

Student Teachers' perspectives on themselves as Future Environmental Educators

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Abstract

Learning to teach environmental concepts within the context of a school subject needs understanding as well as chances for practice and reflection. To what extent a teacher can effectively bring environmental education into the classroom depends very much on the training he receives, whether it is pre-service or in-service. To the majority, the initial training may affect the rest of their days in the profession. Thus the intention of the study was to unearth out the perceptions of student teachers about the teaching of infused environmental concepts through the respective subjects which they are supposed to teach. The study explores student teachers' understanding of Environmental education (EE), incorporation of EE concepts into lesson planning, teaching of Environmental education in depth, difficulties in teaching infused EE concepts, knowledge of different EE dimensions, training needs and perception about themselves as future EE teachers. The study also included a qualitative content analysis of the syllabus for EE at teacher education level to determine how far it endows the student teachers to teach the environmental concepts as a cross-curricular theme. To address these concerns, the study employed a mixed method where both quantitative and qualitative data were collected concurrently through a questionnaire from two units (N=98) of prospective teachers doing the two year B.Ed. course under University of Kerala. The findings of the study revealed that a great percentage of the student teachers specified that their preparation did not equip them to teach EE effectively as future environmental educators. The study has implications for the concerns of both teacher educators and student teachers in order to recover their understanding of teaching of EE concepts in a cross-curricular framework.

Key words: *Environmental Education (EE), Student teachers, Infused Environmental concepts, Cross-curricular*

1 Introduction

Environmental protection and conservation has become one of the goals of school education. It is believed that the efforts to achieve this goal would bring about environmental literacy across the country which ultimately gives the environment some respite from its unprecedented exploitation and degradation. The most important factor in raising educational standards in schools is teacher preparation. Effective teacher preparation is necessary for the successful implementation of EE in the classroom because the policies created for schools are to be carried out by teachers. In the UNESCO-UNEP International Environmental Education programme, the importance of teacher preparation in advancing Environmental Education (EE) has been thoroughly demonstrated. Its significance was emphasised by the Tbilisi Intergovernmental Conference (UNESCO 1977a), which argued that the capacity of teacher education to adopt and implement a successful environmental education curriculum may determine the destiny of the environment. This conference acknowledged that the level of training that teachers got within environmental education would have a significant impact on the introduction of the subject in schools. Yet the best curricula and teaching aids, it has been argued, cannot achieve the desired results if those in charge of them do not fully comprehend the target of environmental education, are unable to guide the learning activities and experiments that make up such education, and are unable to make the best use of the resources at their disposal (UNESCO 1980). The importance of teacher education has been emphasised by Simpson et al. (1985), who contend that it not only prepares teachers to educate Environmental Education successfully but also serves as a catalyst for its inclusion in the curricula of schools. They believe that a top-down approach to curriculum innovation would arise from the creation of an excellent teacher training programme in environmental education. These authors believed that field-based teacher education, for mutually primary and secondary school teachers, was the most efficient way to raise environmental education levels in the general public. In a planned, orderly society, teacher education has the potential to be the biggest source of educational transformation, according to UNESCO (UNESCO 1976).It contends that effective teacher preparation in the field will result in a population that is environmentally literate, and that environmental action will follow. Accordingly, it views the addition of environmental education in teacher training as essential for both the environment's future and the discipline's future. It must come as no surprise that UNESCO has called teacher education "the priority of priorities" (UNESCO-UNEP 1990). The way in which UNESCO views the contribution of teacher education to environmental improvement reflects a growing intergovernmental and worldwide understanding of the significance of teacher preparation.

