feelings towards ES	Heads (n=20)	1(n) 5%	9(n) 45%	10(n) 50%
	Teachers (n=60)	15(n) 25%	19(n) 31,7%	26(n) 43,3%
5. Provision of regular information to parents about the programme	Heads (n= 20)	9(n) 45%	7(n) 35%	4(n) 20%
	Teachers (n=60)	37(n) 61,7%	16(n) 26,7%	6(n) 10%

Table 9 indicates agreement between the majority of heads and teachers that there is continuous in-servicing of teachers at school, 55% (n=11) and 36,7% (n=22) respectively. One is made to assume that the in-service, if at all it is there, is not provided by the appropriately trained people. Some heads and teachers also agree on the fact that heads instill knowledge of methods/instruments to ensure fidelity of implementation, 60% (n=12) and 46,7% (n=28). Only 25% (n=15) of the teachers reflected that they did not receive support in that respect. Heads and teachers agree that there is continuous monitoring of attitudes and feelings towards ES 95% (n=19) and 75% (n=45 collapsing the last two columns together).

Table 10: Support from the Education Authority

Indicator	Post	Not at all	Satisfactory	Much/ Very much
6. Provision of long term funds for training by ministry	Heads (n=20)	17(n) 85%	3(n) 15%	0(n) 0%
	Teachers (n=60)	48(n) 80%	2(n) 3,3%	10(n) 16,7%
11.Provision of books, facilities and resources by ministry	Heads (n=20)	14(n) 70%	6(n) 30%	0(n) 0%
	Teachers (n=60)	27(n) 45%	20(n) 33,3%	13(n) 21,7%
12.Provision of syllabuses	Heads (n=20)	0(n) 0%	9(n) 45%	11(n) 55%
	Teachers (n=60)	19(n) 31,7%	16(n) 26,7%	25(n) 41,7%
13. Exertion of pressure by Ministry on Heads & Teachers	Heads (n=20)	14(n) 70%	6(n) 30%	0(n) 0%
	Teachers (n=60)	43(n) 71,7%	17(n) 28,3%	0(n) 0%
14.Supporting by Ministry of cadres, trainers, networks, teacher magazines and radio services	Heads (n=20)	15(n) 75%	5(n) 25%	0(n) 0%
	Teachers (n=60)	60(n) 100%	0(n) 0%	0(n) 0%
15. Visits by planners to schools to discuss problems and sharing conception of ES with teachers	Heads (n=20)	20(n) 100%	0(n) 0%	0(n) 0%
	Teachers (n=60)	57(n) 95%	3(n) 5%	(n) %

Table 10 indicates that 85% of heads (n=17) and 80% of teachers (n=48) agree that there is no provision of long-term funds for training by Ministry. The provision of books and facilities is equally bad with 70% (n=14) of heads and 45% (n=27) of the teachers saying not at all. However 33,3% (n=20) of the teachers indicate the provision of these is satisfactory. Fifty-five percent of heads (n=11) and 41,7% of teachers (n=25), agree that the provision of syllabuses is adequate while 70% of heads (n=14) and 71,7% of teachers (n=43) agree that there is no exertion of

Table 13: Support received from clusters

Indicator	Post	Not at all	Satisfactory	Much/ Very much
9. Clusters hold review sessions with BEST trained teachers	Heads (n=20)	13(n) 65%	7(n) 35%	0(n) 0%
	Teachers (n=60)	51(n) 85%	9(n) 15%	0(n) 0%
10. Monitoring and evaluation of ES teaching & providing feed back by BEST cluster committee	Heads (n=20)	12(n) 60%	8(n) 40%	0(n) 0%
	Teachers (n=60)	44(n) 73,3%	16(n) 26,7%	0(n) 0%

In Table 13, 65% of heads (n=13) and 85% of teachers (n=51) show that they agree on the absence of cluster review sessions with BEST trained teachers. Sixty percent (60%) (n=12) of heads and 73,3% (n=44) of teachers agree on the absence of monitoring, evaluation and provision of feedback by the cluster committee. The interviews with the two regional officials also reflected the absence of cluster review sessions, monitoring and evaluation and feedback by the cluster committee. In a previous study, Shumba (1999, 2000) confirm the above findings in the clusters that he visited.

