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ARTICLE

Locating and Analysing Environmental Education-Related Courses in Teacher Education Programmes in the Indian Context

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Abstract

Despite its rich biodiversity, India faces severe environmental challenges due to human activities prioritising immediate gratification over long-term sustainability. Recognising the power of education to address environmental crises, Environmental Education (EE) emerged as a field of study to foster environmental consciousness. Hence, equipping teachers with the knowledge, skills and attitudes to effectively integrate environmental education into their pedagogy is crucial for cultivating sustainable behaviour in students. However, research indicated a significant gap in teacher preparedness to effectively address environmental issues, leaving them ill-equipped to implement related activities and tasks in their classrooms. Using qualitative content analysis, the EE-related courses were analysed to study their status, orientation and responsiveness within three pre-service teacher education programmes. The results of the study showed that most environment-related courses are not compulsory and largely have an anthropocentric orientation with a limited socio-scientific approach. The courses are required to be made responsive toward the contemporary issues and concerns related to Education for Sustainable Development.

Keywords: Environment; environmental education; sustainable development goal 4; teacher education programmes; education for sustainable development

Introduction

India, a land of remarkable ecological diversity, is home to many flora and fauna. The intricate relationship in nature supports regulating and maintaining all ecosystems on Earth. However, it is no longer a hidden fact that human longing for bliss and comfort has driven us to exploit nature's gifts to decrease its self-stabilisation and balancing capacities (Buss, 2000; Bostrom, 2005; Sharma, 2009; Shimray, 2016; Diaz *et al.*, 2019). Education plays an instrumental role in resolving environmental crises and concerns. It is a tool that was used to foster environmental consciousness and inspire the population to become responsible citizens (Choudhary, 2022; Mundhe, 2023; Hasanova & Safarli, 2024). Recognising the crucial role education plays in this critical endeavour, particularly its potential to foster environmental awareness and action, gave genesis to the idea of Environmental Education (EE) that emerged as a distinct field of study. One of the earliest definitions of EE, known as the IUCN definition, states that "environmental education is the process of recognising values and clarifying concepts in order to develop skills and

attitudes necessary to understand and appreciate the inter-relatedness among man, his culture and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulation of a code of behaviour a bow issues concerning environmental quality" (IUCN, 1971, p. 17). Hence, EE is a holistic approach, sparking a deeper understanding of the complex interrelationships between humans and the natural world.

Environmental education

Organisations like UNESCO and UNEP recognise the importance of EE and actively promote its inclusion in formal education systems. It serves as a critical pathway for advancing environmental literacy (Ballantyne, 1995; Plevyak *et al.*, 2001; Ruskey *et al.*, 2001). Despite these efforts, EE still struggles to gain a strong foothold in many pre-service teacher education programmes (Lane *et al.,* 1995; Petegem *et al.,* 2005; Thấn, 2001) as some programmes incorporate EE while others do not. This requires an analysis of the status of the EE-related courses in various pre-service teacher education programmes.

EE as a field has a "small core but big periphery" which distinguishes it from the traditional disciplines and makes it more action-oriented to address the environmental issues through education (Robottom & Hart, 1993; Sauvé, 2005). This represents a vast set of contexts and interdisciplinary connections of EE drawing from various fields like natural science, social science, humanities etc. (Palmer & Neal, 1994, Reid & Scott, 2006). To address this complexity, the framework of education "in," "about" and "for" the environment has emerged as a significant paradigm for understanding EE discourses (Lucas, 1972; Palmer, 1998). However, in practice the most convenient approach to EE implementation remains the information-based education "about" the environment, with limited focus on experiential learning "in" the environment or action-oriented education "for" the environment (Shimray, 2016).

The effectiveness of EE largely depends on the teacher's skill and knowledge at all levels of education (Darling-Hammond, 2000; Adejoke *et al.,* 2014; Durrani *et al.*, 2021; Samur & Akman, 2023), as they serve as catalysts for developing environmental awareness, sustainable behaviours and appreciation for the natural world among students (Loubser, 2015; Merritt *et al.,* 2019 & Karim *et al.,* 2021; Ayaz *et al.*, 2021; Onuoha *et al.,* 2022). However, teachers feel that they do not have the necessary skills and knowledge to teach various topics of EE like climate change (Prokopy *et al.,* 2015; Plutzer *et al.*, 2016; Monroe *et al.,* 2017). A persistent challenge is teachers' limited understanding of EE's interdisciplinary nature, with research spanning over four decades documenting how teachers often reduce environmental education to science education (Lucas, 1980, 1983; Li *et al.,* 2022), confuse it with environmental science or fail to recognise its cross-curricular integration potential with their discipline (Ham & Sewing, 1988; Palmer, 1998; Stevenson, 2007; Reid & Scott, 2006; Prokopy *et al.,* 2015). Research demonstrates that teachers face challenges in integrating environmental education topics across disciplines, a difficulty rooted in pre-service teacher education programmes that inadequately prepare them in interdisciplinary and multidisciplinary teaching approaches (Heimlich *et al.*, 2004; Monde, 2011; Ibimilua & Amuno, 2014; Shimray, 2016) and transdisciplinary approach (Heimlich *et al.*, 2004; Semerjian *et al.,* 2004; Riley *et al.,* 2024). Incorporating socio-scientific content and relating it to real-world issues would develop critical thinking skills and provide a more holistic understanding of environmental challenges (Hogan & O'Flaherty, 2021; Capel *et al.,* 2023). The devastating consequences of unsustainable human activities have also brought two viewpoints into sharp focus to understand EE, i.e., the ecocentric and anthropocentric viewpoints. The ecocentric viewpoint emphasises the inherent value of nature, while the anthropocentric view advocates for discovering pragmatic solutions that balance environmental protection with human well-being (Duncan *et al.,* 1959; Mendenhall, 2009; Preiser *et al.,* 2017; Washington *et al.,* 2021). While both viewpoints offer valuable insights into the complexities of EE, these are often underutilised in analyses and interpretations of EE theory and practice.