2 Rationale of the study

Due to EE's inherent multidisciplinary nature, it affects educators from all academic fields. The goals of EE go beyond those of most conventional courses, which are primarily focused on knowledge transfer and acquisition. EE attempts to change attitudes and behaviour while fostering the capacity for action. As a result, the role of the teacher is altered from one of information and knowledge transmitter to one of facilitator, helping students move from awareness to attitude change to the development of skills necessary to take action for a better environment. In the secondary school curriculum of Kerala state, there exists no separate subject as Environmental Education. However it is presumed that environmental concepts exist in all school subjects that reflect both multi-and inter-disciplinary nature of EE. This in itself does not serve the purpose. It is pathetic to say that those environmental concepts are almost taught as any other school subjects confining to only cognitive domain ignoring the affective and psychomotor domain. In favour of a secondary teacher to be an environmental educator must possess some extra abilities for the transaction of the infused environmental concepts. The teacher has to identify the infusion spot to infuse environmental dimension in whatever subject they are teaching. Also the teacher has an additional responsibility to find ways and means to teach environment related aspects during the transaction of their respective subjects without jeopardizing the latter's nature. This integrated approach to Environment Education is very much important to give holistic perspective to it. More over the teacher is expected to be environmentally literate and be aware of environmental concepts and issues of local, national and global level. Thus all the teachers are Environmental educators who should go beyond just covering portions for exams and make efforts to develop environmental sensitivity among pupils in order to inculcate a positive attitude towards the protection of environment. At the same time, to what extent a teacher can effectively bring Environmental Education into the classroom depends very much on the training he receives, whether it is pre-service or in-service. To the majority, the initial training may affect the rest of their days in the profession. As the entire prospective teachers are supposed to take up the task of educating about environment, it may be worthwhile to investigate how these would-be implementers are ready to environmentalize their subject syllabus. Thus the major questions arises in the mind of the researcher are

1. Is the syllabus for Environmental Education at secondary pre-service level capable of equipping the student teachers to teach the infused environmental concepts where ever possible?
2. What is the nature of student teachers' EE related knowledge with regard to the teaching of infused environmental concepts?

3 Methodology in brief

The present study is descriptive in nature and uses both qualitative and quantitative methodologies to collect data in accordance with the background information and research topic. Hence the study was framed as a mixed method. A qualitative content analysis of the syllabus for EE in Secondary Teacher Education curriculum was also examined for its relevance and how far it equips the prospective teachers in teaching of EE through infusion approach. Representative samples of student teachers in different subjects, two units (N=98) doing the two year B.Ed. course under University of Kerala were selected as the sample for collecting the data required. The tool used for collecting data required for the study is a Questionnaire for assessing the Prospective teachers' EE related perceptions with regard to the teaching of infused environmental concepts at secondary level. For getting a general idea about the various concepts/constructs involved in the teaching of infused environmental concepts, the related literature in the area under investigation was reviewed, beside having discussion with subject experts /teacher educators and existing practicing teachers so as to ensure the concept /construct validity of the tool prepared for the study. For this purpose the view of the student teachers with regard to certain dimensions such as adequacy of treatment of EE concepts in secondary school textbooks, extent of awareness about the major infused environmental concepts, familiarity with the dimensions of EE, understanding of effective pedagogies for EE, the advantages of teaching learning through infusion approach, the difficulties anticipated in teaching EE through Infusion approach and the perceptions of the would be teachers themselves as future Environmental Educators have been studied. The questionnaire items were prepared after surveying the literature related to the area under study .The criterion of content validity is assessed by a panel of experts in the field who judged its adequacy.

4 Findings and Discussion

4.1 Findings from the analysis of the syllabus for EE at B.Ed. level

The primary goal of pre-service teacher education courses is to fully develop student teachers, notably in knowledge and skills, personalised care of learners, and techniques and evaluation intended to promote learning. No matter how well-structured an in-service programme is, any deficiencies and shortcomings in the pre-service training cannot be made up for. The B.Ed. course is expected to cater to the current curricular concerns of secondary school education. The two year B.Ed. course (2015-2017) of University of Kerala under the purview of this study includes four semesters. The paper EDU-11: *Developmental Perspectives in Education*