DISCUSSION

In this section, discussion of the findings of the survey will be undertaken. All findings were interpreted with respect to implementation of the ES curriculum. Stages of concern were related to BEST training, highest level at which science was passed and the amount of support given the implementers. Levels of use were also related to BEST training, highest level of science passed and the amount of support given the implementers.

STAGES OF CONCERN OF TEACHERS AND HEADS

The majority of the teachers has self-concerns 62,7% (n=38). Regarding the relationship between BEST training and stages of concern, it has been revealed that the majority of the teachers 65,9% (n=29) is not BEST trained (refer to Table 4). Table 4 also reveals that the majority of those teachers who have been BEST trained, 62,5% (n=10) are at the impact stages and the majority of those who have not been Best trained 65,9% (n=29) are at the self stages, possibly suggesting that BEST training appears to remove self concerns. Tables 10, 11,

12 and 13 reveal that the teachers are not getting the necessary support. Support has been found by Loucks and Hall (1979) to lead to the movement from self-concern stages to higher stages. Regarding the relationship between the highest level of science passed and stages of concern of teachers, it has been revealed that 'O' level science education appears to decrease self concerns of teachers. In fact, most of the teachers, 81,4% (n=35) with 'O' level science training have been found at impact stages (see Table 5).

The majority of heads also have largely self concerns 60% (n=12). These might be having self concern because all the heads 100% (n=20) are at beginning level of use of the Environmental Science curriculum (cf Table 6). Users at the beginning use level normally have self concerns (Loucks and Hall, 1979). Heads might also be having self- concerns because data on support (Table 10) indicate that heads appear not to be receiving support in the form of networks, teacher magazines, local cadres and radio services. Such lack of support may keep users with self concerns (Hord and Hall, 1984). Regarding the relationship between BEST training and stages of concern of heads, it appears the majority of heads, 53,3% (n=8), who have received BEST training have had their concern levels raised to the impact stages, possibly reflecting, once more, that BEST training raises concern levels. The majority of non-BEST trained heads, 60% (n=3) is at self-concern stages.

Regarding the relationship between the highest level of science passed and the stages of concern of heads, it has been revealed that a sizeable number of heads, 58,3% (n=7), who have passed 'O' level science had moved to the impact stages like the majority of teachers with 'O' level science training. This further enhances the possibility of 'O' level science training raising the stages of concern to the impact stages. At the impact stages implementation of the ES curriculum is said to be at its highest according to Loucks and Hall (1979).

LEVELS OF USE OF THE ES CURRICULUM OF THE HEADS AND TEACHERS

All the heads 100% (n=20) were found to be at the Beginning of use level which are levels III and IVA. Such users are engaged in stepwise attempts to master the tasks required by a new curriculum, often resulting in disjointed and superficial use and have been referred to as hanging on the teachers' guide (Rutherford, Hall and Huling, 1983). The majority of the teachers, 41,7% (n=25), are non users. Non users have no interest, or are taking no action, or are not taking the initiative to learn more about the innovation, while some might be at preparation level where they have definite plans to begin using the innovation (Hord and Huling-Austin, 1987). One of the reasons why the heads and teachers are at such low levels of use appears to be little support that the implementation of the programme is getting at school, district and national levels (cf tables 9, 10, 11, 12 and 13).

As for levels of use of teachers and heads in relation to BEST training, it has been found that 81% (n= 13) of the teachers who were BEST trained were effective users while 100% of the BEST trained heads were at beginning use levels. Among the BEST trained teachers, therefore, were some who were making changes to increase outcomes, some who were deliberately making efforts to co-ordinate with others in using the innovation while some were seeking more alternatives to the established use of the innovation (Hord, Rutherford and Huling-Austin, 1987). Among the heads who were BEST trained were some who were making changes to better organise use of the innovation while some were making few or no changes and had an established pattern of use (Hord, Rutherford and Huling - Austin, 1987).

Fifty- five and half percent (55,5%; n=25) of the teachers who were non BEST trained were at non-use level and 44,4% (n=20) were at beginning use levels. The larger number in this group as compared to the other group is indicative that BEST training appears essential in raising the levels of use of the teachers.

The above findings confirm findings by Shumba, Voss & Zilg (1997), and Shumba (1999, 2000) who found that teachers who were BEST trained were effectively teaching the ES curriculum compared to those not subjected to this kind of training.

