

Training Pre-service Teachers in Environmental Education: The Case of Colleges of Education in Botswana

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Abstract

Botswana's 1994 Revised National Policy on Education of 1994 (RNPE, 1994) recommended that colleges of education in Botswana train teachers in Environmental Education (EE) methodologies using the infusion approach. To assess the extent to which this recommendation has been implemented, sixty teachers in their final year of study were surveyed. The results of this study show that, to date, colleges of education have not yet introduced environmental education into their teacher education programmes. Consequently, the subjects of the study did not perceive themselves as competent and effective environmental education teachers; however, they did see environmental education as a very important subject that could raise the environmental literacy of children in schools. The results of the study were analyzed using frequencies and percentages and for interview protocol questions thematic analysis was used. Implications for teaching environmental education are discussed in the light of the findings.

Keywords: Botswana, Colleges of Education, Environmental Education (EE), Pre-service Teachers, RNPE (1994)

Reference to this paper should be made as follows:

Mosothwane, M., & Ndwapi, G. (2012). Training Pre-service Teachers in Environmental Education: The Case of Colleges of Education in Botswana. *International Journal of Scientific Research in Education*, 5(1), 26-37. Retrieved [DATE] from <http://www.ij sre.com>.

INTRODUCTION

For some time, concerns about the deterioration of Botswana's environment have been raised. These included concerns that Botswana was not managing its resources sustainably and concerns that Botswana does not have environmental

strategies which it can use to curb the deterioration of its ecosystem (Cooke & Campbell, 1984, 1987). Two workshops were held on these environmental issues and aimed to teach participants ways of preserving and maintaining the environment and ways of devising solutions to current environmental problems.

It was at these two workshops, 'Management of Botswana's Environment' (1984) and 'Developing Our Environmental Strategies' (1987) that the participants called for the introduction of Environmental Education (EE) into the school curriculum (Cooke & Campbell, 1984, 1987). The participants argued that EE should first be introduced in colleges of education and the University of Botswana (UB), and then infused into other subjects and levels of the school curriculum. They asserted that the teaching of EE would help citizens to support the implementation of environmental legislation and to practice responsible environmental behaviors. Ketlhoilwe (n.d.) has likewise noted that the teaching of EE would help citizens to become environmentally literate and as a result, facilitate the implementation of Botswana's environmental laws. The participants at the two workshops thought that if EE is introduced in colleges of education and UB, pre-service teachers would graduate with greater environmental competencies. At the 1987 workshop, the participants recommended that a National EE Conference be held at the UB in which scholars could articulate their views on teacher training and EE (Cooke & Campbell, 1987). A National EE Conference was held at the University of Botswana in 1991.

At the conference, the then Minister of Education Honorable Molomo contended:

Education is one of the key components in the National Conservation Strategy and this Conference is a first initiative to start the planning process for environmental education. Here we refer not only to environmental education for school children but for the whole population- a task that can only be achieved through a joint effort of both Government and Non-Governmental Organizations. A major objective of the Conference was therefore to bring together all those who have a role to play in the provision of environmental education in Botswana. It was in this spirit of cooperation that the Conference was planned and organized. The Ministry of Education regards environmental education as a priority issue and the recommendations from this conference will be most useful in drawing up a plan of action. My Ministry accepts that it has an important role in coordinating and promoting environmental education in the country. This includes incorporating and strengthening environmental education at all levels of the education system and working closely with other organizations, governmental and non-governmental, to provide environmental education for all (Cantrell & Nganunu, 1992, p.1).

Also at this conference, participants recommended that (a) a National Environmental Education Coordinator be appointed to oversee the introduction of environmental education; (b) a curriculum panel for environmental education with representation from all subject areas be formed; and (c) environmental education guidelines for primary, secondary and tertiary institutions be developed to help teachers develop their own environmental education activities (Cantrell & Nganunu, 1992).