is a core paper in the semester three which includes *Educational Management, Environmental Education, Health Education and Entrepreneurship Education*. The contents of the paper have been divided into two major sections. The section A: Educational Management and Entrepreneur education and the section B: Environmental and Health Education. The unit three: Environmental awareness and importance of Environmental Education under the section B is the only unit solely dedicated to environmental education at B.Ed. level. The transitory study of the B.Ed. syllabus was done to find out how far EE is reflected in the syllabi of B.Ed. courses in general though the results does not depict the status prevalent in all universities. The guidelines for Teacher Preparation in EE are clearly portrayed in the document -The Tbilisi Declaration on Teacher Preparation and Professional Development (1977). The four basic essential elements identified so as to be included in all training programmes in EE at pre service and in service level are a) purpose and goals of EE b) functional knowledge of environmental sciences or how natural systems work c) educational methods and professional skills including value clarification and action oriented abilities and d) exposure to genuine circumstances that allow students to better develop their skill set. In addition to this the analysis of national papers such as NCF (2005), KCF (2007) and NCFTE (2009) were helpful in deciding the elements to look for while analyzing the syllabus. The content analysis of the text books at secondary level already helped the investigator to locate the infused environmental concepts and activities which the prospective teachers are supposed to teach.

The results of the analysis show that even though EE has been reflected in some ways, there are aspects that need to be addressed and there are scopes for improvement in others. A good amount of content on environment related topics find place in the syllabus. The concept, nature and scope of EE clearly form a part of the syllabus .Education for sustainable development and disaster management forms a part of the syllabus. The syllabus provides ample opportunities to enrich environmental content knowledge. Though the effort to include EE in the B.Ed. course itself is appreciated, the syllabus under purview of this study is also not without limitations. Information on how to incorporate EE is not provided in the syllabus. No specific pedagogy courses on EE find place in the syllabus. Then there are issues with regard to the inclusion of various looms used in the teaching of EE. The infusion approach has not found any place in the syllabus. The term 'Infusion' is not even mentioned in the syllabus which in turn reveals the non-alignment of the teacher education curriculum with that of NCF (2005) which spells out the secondary school curriculum. NCF (2005) also mentions that projects and activities will form the backbone of EE. However even this has not been spelt out in the two year B.Ed. syllabus. Nevertheless, local environmental concerns have not been taken into consideration in the syllabus. The analysis further reveals that the syllabus is biased towards the theory given the fact that projects and activities have not been emphasized. The opportunities to participate in the resolution of environmental issues are essential for achieving one of EE's goals of preparing problem-solvers. Thus EE will be meaningful only if teacher training programs inculcate problem solving skills through actual involvement in environmental issues. However the scope for developing this is found less in the syllabus under study. Something which is heart breaking is that among the expected learning outcomes listed not even a single one was related or associated with the enhancement of environmental pedagogic content knowledge needed for teaching the infused environmental concepts in schools

4.2 Findings from the analysis of the responses of the questionnaire

The major intention of the study was to determine the student teachers' perceptions regarding the teaching of infused EE concepts. Following a brief, descriptive explanation of the findings, the participant replies are presented in tabular form. Reference is made to the percentage while making comments about the answers to the questions. The findings in this regard are detailed below:

4.2.1 Purpose of EE

The responses on this aspect are reported below:

Table 4.1: Purpose of EE: Responses of student teachers

Ideas	Frequency	Percentage
awareness about the environment	40	41
study about environment	30	31
positive attitude towards environment	9	9
developing environmental knowledge/ concepts	11	11
acquiring the knowledge, abilities, attitudes, and values necessary for environmental protection	8	8

Table 4.1 demonstrates that EE was viewed in a variety of ways by those who were tasked with educating future generations. The majority of responders (40%) thought that EE was important for raising environmental consciousness and for encouraging environmental research (30%). The responses' alignment with the five EE objectives—awareness, knowledge, attitudes, skills, and

to some extent participation—as outlined at the Tbilisi conference was an interesting finding. It is crucial to keep in mind that the word "environmental awareness" only refers to knowing something about the environment; occasionally, it is used synonymously with EE. However, the phrase EE is more general and includes participation, attitudes, knowledge, and attitudes. It should not just be viewed as a method for raising environmental awareness, but also as a way to foster genuine care for preserving the standard of life on earth (UNESCO, 1985). Since EE was thought to be about fostering awareness or knowledge acquisition, even the method it was taught appeared to be about merely transferring knowledge to students.