Regarding the levels of use of the teachers and heads in relation to the highest levels of science passed, it was found that 53,4% (n=22) of the teachers with 'O' level science training were at effective use levels and 46,5% (n=20) were at beginning use level. All the heads (100%; n=12) with 'O' level science training were at beginning use level. The majority of those teachers with no science training at all, 81,8% (n=9) were at non-use level while 6 heads (100%) who had no science training were at beginning use level. 'O' level science training appears to have a positive effect on the teaching of ES (Table 8).

SUPPORT GIVEN TO HEADS AND TEACHERS REGARDING THE IMPLEMENTATION OF THE ES CURRICULUM

Support from heads was found in such areas as provision of continuous in-service at school, but Table 10 indicates that the BEST trained teacher is not in-servicing teachers. Thus, the in-service might be provided by inappropriately trained teachers. Shumba (1999, 2000) reported very little continuous in-servicing by BEST trained teachers in the Zimbabwean schools. This further confirms the fact that in-service training might be there, but being provided by those who are not appropriately trained. In-service training by appropriately trained facilitators has been found to raise levels of use of an innovation (Van den Berg, 1981; Hord & Hall 1984; Howes and Quinn, 1987; Taylor, 1988; O'Neill, 2003).

Heads and teachers agree on the fact that heads instill knowledge of methods or instruments to ensure fidelity of implementation. Taylor (1988) has found that instilling knowledge of methods or instruments to ensure fidelity of implementation is instrumental in raising stages of concern of individual users which is a result of the raising of levels of use of those individuals. Heads and teachers agree on the fact that heads delegate a senior teacher to continuously monitor whether ES is being taught well. However, a fairly large number of teachers, 48,3% (n=29) indicated that these senior teachers are not there (Table 9 number 3). Heads might have said so to protect themselves as administrators and managers of schools for they are to ensure that such people are there for an innovation to be properly implemented. Continuous monitoring and evaluation of those implementing an innovation has been found to lead to successful implementation (Van den Berg, 1981; Hord & Hall, 1984; Fullan, 1989; Durrant and Holden, 2006). Monitoring and evaluation is considered to be part of supervision in Zimbabwean schools (Madziyire, 2000). Chivore (1994), in a research carried out in Zimbabwe, found that poor implementation of innovations has, among other factors, been caused by inadequate or lack of supervision. Heads and teachers agree that there is continuous monitoring of attitudes and feelings towards ES by heads, but one wonders if this is the case when the majority of teachers has been found to have self concerns, 62,7% (n=38; cf table 3). Continuous monitoring of attitudes and feelings has been found to lead to higher levels of implementation if negative attitudes and feelings are addressed (Bishop, 1985; Taylor, 1988). Heads and teachers disagree on whether parents are regularly informed about ES implementation. Heads might have indicated this because they are the ones who are supposed to ensure that parents are regularly informed. External communication with groups outside the school like parents has been found to lead to gaining of their support which facilitates the implementation of new programmes (Hord & Hall, 1984; Fink, 2003).

Ministry has been found not to be providing long term funding for training which could lead to successful implementation of new programmes (Hord & Hall, 1984; Howes & Quinn, 1987; Taylor, 1988; Fink, 2003). Heads said that the provision of books and facilities by Ministry is not adequate, but teachers had mixed views about the provision of these. It is possible that heads might be better placed to honestly assess the provision of these assets because they are the ones who have the school's global position on them because they are the ones who receive them.

Provision of syllabuses has been found to be adequate contradicting Shumba, Voss & Zilg's (1997) finding of inadequate provision of ES syllabuses in the primary schools in Zimbabwe. Poor resource provision has been found to negatively affect implementation of changes (Shumba, 1999, 2000; Zvobgo, 1997, 1999). Adequate provision of syllabuses has been found to aid implementation of new

programmes (Taylor, 1988). Ministry has also been found not to be exerting pressure on heads and teachers to implement the curriculum, 70% (n=14) and 71,7% (n=43). Exerting of pressure on the implementers has been found to lead to successful implementation of an innovation (Taylor, 1988; Fullan, 1989). Ministry has also been found not providing support in the form of cadres, trainers, networks, teacher magazines and radio services. Van den Berg (1981) and Clement and Vandenberghe (2003) identified these as some of the long-term strategies for facilitating changes. Visits by Planners of the curriculum which are considered essential in facilitating implementation of change (Hord & Hall, 1984; Taylor, 1988), have been found to be lacking (Table 10).