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The integration of these pedagogical viewpoints (inter-multi-transdisciplinarity), epistemological viewpoints (social, scientific or socio-scientific) and philosophical viewpoints (ecocentric and anthropocentric) reflect on the "orientation" of EE-related courses, which refers to the positioning of EE course content and how it is framed and approached in teacher education programmes (Stevenson, 2007).

However, in the context of Sustainable Development Goals and 21st-century environmental concerns like climate change and biodiversity loss, etc., EE is expected to respond to the emerging goals in contemporary times. "Responsiveness" in relation to the EE-related courses within the Pre-service Teacher Education Programme signifies their adaptability to address the emerging contemporary environmental issues and concerns (Boamah *et al.,* 2020; Onuoha *et al.,* 2022).

There is very limited research on the interface between teacher education and environmental education, and no research has been found that analyses the status, orientation and responsiveness of EE-related courses within pre-service teacher education programmes. The present research has contributed towards developing various perspectives for analysing the EE-related courses within pre-service teacher education programmes.

Teacher education programmes and place of environmental education-related courses in Indian context

In India, for teacher education programmes National Education Policy (NEP) 2020[1] advocates to "integrate environmental awareness and sensitivity towards its conservation and sustainable development, so that environment education becomes an integral part of school curricula." (NEP 2020, pg. 23)

However, the successful translation of these policy provisions requires adequately prepared teachers, where the National Council for Teacher Education (NCTE) plays a central regulatory role for teacher education institutions in India, establishing standards for curriculum and pedagogical practices. A variety of pathways exist to qualify as a teacher, including diploma programmes (e.g., D.El.Ed.[2], DECCE[3], D.P.Ed[4], D.Ed. Special Education[5]), bachelor's degrees (e.g., B.Ed.[6], B.El.Ed[7], B.A. B.Ed.[8], B.Sc. B.Ed.[9], B.P.Ed.[10], B.Ed. Special Education[11]) and postgraduate programmes (e.g., MA Education[12], M.Ed.[13], M.P.Ed.[14]) catering to diverse educational levels and specialisations. Recent curriculum revisions and governance reforms signal a re-envisioning of teacher education, emphasising on integrating critical perspectives such as environmental education and education for sustainable development into teacher training programmes. Consequently, the ITEP[15] is an emerging teacher education programme designed to address contemporary demands and needs within India.

[1]The National Education Policy (NEP) 2020, enacted by the Government of India, is a comprehensive document provides a transformative vision for the Indian education system, from early childhood through higher education.