4.2.2 Infusing EE concepts /issues into lessons

At present, it is not certain whether or not the student teachers take it obligatory to incorporate EE concepts/issues while teaching their respective subjects. The investigator therefore collected their responses regarding this aspect. Their ratings and results of the differences in their responses are presented in the Table 4.2

Table4.2: Incorporating EE concepts /issues into lessons: responses of student teachers

Statement	Students teachers’ responses		
	Always	Sometimes	Never
Incorporation of EE concepts /issues into lessons	23 (23.46%)	59 (60.22%)	16 (16.32%)

Table 4. 2 shows that only 23.46% of the 98 participants who responded to the question said they always incorporate EE concepts and topics into their teaching.60% of the participants said that they either occasionally or never use EE concepts or issues in their teaching, whereas 16.32% never do so. The findings show that the method currently used to incorporate EE concepts and issues into the various lessons of study is not effective.

4.2.3 Teaching EE in immense deepness

Table 4.3: Responses of Student teachers regarding the teaching of EE in depth

Statement	Student teachers’ responses				
	Strongly agree	Agree	Partially agree	Disagree	Strongly disagree
Teach EE in depth	(6.1%)	(40.8%)	(34.7%)	(14.3%)	(4.1%)

According to table 3 above, 46.9% of student teachers extensively cover EE aspects in their instruction, compared to 53.1% of student teachers. The answers to the previous two questions indicate that, although several dimensions are included in various school subjects to differing degrees, not all of them are thoroughly discussed.

Table4.4: Cross-tabulated subjects versus level of EE instruction

Response s	Eng	Mal	Hin	Mat	NS	PS		SS
Great Extent	(54.5%)	(41.3%)	(38.4%)	0	(66.7%)	(40%)		(75%)
Some Extent	(27.3%)	(58.7%)	(45.3%)	(42.8%)	(33.3%)	(20%)		(25%)
Not at all	(18.2%)	0	(16.3%)	(57.2%)	0	(40%)		0

While many student teachers in the social sciences (75%) and the natural and physical sciences (66.7 and 66.7 percent, respectively) said that they taught EE in great depth, many others said they never or only occasionally did so. These student teachers were instructing students in mathematics (100%) and languages (45 – 61.6%).

4.2.4 Infusion of EE into all subjects

Table 4.5: Responses regarding the infusion of EE in all subjects

Statement	Student teachers’ responses				
	Strongly agree	Agree	Partially agree	Disagree	Strongly disagree
Infusion of EE into all learning areas	43 (43.8%)	35 (35.4%)	18 (18.8%)	2 (2.1%)	0

79.2% of those surveyed think that EE should be integrated into all topics. 18.8% and 2.1% of respondents indicated they did not entirely agree with this method of teaching EE.

4.2. Schooling EE as a Separate Subject

Table 4. 6: Schooling EE as a separate subject

Statement	Student teachers' responses				
	Strongly agree	Agree	Partially agree	Disagree	Strongly disagree
Schooling as a separate subject	29 (29.2%)	22 (22.9%)	31 (31.3%)	16 (6.3%)	10 (10.4%)

51.1% of interviewees said that EE should be taught as a separate subject, while 31.3% were not quite in agreement. Only 16.7% of respondents objected to teaching EE as a separate subject. In contrast, 79.2% of respondents to the previous question said that EE should be integrated into all topics. It appears that some respondents thought it should be taught as a separate subject in addition to being integrated into other disciplines. The respondents may have been uncertain or thought that both strategies would be advantageous. Incorporating EE "across the curriculum" is the "official" strategy for addressing the status of EE in the National Documents. Contradicting this strategy and showing that the respondents were not scared to challenge official policy is the relatively large percentage of teachers who support teaching EE as a single subject. From a completely different perspective, this would therefore suggest favourably that the questionnaire's question-response dependability is high.