Visits from the Regional Co-ordinator BEST to schools have been found to be non-existent (Table 11). This finding is consistent with Shumba's (2000) that the BEST Regional Co-ordinators were found not to be visiting schools because of transport problems and also the fact that they were busy helping other BEST Regional Co-ordinators who were holding training sessions in their own regions. Visits by Regional Programme Co-ordinators are useful in facilitating implementation of new programmes (Van den Berg, 1981; Hord & Hall, 1984; Durrant & Holden, 2006).

Holding regular coaching sessions by BEST trained teachers in schools has been found to be inadequate by teachers, but heads have mixed views with half reflecting inadequacy of these sessions and half reflecting adequacy (Table 12). Heads might have expressed that the coaching sessions are available because they are the ones who should ensure that the BEST trained teachers provide these sessions. This finding from teachers is consistent with Shumba's evaluation and monitoring findings (1999, 2000) in which they found no regular coaching sessions in the schools that they visited. These local cadres have been found to greatly facilitate change in schools (Van den Berg, 1981; Hord & Hall, 1984; Durrant & Holden, 2006).

The holding of review sessions with BEST trainers in clusters, the monitoring/evaluation of teaching, and the provision of feedback by the BEST cluster committee has been found to be inadequate. The above result is consistent with Shumba's (1999, 2000) evaluation and monitoring result in which they found the absence of review sessions in clusters that they visited. Cluster review sessions, monitoring and evaluation and provision of feedback have greatly facilitated implementation of changes in a number of countries (Hord & Hall, 1984; Perera, 1997; Khaniya, 1997; Carron & De Grauwe, 1997).

CONCLUSION

The study has found that implementation of the ES Curriculum was mainly at non-use and beginning use levels. The teachers' and heads' concerns were mainly

self-concern and the support to teachers implementing the ES programme was inadequate at school level, in the clusters and from the Ministry. Implementation of the ES programme was, therefore, problematic.

There is also need to continuously establish stages of concern and levels of use of the teachers, possibly, yearly. Concerted efforts are to be taken to address the issues raised above, perhaps by instituting the following recommendations:

RECOMMENDATIONS

Teacher Concerns

Since many teachers have self-concerns, they should be provided with a year-long series of meetings, training sessions and follow-up activities similar to what was provided to Jeffco County teachers (Loucks and Hall, 1979: 10) in order to assist them to move from stages 0-3 to higher concern stages. The sessions would be aimed at providing them with information. All those teachers who have not passed 'O' level science should be exposed to it. BEST training content should be reviewed to address the low stage concerns.

Levels of Use

That the majority of teachers are non users and some teachers and all heads are at the beginning-to-use level means that they need sessions with information which would address what the innovation is all about, how it would affect the users, and how the users would change what they are doing now. Teachers who are using the curriculum at level 3 would be given help related to planning, organising their classrooms, and actually teaching (Loucks and Hall, 1979). Teachers at this level have concerns about management and are pre-occupied with logistical issues, that is, how much time the innovation is taking, how to manage the classroom and how to stay ahead of students. Teachers who are using the curriculum effectively are to be encouraged and provided with the opportunity to share and discuss their experiences in the teaching of the ES curriculum and ways of refining their use.

Support

Heads should consider delegating the following:

- i) a BEST trained teacher who has passed science at 'O' level to advise and assist teachers;
- ii) delegate the deputy head that has been BEST trained to monitor implementation continuously.

The Ministry of Education Sport Arts and Culture ought to consider the following:

- development of local cadres, which is an external form of support consisting of a group of fellow teachers who are not connected to the school in question, and who can meet teachers and other cadres for discussions and problem solving;
- establishment of networks made of voluntary and informal groups of teachers who link with one another over distance, with the aim of gaining access to resources and sharing expertise on the E S curriculum;
- establishment of documentation and information centres such as cluster resource centres;
- provision of radio programmes and teacher magazines to promote discussion of information;
- provision of technical support systems, for example, places and procedures where newsletters about the curriculum can be prepared;
- provision of sufficient funds for the Regional Coordinator BEST to visit schools and provide caring sessions, which have been found to raise levels of use and concern stages.