According to Stronhorst (1992), there is an urgent need for a sound EE programme for teacher trainees who will subsequently influence changes in attitudes and behavior. He notes that the programme should emphasize sustainable development in which certain qualities of the environment are taught and thus safeguarded. Their objective should be sustainable use of the environment that does not impair ecological productivity. This kind of sustainable development requires solidarity and cooperation amongst all users of the environment. Stronhorst opines that the ultimate goal must be to foster a universal environmental ethic in which citizens unite in a common cause around the slogan 'Think Globally, Act Locally'. Stronhorst (1992) was also of the view that environmental education programmes for teacher trainees must incorporate elements of moral or value education if they are to be effective.

An effective EE programme for teacher trainees is the one that provides skills with which people can investigate and evaluate environmental problems and undertake appropriate action within their community. It is important therefore that environmental education is participatory and focuses on the local environmental problems, be there around the school, village or community since that is where change should take place. Effective environmental education demands much from those who teach it. Training of these educators therefore is of paramount importance (Stronhorst, 1992, p.10).

Marsland (1992) also supports the need for an effective environmental education programme. For him teachers' knowledge of basic environmental issues falls far short of what they are expected to teach. This is because environmental education has never received strong emphasis in pre-service teacher training and there are no avenues for teachers to study environmental education privately. Unfortunately, the introduction of environmental education in colleges of education is

regrettably low not only in Botswana, but across the globe (Gursory & Saglam, 2011; Tuncer, et al, 2009; Yavertz, et al, 2009; Stronkhorst, 1992).

A 1993 National Commission on Education summarized its recommendations in a policy called the Revised National Policy on Education (RNPE) of 1994. In terms of colleges of education this policy paper recommended (a) introducing environmental education methodologies for teacher trainees; (b) having teachers teach environmental education concepts using the infusion approach; and (c) training lecturers in environmental education up to the graduate degree level to facilitate implementation process (Republic of Botswana, 1994). Colleges of education have been identified as legitimate institutions for designing and delivering environmental education courses to teacher trainees. UNESCO has long advocated teacher preparation in EE because such programmes can promote awareness, knowledge and skills that can lead to attitudinal change and citizen participation. The first call for teacher preparation in EE was made by the International Union for the Conservation of Nature and Natural Resources (IUCN) in 1972:

We recognize that teacher training forms one of the most important and significant aspects in the development of environmental education programme and we recommend that; as teacher training in environmental education involves the use of many techniques and methods, all prospective teachers should be given training in the use and evaluation of pedagogic methods, including those relating to inter-disciplinary approaches and team teaching (p.3).

Meredith, et al (2000) suggested that the teaching of EE must first start with teacher educators because a thorough training of teacher educators in EE will be more focused and more likely to lead to success. If teacher educators are well trained in EE they will be proficient at explaining EE concepts to teacher trainees. However, teacher educators who are to teach EE must have a working knowledge of environmental education methods and this depends on their own pre-service training. Training teachers in EE should include both pedagogical content knowledge and subject matter knowledge, both of which are central to teaching.

While there has been a call for teacher educators to develop strong environmental education programmes for teacher trainees for more than thirty years now (UNESCO, 2012), this has not been forth coming in Botswana. The main reason advanced for this lack of accomplishment is the absence of curriculum development specialists in EE who could help develop EE courses (Mosothwane, 2002). If this be the case, it is important that college lecturers who have received training in EE step up and help develop professional guidelines and standards for teacher trainees. As environmental crises worsen across the region and the globe, individuals with environmental education have an absolute responsibility to offer the needed inputs that will strengthen EE in colleges of education (UNESCO-UNEP, 1990). At the same time, there must be continuous monitoring of the progress of the EE programmes in colleges of education. The programme must also be mandatory if colleges of education are to ensure that they have environmentally literate teacher trainees.