4.2.6 Insufficient time to teach EE

Table 4.7: Responses regarding the insufficient time to teach EE

Statement	Student teachers' responses				
	Strongly agree	Agree	Partially agree	Disagree	Strongly disagree
Insufficient time to teach EE	27 (27.1%)	33 (33.3%)	20 (20.8%)	4 (4.2%)	14 (14.6%)

Due to the focus on preparing students for, the majority of respondents (60.4%) agreed and strongly agreed that there was not enough time to teach EE in a meaningful way. Only 18.8% of respondents disagreed that there was not enough time to teach EE, while another 20.8% agreed to some extent that this was the case.

4.2.7 Teaching EE by an expert

Table 4. 8: Responses of student teachers regarding the Teaching of EE by an expert

Statement	Student teachers' responses				
	Strongly agree	Agree	Partially agree	Disagree	Strongly disagree
Teaching of EE by an expert	22 (22.9%)	27 (27.1%)	27 (27.1%)	10 (10.4%)	12 (12.5%)

The majority of survey participants, 50%, agreed or strongly agreed that EE should be taught by a topic expert. While 22.9% disagreed that EE should be taught by an expert, a further 27.1% agreed to some level with this assertion. The answers to this query are frequently closely related to those of the preceding query. In response to the previous question, 52.1% of respondents said they preferred that engineering and applied sciences (EE) be taught as a separate subject, and in response to this one, 50% said EE should be taught by an expert.

4.2.8 Importance of EE in the Curriculum

Table 4.9: Responses of Student teachers concerning the Importance of EE in the curriculum

Statement	Student teachers' responses				
	Strongly agree	Agree	Partially agree	Disagree	Strongly disagree
Importance of EE in the curriculum	59 (60.4%)	31 (31.3%)	8 (8.3. %)	0	0

The vast majority of respondents felt that EE should be a key component of the curriculum. 91.7 percent of respondents agreed and strongly agreed that EE should be a key component of the

curriculum. 60.4% of them firmly agreed with this assertion. No respondents disagreed that EE should be a core component of the curriculum.

4.2.9 Knowledge of different EE dimensions

Effective teachers of EE must have a thorough understanding of the natural and artificial, ecological, political, economic, technological, social, governmental, cultural, and aesthetic components (UNESCO-UNEP). In light of this, it was important to provide information regarding the degree of environmental understanding in agreement with a comprehensive and systemic framework. The questions in this section are specifically related to the Van Rooyen Model from 2006.

Table 4.10: Responses of student teachers regarding the knowledge of different EE dimensions

DIMENSIONS	To a Great Extent	To Some Extent	Not at all
Biophysical	13(13.4%)	44(44.8%)	41(41.8%)
Social	26(26.6%)	65(66.3%)	7(7.1%)
Political-juridical	19(19.3%)	38(38.7%)	41(42%)
Economic	21(21.4%)	60(61.2%)	17(17.4%)
Scientific-Technological	27(27.5%)	44(45%)	27(27.5%)
Personal	25(25.5%)	55(56.1%)	18(18.4%)
Contextual	15 (14.9%)	56(57.4%)	27(27.7%)

Teachers who have indicated that the dimensions are understandable to a great extent and some extent have been grouped together in the different dimensions and analyzed as follows:

- 89. 7% have indicated that they understood the social dimension;
- 82.6% understand the economic dimension;
- 81. 6% understand the personal dimension;
- 72. 5% understand the scientific-technological dimension;
- 72. 3% understand the contextual dimension;
- 58% understand the political dimension;
- 56.5% understand the biophysical dimension

The majority of educators incorporated the social, economic, and personal dimensions of EE into their lessons. Fewer teachers frequently understand the political and biophysical dimensions, which results in fewer teachers addressing them in their courses.