At schools

- BEST coordinators based at schools should continuously evaluate and hold coaching sessions with teachers.
- BEST cluster committees should meet twice per month to monitor and evaluate the teaching of ES and meet with teachers once in two months to provide feedback on their findings.

Further Research

Further research in this area would include a larger sample. It should be aimed at the establishment of innovation and user profiles (Leithwood, 1982) or innovation configurations (Hall and Loucks, 1979) in conjunction with stages of concern and levels of use. In order to end up generalising there is need to carry out similar studies in a number of districts in the Midlands and other Provinces.

References

- Berman, P. (1981). Educational Change: An implementation Paradigm. In Lehming, R. and Kane, M.(eds). *Improving Schools, Using What We Know*, Beverly Hills: Sage Publications.
- Berman, P. (1978). The study of macro and micro-implementation, Public Policy, 26(20) :157-187.
- Bishop, G. (1985). *Curriculum Development .A Textbook for Students*. London: MacMillan.
- Carron, G. & De Grauwe, A. (1997). *Current Issues In Supervision : A Literature Review*. Paris: International Institute of Educational Planning.
- Chivore, B. R. S. (1994). *The Effectiveness of the Primary School Teacher In Zimbabwe*. Gweru: Mambo Press.
- Clement, M. & Vandenberghe, R. (2003). Leading Teacher's Professional Development In Kydd, L., Anderson, L. & Newton, W. (ed). *Leading People and Teams In Education*, London: Paul Chapman pub: 123-135.
- Durrant, T. & Holden, G. (2006). *Teachers Leading Change Doing Research for School Improvement*. London: Paul Chapman Publishers.
- Fink, D. (2003). The Attrition Of Change: A Study Of Change and Continuity. In Kydd,L., Anderson,L., & Newton, W. (ed). *Leading People and Teams In Education*, London: Paul Chapman, 263-277.
- Fullan, M. (1983). Evaluating Programme Implementation. What can we learn from follow through. *Curriculum Inquiry*, 13 (2), 217-291.
- Fullan, M. (1989). Managing Curriculum Change. In Preedy, M. (ed). *Approaches To Curriculum Management*. Philadelphia: Open University Press, 144-149.
- Fullan, M.G. (1994). Co-ordinating Top-down and Bottom-up strategies for education reform. In Elmore, R. and Fuhrman, S. H. (eds). *The Governance Of The Curriculum*, Alexandria: Association for Supervision and Curriculum Development:186-202.

Hall, G. E. (1979). Using the individual and the innovation as the frame of reference for research on change. Paper presented at the annual meeting for the Australian Association for Research in Education, Melbourne, November.

Hall, G. E., George, A. A. & Rutherford, W. L. (1979). *Measuring Stages of Concern About The Innovation: A Manual for Use of the SOC Questionnaire* (second edition).

Austin: The Research and Development Centre for Teacher Education, The University of Texas at Austin.

Hall, G. E. and Loucks, S. F. (1978). *Innovation Configurations: Analyzing the adaptations of innovations*. Research and Development Centre For Teacher Education, The University of Texas, Austin.

Hall, G. E., Wallace, R. C. Jr and Dossett, W. A. (1979) A Developmental Conceptualisation of the Adoption Process Within Educational Institutions, Research and Development Centre For Teacher Education, Austin: The University of Texas at Austin.

Heck, S. Stiegebauer, S. M., Hall, G. E. and Loucks, S. F. (1981). *Measuring Innovation Configurations: Procedures and Application*. Research and Development Centre for Teacher Education, Austin: The University of Texas at Austin.

Hord, S. M., Rutherford, W. L., Huling-Austin, L. and Hall, G. E. (1987). *Taking Charge of Change*. New York: Association for Supervision and Curriculum Development.

Hord, S. M. and Hall, G. E. (1984). Analyzing what change facilitators do, The intervention taxonomy. *Knowledge, Creation, Diffusion Utilization*, 5 (3): 275-292.

Huberman, A. M. and Miles, M. B. (1984). *Innovation Close; How School Improvement Works*, New York: Plenum Press.

Kasambira, P. K. (1998). *Education, Administration and Management*, Harare: College Press.

Khaniya, T. R. (1997). *Teacher Support Through Resource Centres: The Nepalese Case*, Paris: International Institute of Educational Planning.

Leithwood, K. A. (ed) (1982). *Studies in Curriculum Decision-Making*, Toronto: IOSE Press.