Purpose of the Study

The main purpose of this study was to assess the extent to which colleges of education have implemented the recommendations of the Revised National Policy on Education of 1994 (RNPE, 1994), specifically rec.no.44 (e) which states that “teachers must be trained in the methodologies, at both pre-service and in-service levels, for environmental education to ensure that learning results in attitudinal changes and citizen participation” (Republic of Botswana, 1994; p.26). From this main objective, two other related objectives were derived:

- (a) To assess pre-service teachers’ perception of environmental education and environmental education teaching in colleges of education.
- (b) To assess pre-service teachers’ perception of themselves as effective future EE teachers

Research Questions

The main research questions intended to assess the provision of EE in colleges of education was: to what extent and under what conditions are colleges of education in Botswana training pre-service teachers in EE as recommended by the RNPE (1994)? From this main research question, two other research questions were derived:

- (a) What are pre-service teachers’ perceptions of the provision of EE in colleges of education in Botswana?

(b) To what extent and under what conditions do pre-service teachers perceive themselves to be effective future EE teachers?

METHODOLOGY AND INSTRUMENTATION

Data for this study was collected through both questionnaire and interview-type survey questions. The instrument used for data collection consisted of three sections.

Section A: *Pre-service Teachers' Perceptions of Environmental Education and Environmental Education Teaching in Colleges of Education*

This section of the survey instrument consisted of ten statements that solicited information from pre-service teachers on their perceptions of environmental education and environmental education teaching in colleges of education. The responses to each statement were tallied and converted into percentages under the categories of strongly agree (SA), agree (A), neutral (N), disagree (D) and strongly disagree (SD) and are displayed in Table 1.

Section B: *Pre-service Teachers Perceptions of Themselves as Environmental Education Teachers*

This section of the instrument consisted of eleven statements intended to assess how pre-service teachers perceive themselves as future environmental education teachers. The responses to each of these statements were tallied and converted into percentages under the categories strongly agree (SA), agree (A), neutral (N), disagree (D) and strongly disagree (SD) and are displayed in Table 2.

Section C: *Open-ended Questions*

This section of the study contained seven open-ended questions. The purpose of this section was to give the respondents an opportunity to express their views on the provision of environmental education in colleges of education and to investigate other competencies required to promote environmental literacy. Open ended questions are important in research because they provide information that cannot be obtained through survey type questions. The responses to open-ended questions in this study were analyzed under themes developed according to the language and responses of the subjects.

Validation of the Instrument

For the survey instrument, forty statements were developed based on EE programmes for Tertiary Institutions (Republic of Botswana, 1999). Three college lecturers were given the statements and were asked to put each statement under one of the following headings: (a) *Pre-service Teachers' Perceptions of Environmental Education and Environmental Education Teaching in Colleges of Education*; or (b) *Pre-service Teachers' Perceptions of themselves as Environmental Education Teachers*. Of the forty statements, the validators categorized only twenty one statements under one of the two headings. The remaining statements were considered inappropriate for the above headings and hence the purpose of the study and so were rejected. The validators also suggested that an open-ended section be included in the instrument to give pre-service teachers the opportunity to state their views on the teaching and learning of environmental education in colleges of education. The researchers thus developed Section C with fifteen questions, seven of which were seen by the validators as corresponding to the objectives of the study and subsequently included in the questionnaire.

Instrument Reliability

We used one survey instrument consisting of two Sections (A and B). The instrument was pre-tested with thirty pre-service teachers from two colleges of education not used in the study. Based on the responses of this pilot study, questions 9 and 10 of Section A were changed. Question 9 was changed from 'I think the teaching of EE should aim for environmental quality and sustainable development' to 'I think the teaching of EE will promote environmental quality and sustainable development'. Question 10 was changed from 'I think EE will help Botswana to use natural resources sustainably' to 'I think EE will teach Botswana how to use natural resources sustainably'.