Table4.11: Understanding of EE dimensions cross-tabulated against subjects

Dimensions	Eng	Mal	Hin	Mat	NS	PS	SS
Bio-physical	63.6	59.1	50.6	42.9	83.3	33.4	50
Social	81.8	70.6	60.4	71.4	100	100	100
Political Juridicial	36.4	33.4	31.2	42.9	50	66.2	75
Economic	90.9	56.1	59.5	71.4	83.3	83.6	75
Scientific Technological	63.7	55.8	50.6	71.4	83.3	100	50
Personal	63.7	59.7	53.6	71.4	83.3	100	75
Contextual	90.9	52.3	49.1	42.9	83	66.1	75

The percentage of language teachers who said they understood the political-legal aspect was extremely low (31.2–36.4%). Only a small percentage of pre-service math teachers (42.9%), political-juridical (42.9%), and contextual (42.9%) understood the biophysical dimension. With the exception of the political-juridical dimension, which only 50% of the teachers were familiar with, a very high percentage of natural science teachers (80-100%) indicated an understanding of all dimensions. For the purpose of efficiently teaching physical science, a very high majority of teachers (80–100%) stated that they comprehended all dimensions. The bio-physical dimension was the only one that a small minority of social science professors (between 75 and 100%) said they did not comprehend. All dimensions were understood to a high degree by physical science teachers, with the exception of the biophysical, which was only understood by 33.4% of them.

4.2.10 Student teacher’s sensitivity about themselves as future EE teachers

Table 4.11: Responses of student teachers’ sensitivity about themselves as future EE teachers

Statements	Student teachers’ responses					
	Strongly agree	Agree	Partially Agree	Disagree	Strongly Disagree	
I have been well trained in EE methodology	7 (6.7%)	15 (15%)	18 (18.3%)	31 (31.7%)	27 (28.3%)	
I have mastered all content taught in EE	7 (6.7%)	9 (10%)	44 (45%)	31 (31.7%)	7 (6.7%)	
I am in a better position to infuse EE concepts into the subject of the school curriculum	2 (1.7%)	13 (13.3%)	41 (41.7%)	27 (28.3%)	15 (15%)	
I possess the necessary content, knowledge, skills and professional expertise to lead EE in the school	2 (1.7%)	8 (8.3%)	37 (38.3%)	18 (18.3%)	33 (33.3%)	
I think I will be successful in teaching EE	1 (1%)	3 (3.3%)	34 (35%)	31 (31.7%)	29 (30%)	

Student teachers' responses to this question reveal that they do not believe they will be future environmental educators capable of fostering children's environmental literacy. Due to a lack of training in EE methodology and subject matter, over two thirds (62%) of the respondents stated that they will not feel confident teaching EE. They argued that because EE is an integration of topics with shared themes, it can only be taught following instruction in its pedagogical principles and content knowledge. The national documents state that in order to give every kid the chance to understand EE concepts, pre-service teachers must incorporate EE concepts into their fields of instruction in the school curriculum. According to responses, over 70% of the student teachers included in the study's scope are not in a better position to integrate EE concepts into the relevant subject of the school curriculum. Since student teachers haven't been exposed to the idea of infusion, this could be challenging. 56 percent of respondents said they lacked the necessary material, knowledge, and professional expertise to run EE-related initiatives in the classroom. In the opinion of about 66.7% of respondents, teaching EE in schools won't be successful. As a result, the majority of aspiring teachers do not believe that they are successful in imparting the absorbed EE concepts after completing the teacher education course.

5 Recommendations and Conclusion

The study's findings supported the idea that student teachers lack the expertise needed to teach lessons that incorporate environmental topics. This shows that the EE program's secondary school implementation is problematic. A situation like this demonstrates the necessity to refocus the teacher education curriculum to enable the inclusion of appropriate pedagogical training for teaching EE concepts throughout the secondary school subjects. By refocusing the teacher education curriculum, aspiring teachers will be aware about the teaching of infused EE concepts across their topic before taking on their teaching responsibilities. In order to bring about the social changes required for sustainable development, this will guarantee that all teachers adhere to the teaching EE requirements. Overall, changing the teacher education curriculum to incorporate the instruction of infused EE ideas attests to the fact that teachers would be well-prepared to teach using the cross-curricular approach and train their students to be responsible citizens.

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