Loucks, S. F. Newlove, B.W. and Hall, G. E. (1975). *Measuring Levels Of Use of The Innovation. A Manual For Trainers , Interviewers and Raters*, The Research and Development Center for Teacher Education, Austin: The University of Texas at Austin.

Loucks, S. F. and Hall, G. E. (1979). Implementing innovations in schools. A Concern-Based Approach, A Paper presented at the annual meeting of American Education Research Association, San Francisco, April 12.

Loucks-Horsely, S. (1996). Professional Development of Science Education: A Critical and Immediate Challenge, In Bybee, R. (ed). *National Standards and the Science Curriculum Study*, Iowa: Kendall /Hunt Publishing Co.

Loucks-Horsely, S. (1996). Professional Development Of Science Education: A Critical And Immediate Challenge, In Bybee, R. (ed). *National Standards And the Science Curriculum Study*. Iowa: Kendall /Hunt Publishing Co. <http://www.nas.edu/rise/backg4a.htm> (accessed 2009).

O'Neill, J. (2003). Managing Through Teams. In Kydd, L., Anderson, L. & Newton, W. (Ed). *Leading People and Teams In Education*. London: Paul Chapman , 215-228.

Madziyire, N. C. (2000). Supervision of Educational Personnel. Module DEA 502 , Harare: Zimbabwe Open University.

Nziramasanga, C. T, (1999). *Report of The Presidential Commission of Inquiry into Education and Training*, Harare: Government Printers.

Perera, W. J. (1997). *Changing Schools From Within: A Management Intervention For Improving School Functioning In Sri Lanka*. Paris: IIEP.

Rutherford, W. K. Hall, G. E. and Huling L. L. (1983). Implementing Instructional Change: The Concerns Based Perspective. *Teachers Inquiry*, 3 (5): 133-143.

Sergiovanni, T. J. and Starratt, R. J. (1993). *Supervision: A Redefinition* (5th ed), New York: Mc Graw-Hill, incl.

Shumba, O. (1999). *Report On Findings Of The 1999 BEST Annual Monitoring and Evaluation In Phase 1 Regions and Situation Analysis in Phase II Regions*, Harare: C.D.U.

Shumba, O. (2000). *Report On Findings Of The 2000 BEST Annual Monitoring and Evaluation in Phasel and Phasell Regions*, Harare: C.D.U.

Shumba, O. (2001). Situational Analysis of Primary Teacher Preparation for Environmental Science Education In Zimbabwe, *Zimbabwe Journal Of Educational Research* , 13 (3) , 257-282.

Shumba, O., Voss, I. And Zilg, A. (1997). *Baseline Survey Of BEST In Primary Schools And Teacher Training Colleges In Zimbabwe* , Harare : C.D.U.

Shumba, O. (1994). Curriculum Implementation In Primary Schools Without Curriculum Leadership. The folly of a system, *The Zimbabwe Bulletin of Teacher Education*. 4 (1), 26-52.

Shumba, O. (1995). Environmental and Agricultural Science: Are the Primary colleges meeting the Primary level demands? *The Zimbabwe Bulletin of Teacher Education*, 4 (2), 84-94.

Taylor, C. A. (1988). The Evaluation Of Implementation In Schools With Special Reference To Gifted Education. Unpublished Report. Pretoria: Human Sciences Research Council.

van den Akker, J. J. (1988). The teacher as learner in curriculum implementation, *Journal Of Curriculum Studies*, 20 (1): 47-55, January.

Van den Berg, R. (1981). Large Scale Strategies For Supporting Complex Innovations In Participating Schools. General Report of a conference at Hertogenbosch. The Netherlands: *Kathohek Padagogisch Centrum* : 7, 46-50, 54-61.

Vaughan, W. (2002). Professional Development and the Adoption and Implementation of new Innovations: Do teacher concerns matter? In *International Electronic Journal For Leadership In Learning*, 6 (5), 1-3. <http://www.ucalgary.ca/iejll/volume6/Vaughan.html> (accessed 2009)

Zvobgo, R. J. (1997). *State, Ideology and Education*, Gweru: Mambo Press.

Zvobgo, R. J. (1999). *The Post Colonial State and Educational Reform in Zimbabwe, Zambia and Botswana*, Harare: Zimbabwe Publishing House.



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