In Section B of the instruments, question 11 was changed from ‘I think I am a very good EE teacher’ to ‘I think I will be a very good EE teacher when I complete my studies’. Following these changes, the instrument was then administered to twenty five students from another college of education not used in the study. A marking key was developed by the researchers and three additional college lecturers. Since none of the items contained in Sections A and B included negative statements, marks were allocated as follows: 5 for SA, 4 for A, 3 for N, 2 for D and 1 for SD. Subsequently, the Statistical Package for the Social Sciences (SPSS), specifically the KR21, was used to calculate the reliability coefficient, which was found to be 0.68. The researchers concluded that the coefficient was high enough to warrant the use of the instrument to collect data for this study. The consistency of Section C was established by giving the questions to four students who were not participating in the study. Students’ responses were then grouped under a number of themes.

Data Collection and Analysis

Data for this study was collected using questionnaires with close-ended and interviews with open-ended questions. The results of questionnaires were analyzed using statistical analysis in which responses were counted and the frequencies converted into percentages. This was to ensure that the responses of teacher trainees on EE could be assessed quantitatively. The interview questions (qualitative data) were analyzed using interpretative explanation in which the responses were categorized by theme.

Participants

The participants for this study were sixty teacher trainees in the final year of their three year diploma programme. The participants consisted of twenty males and forty females. Their age ranged from 22 to 25. They all completed the questionnaires but only ten of them participated in the interview. The study was conducted in June, 2010.

RESULTS

The results of the study will be discussed in two sections: quantitative and qualitative.

Quantitative Results: Section A

Table 1 presents the frequency of responses transformed into percentages to allow for analysis.

Table 1: Pre-service Teachers Perceptions of Environmental Education and Environmental Education Teaching in Colleges of Education

Statement	Responses in Percentages				
	SA	A	N	D	SD
1. Environmental Education is a well established subject in Colleges of Education	2 (3%)	10 (17%)	16 (27%)	20 (33%)	12 (20%)
2. The training that I have received in environmental education will help me to instill into children responsible environmental behaviors	0 (0%)	2 (3%)	19 (32%)	23 (38%)	16 (27%)
3. I possess skills, knowledge and expertise to teach environmental education with confidence when I complete Diploma	1 (1.7%)	3 (5%)	16 (27%)	13 (22%)	27 (45%)
4. I think environmental education should be made a compulsory subject for all those who want to train as teachers.	48 (80%)	5 (8%)	7 (12%)	0 (0%)	0 (0%)
5. The teaching of environmental education in colleges of education is well organized	4 (6.7%)	1 (1.7%)	21 (35%)	20 (33.35)	14 (23.3%)
6. The teaching of environment education in colleges of education is based on Botswana’s National Environmental Education Goals (Republic of Botswana, 1999)	0 (0%)	0 (0%)	50 (83.3%)	4 (6.7%)	6 (10%)
7. The teaching of environmental education has been	41	15	4	0	0

effective as evidenced by environmental and wild life clubs in colleges of education	(68.35)	(25%)	(6.7%)	(0%)	(0%)
8. In our training emphasis is placed on raising the environmental literacy of our children	11 (18.3%)	9 (15%)	29 (48.3%)	11 (18.3%)	0 (0%)
9. I think the teaching of environmental education will promote environmental quality and sustainable development	7 (11.7%)	16 (26.6%)	37 (61.7%)	0 (0%)	0 (0%)
10. I think environmental education will teach Batswana to use natural resources sustainably.	42 (70%)	13 (21.7%)	5 (8.3%)	0 (0%)	0 (0%)

N=60

Quantitative Results: Section B

Table 2: Pre-service Teachers' Perceptions of Themselves as Environmental Education Teachers

Statement	Responses in Percentages				
	SA	A	N	D	SD
1. I think I will be successful teaching environmental education	0 (0%)	2 (3.3%)	21 (35%)	19 (31.7%)	18 (30%)
2. I have been well trained in environmental education methodologies	4 (6.7%)	9 (15%)	11 (18.3%)	19 (31.7%)	17 (28.3%)
3. I have mastered content taught in environmental education	4 (6.7%)	6 (10%)	27 (45%)	19 (31.7%)	4 (6.7%)
4. I can now be used as a resource person to run environmental education workshops for other teachers.	3 (5%)	5 (8.3%)	32 (53.3%)	17 (28.3%)	3 (5%)
5. I am in a better position to infuse environmental education concepts into other subject of the school curriculum	1 (1.7%)	8 (13.3%)	25 (41.7%)	17 (28.3%)	9 (15%)
6. I have a clear understanding of the rationale for teaching environmental education.	17 (28.3%)	22 (36.7%)	11 (18.3%)	6 (10%)	4 (6.7%)
7. I can now develop environmental education programme for primary school children	3 (5%)	7 (11.7%)	13 (21.7%)	27 (45%)	10 (16.7%)
8. I can write environmental education teaching materials with confidence	1 (1.75%)	3 (5%)	15 (25%)	19 (31.7%)	12 (20%)
9. I possess content knowledge, skills and professional expertise to lead environmental education unit in my school	1 (1.7%)	5 (8.3%)	23 (38.3%)	11 (18.3%)	20 (33.3%)
10. I shall be able to conduct research on environmental issues when I complete my diploma programme.	2 (3.3%)	2 (3.3%)	35 (58.3%)	7 (11.7%)	14 (23.4%)
11. I think I will be a very good EE teacher when I complete my study	4 (6.7%)	11 (18.3%)	6 (10%)	18 (30%)	21 (35%)

N= 60

Section C: Qualitative Results of Interview Protocol Questions

This section presents responses of teacher trainees to interview protocol questions. The interview protocol questions are listed below and the responses to them are summarized by theme:

1. In your own view, are colleges of education adequately training you to teach environmental education as recommended by the RNPE (1994)? Support your answer.

In disagreement

'We are not being adequately trained in EE because our lecturers do not have the expertise to do so. However, EE issues are discussed in Environmental Science which is a part of science. We would like to have more EE courses to increase our knowledge concerning environmental issues'.

In agreement

'We are adequately trained in EE. Lecturers teach EE because we have it under professional studies. We also have field trips. EE is included into other subjects and we get exposed to it in those subjects. We

have environmental education clubs in colleges of education and we will not have them if EE were not offered in colleges of education’.

2. In your own words, how would you describe an environmentally literate person?

Environmentally literate person

‘Someone who participates in cleaning campaigns. Someone who does not pollute the environment. Someone who works with the local people to solve environmental problems in their areas. Someone who is environmentally friendly and behaves responsibly towards the environment’.

3. Some researchers are of the view that EE should be taught as a separate subject. What do you say about this view? Support your answer.

Supporters of EE as a separate subject

‘Yes, it should be treated as a separate subject so that it is studied in depth and not superficially. It will also have a recognized status like other subjects’.

Objection to EE as a separate subject

‘It should be included into other subjects of the curriculum as is currently the case because if treated separately it will increase the number of courses being taught which means more work for college lecturers and students’.

4. The Revised National Policy on Education of 1994 recommended that EE be taught using the infusion approach. (a) What do you understand by infusion? (b) Do you think using the infusion approach has any advantage?

Definition of infusion

‘Infusion is when teaching a particular subject other than EE and introduces some of EE topics in that subject. Infusion is fitting in some concepts into other subjects. Infusion is integrating content into other subjects during teaching but making sure that those subjects do not lose their status. Infusion means including environmental education concepts into other subjects’.

Advantages of infusion

‘Infusion promotes creative thinking and saves time because many concepts are taught at one time. More knowledge is gained since one concept is taught in different subjects’.

5. What methods of instruction do your lecturers use in teaching environmental education and why do you think they use such methods?

Methods of teaching used by college lecturers

‘Our environmental science lectures use field trips to actually make us see how the environment is affected. Sometimes we use discussion and debate in our class. In Social Studies, we use investigation, that is we go out and investigate environmental issues to see what effects they have on the environment and we discuss how we can help local people to address environmental problems. In biology we talk about problem solving, where the affected local people could also participate and make contributions. Our Earth Science Lecturer likes learner centered method. She asks us to suggest ways of solving environmental problems. We think participatory methods are the best because local people know their problems better and can suggest realistic solutions to save the environment. These methods are important if EE is to be effective in promoting environmental literacy’.

6. Do you think you need Environmental Content Knowledge (ECK) to teach EE to teach it with confidence?

The Importance of Environmental Content Knowledge

'Yes, we need a strong EE content to teach confidently. Some EE concepts are taught in primary and secondary schools and if we have not mastered them it will be difficult for us to teach. In biology, we are taught ecology. We learn concepts such as ecosystem, nutrients recycling, net productivity, succession, etc. We also learn about ecological energetic. In Social Studies we learn about population, pollution, natural resources, soil erosion, etc. We need Environmental Content Knowledge to teach EE'.

7 (a) What teaching materials do your college lecturers use to teach EE?

EE Teaching Materials in Colleges of Education

"There are no EE teaching materials, no EE textbooks for us in our college because EE is not taught or offered as a course in colleges of education".

7 (b) What EE teaching materials did you find in primary schools where you were doing your teaching practice?

EE materials used during teaching practice (TP)

"During our TP we found no EE teaching materials in primary schools. It seems there are no EE teaching materials in all primary schools in Botswana".

DISCUSSION OF THE RESULTS

The findings will be discussed based on the quantitative and qualitative facets of the data collection.

Quantitative

Pre-service Teachers' Perception of Environmental Education and Environmental Education Teaching in Colleges of Education

The results of this study suggest that colleges of education have not yet developed EE courses for pre-service teachers as suggested by responses to Section A of questionnaire. As a result, pre-service teachers are unlikely to graduate with required EE competencies given this lack of training. Unless college lecturers put more effort into the design and the development of environmental education courses, it is unlikely that Botswana will have an environmentally literate population anytime in the near future. There is an urgent need for environmental education in college of education as it is needed to help citizens to sustain and safeguard their environment.

Nearly two-thirds of respondents (63%) reported that environmental education was not a well established subject in colleges of education. Three-quarters (75%) of the participants also reported that they have not received training in environmental education and so will not be able to promote environmental literacy among the children they teach. Sixty-seven percent felt that they will complete their diploma without the knowledge, skills and expertise needed to successfully teach EE. Wilke (1985) has noted the same:

The key to successful environmental education is the classroom teacher. If teachers do not have the knowledge, skills and commitment to environmentalize their curricula, it is unlikely that environmentally literate students will be produced (p.11).

Almost all (92%) of the participants felt that environmental education should be introduced in colleges of education so as to teach Batswana children how to sustain and use their natural resources wisely. The future sustainable use of natural resources ultimately depends on the education the people of Botswana have received. Education about the environment is important because it upholds the conservation, preservation and sustenance of their environment. Mmusi's (1987) remarks support this observation:

The different strata of our society must be sufficiently educated to conserve the environment, to police it from further destruction and to utilize it in such a way that posterity will reap benefits from a fragile ecosystem (p.5).

Pre-service teachers did not see themselves as being successful in implementing EE in schools because they have not received training in it themselves. The fact that EE does not pervade all institutions of higher learning but rather it is scattered in few institutions of higher learning is true in most countries today (Gursory & Saglam, 2011; Kennelly, et al, 2008; Miles, et al, 2006). In Batswana, Primary Education and Language and Social Science Education Departments at the University of Botswana are the only departments that offer some EE courses (Primary Education Handbook, 2011/2012; Handbook of Language and Social Science Education. 2010/2012).

Pre-service Teachers' Perception of Themselves as Environmental Education Teachers

Responses of pre-service teachers to this section indicate that they do not see themselves as being future EE teachers capable of promoting children's environmental literacy. Nearly two-thirds (62%) of the participants reported that they will not feel confident teaching environmental education because they lack training in EE methodologies and subject matter. They contended that environmental education is an integration of subjects sharing common themes and therefore can only be taught after receiving training in its philosophies and pedagogical content knowledge. Sixty per cent of teacher trainees indicated that they have not been well trained in the language of EE and as such will not be able to articulate environmental messages clearly to pupils using effective instructional strategies. Sixty-five per cent do not think they will be good EE teachers because they have not been properly trained and will not be able to workshop other teachers who have likewise not completed EE as part of their pre-service training.

According to the Revised National Policy on Education (1994), pre-service teachers are also expected to infuse EE concepts into other subjects of the school curriculum to ensure that every child has an opportunity to learn EE concepts. This could prove difficult as teacher trainees have not been exposed to the concept of infusion. Pre-service trainees were not sure if they could write EE materials for primary school children because they lack EE content knowledge. This glaring oversight calls for proper and professional training in EE. In order for pre-service teachers to feel like and be recognized as professionals, they must have access to proper EE training in colleges of education. Lahiry, et al (1988) concurs:

Teachers are important professional and like any other group of professionals, they require a proper background in the subject, along with necessary training and commitment to effectively impact desired skills and attitudes on learners, without proper training much energy is wasted and efficacy diminished (p.135)

Qualitative Aspect

Interview Protocol Questions

The participants that were interviewed held opposing views on the teaching of environmental education in colleges of education. Some felt that EE should be taught as a separate subject so that its status as a subject is established and recognized. Being taught separately will also help to ensure that it is treated in depth, and not superficially. The opposing view is that EE should be infused into other subjects of the college curriculum so that every teacher trainee is exposed to it. The infusion of EE into other subjects would mean not having to increase the number of courses colleges of education offer. This approach tends to be favored by EE educators on the grounds that infusing it into other subjects will promote holistic learning.

With regard to teaching methods, Environmental Science students reported that their lecturers used field trips, debate and discussion to teach EE, while Social Studies students reported that their lecturers used investigation, field trips and learner-centered methods. Biology students reported that their lecturers used experimentation and problem solving methods. According to student teachers, field trips had helped them to learn how to write reports and acquire important research skills. Debate and discussion methods, on the other hand, promoted listening and thinking skills which are required for teaching environmental education. Teacher trainees also felt that exposure to different views on environmental issues has enriched their knowledge and promoted their critical thinking.

Implications for Teaching Environmental Education in Schools

Pre-service teachers do not perceive themselves as being competent and effective future EE teachers since they lack EE competencies and as such do not feel equipped to explain environmental issues to children. It is thus unrealistic to expect that the environmental literacy of Batswana children will increase any time in the near future. Given that the attitudes of

our children may not be positive towards the environment, we can expect the attainment of sustainable development to take several more generations.

Recommendations

Based on the findings of the study, the following recommendations are made:

- (1) Colleges of education should be staffed with trained personnel well-versed in EE methodologies and curriculum development. Inadequate teacher training is one of the main reasons college lecturers are not including EE in their teaching.
- (2) EE should be made mandatory for those who aspire to be teachers. This will ensure that all primary school teachers will be equipped to promote children's environmental awareness.
- (3) EE curricula materials for colleges of education should be developed to facilitate the implementation and learning processes.
- (4) A policy document which articulates how to infuse EE concepts into other subjects of the college curriculum should be developed because infusion remains an effective means of promoting holistic learning.
- (5) EE courses for colleges of education should be developed and be implemented in a timely manner to ensure that pre-service teachers graduate with required environmental competencies. Colleges of education in Botswana should call for a National EE Conference on teacher education to give scholars an opportunity to deliberate EE course development and in turn help college lecturers develop relevant EE courses. We propose the conceptual model for training pre-service teachers in environmental education depicted in Appendix A.

CONCLUSION

We were motivated to conduct this study because we strongly believe in the value of teacher education in contributing to environmental education in Botswana. We also believe in its importance to society and to children getting an adequate environmental education. This study has revealed that Botswana, like other developing countries, urgently needs an effective environmental education programme. It seems there is no officer whose task it is to oversee that the recommendation of the RNPE (1994) are implemented in colleges of education. Consequently, EE has permeated few subjects of the college curriculum and this has contributed to delays in the development of EE courses.

Pre-service teachers do not perceive themselves to be effective in teaching EE when they complete their training. This causes concern since the quality and preservation of the environment depends on the education its people have received. The results of the study suggest that colleges of education in Botswana have not been successful in developing EE courses. Urgent action is thus required in the field of teacher training.

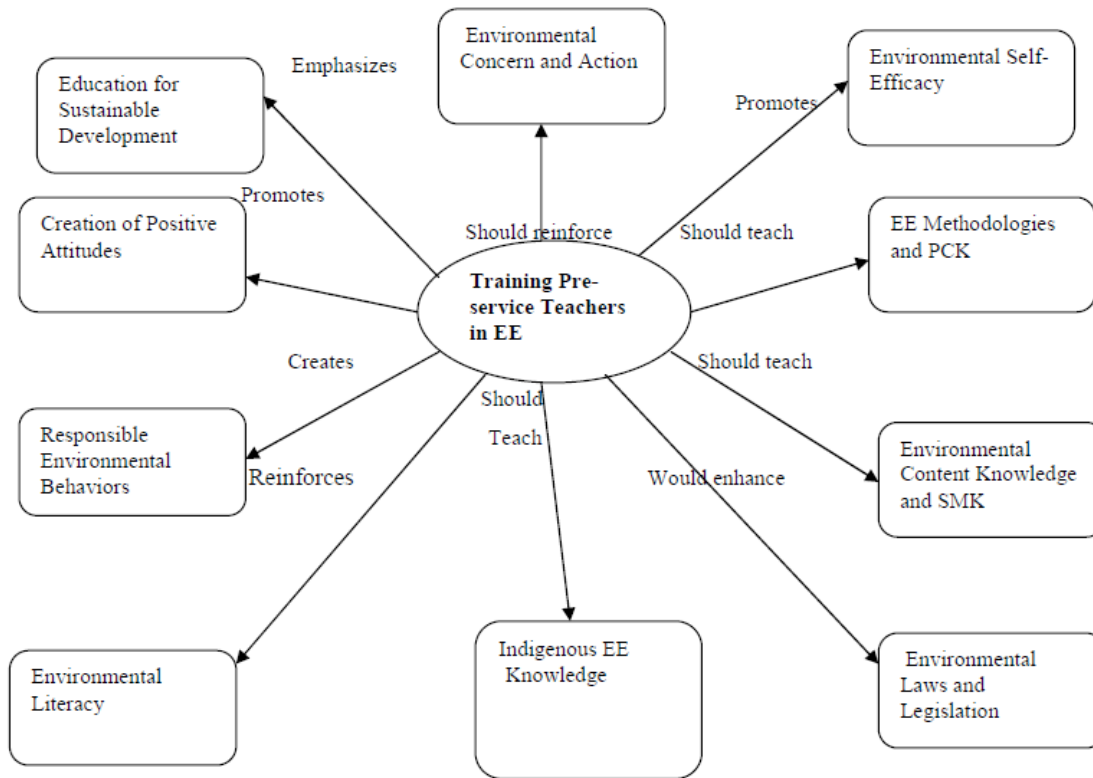
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Appendix A

Figure 1: A proposed conceptual model for train pre-service teachers in EE



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