[2]Diploma in Elementary Education

[3]Diploma in Early Childhood Care Education

[4]Diploma in Physical Education

[5]Diploma in Special Education

[6]Bachelor of Education

[7]Bachelor of Elementary Education

[8]Bachelor of Arts Education

[9]Bachelor of Science Education

[10]Bachelor of Physical Education

[11]Bachelor in Special Education

[12]Master of Arts in Education

[13]Masters of Education

[14]Master of Physical Education

[15]Integrated Teacher Education Programme

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This study examines teacher education programmes in India, specifically focusing on courses related to environmental education. While these courses vary in title and credits, they generally indicate their orientation and status within the programme broadly. For instance, the D.El.Ed. programme (2 years) includes a compulsory 100-mark course, "Environmental Studies Education," emphasising a socio-scientific perspective. In contrast, the DEECE programme (2 years) integrates environment-related content as a sub-section within a pedagogy course, accounting for 2 credits. Similarly, the B.Ed. programme (2 years) offers a 100-mark elective paper titled "Environmental Education," also adopting a socio-scientific perspective. B.El.Ed programme (4 years) includes "Pedagogy of Environmental Studies," with a broadly socio-scientific perspective. Other programmes, like B.P.Ed. require students to complete a 100-mark (4 credits) paper entitled "Health Education and Environmental Studies." The B.A. B.Ed programme (4 years) mandates a 2-credit course titled "Environment Education," which approaches the subject from a socio-scientific perspective. In contrast, the B.Sc. B.Ed programme (4 years), while offering a course with the same name and credit weighting, emphasises a scientific perspective. Furthermore, both the B.A. B.Ed and B.Sc. B.Ed programmes extend their environmental curricula by providing a 3-credit elective course in "Environmental Economics." The ITEP (4 years) offers a 2-credit compulsory course, "Citizen Education, Sustainability and Environment Education" and a 4-credit elective course titled "Education for Sustainable Development." Notably, certain programmes, such as D.Ed Special Education (2 years) and B.Ed. Special Education (2 years) does not include any specific environmental education content within its curricula. This study has further analysed the established and widely adopted pre-service teacher education programmes in detail that have been in place for many years, i.e. B.Ed., B.El.Ed. and D.El.Ed. These programmes were selected because they provide a wide spectrum of teacher preparation across all school education levels (primary, elementary, secondary and senior secondary) in India.

Research objectives

This study has two major objectives:

1) To explore how the EE-related courses have been reflected in the pre-service teacher education programmes;

2) To examine the orientation and responsiveness of the EE-related courses.

Methodology

This qualitative study examined EE-related courses across three major and widely offered pre-service teacher education programmes (B.El.Ed., D.El.Ed. and B.Ed) in Delhi (the capital city of India). These programmes were selected as they are the most prevalent pre-service teacher education programmes in India that prepare teachers for various levels of school education, specifically those administered by government institutions with a minimum operational period of 10 years. B.Ed and B.El.Ed. programmes were chosen from the University of Delhi, and D.El.Ed. was chosen from the SCERT[16]. After identifying relevant EE courses and their structural placement within each programme (duration, credit allocation, status), the study employed Qualitative Content Analysis (QCA) to systematically analyse course syllabi. This methodology entailed a rigorous examination of textual content and contextual meaning through systematic coding procedures to identify emergent themes, focusing particularly on course objectives and their interpretive significance.

The analysis employed four pre-established analytical perspectives derived from literature: ecocentric/anthropocentric viewpoints, interdisciplinary/multidisciplinary/ transdisciplinary

[16]State Council for Educational Research and Training

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approach, social/scientific/socio-scientific approaches and contemporary environmental concerns. These perspectives were systematically applied to examine course status, orientation and responsiveness across four thematic areas: nature and scope, theoretical content, practicum, pedagogical and assessment approaches.

The study employed triangulation to enhance research credibility and trustworthiness. It involved two peer reviewers and an environmental education expert in the data analysis process. Following the QCA methodology, the data were analysed using coding themes. Subsequently, a consensus-building discussion was held, allowing for the triangulation of findings and ensuring a reliable interpretation of the data.

Analysis and interpretation

This section presents organised data, analysis, as well as interpretation thematically, of the three respective courses related to EE.

EE-related courses: Nature and scope

(a) Structure of the courses

	B.Ed.	B.El.Ed.	D.El.Ed.
Course Title	*Environmental Education*[17]	*Pedagogy of Environmental Studies*[18]	*Environmental Studies Education*[18]
Course Placement	*Second year*	*Third year*	*Second year*
Weightage	*100-marks*	*50 marks*	*100 marks*
Status	*Elective*	*Compulsory*	*Compulsory*

While the elective status of "Environmental Education" course in B.Ed. offer the opportunity to enrolled student-teachers from any discipline to opt and engage with the course. However, the elective status can result in the engagement of a limited number of student-teachers who can effectively integrate EE across school subjects. Consequently, the aim of widespreading EE among student-teachers could be hindered. It shows that EE is valued when chosen (100 marks) but not considered essential. Conversely, the compulsory status of PEVS and ESE courses in the B.El.Ed., and D.El.Ed. programmes reflect that institutions offering the course view them as essential teacher competencies. All enrolled student-teachers get basic EE exposure that aims to develop an understanding of the nature of EVS and related pedagogical approaches. However, the total marks of PEVS course (50 marks) implies limited depth in the content it covers. Hence, the compulsory PEVS and ESE courses acknowledge importance of EE, but the elective "Environmental Education" course suggests that comprehensive environmental preparation is not considered necessary for all student-teachers.

[17]CIE (NA). *Environment Education.* University of Delhi, Delhi. Retrieved from https://cie.du.ac.in/userfiles/downloads/Academic/Syllabus/BED/E.5_Environment%20Education.pdf

[18]MACESE, Department of Education (2001). *The Bachelor of Elementary Education: Programme of Study.* University of Delhi, Delhi, 165-.167. Retrieved from https://mscw.ac.in/LOCF/BElEd%20Handbook.pdf

[19]SCERT (2014). *Diploma In Elementary Education: Curriculum and Syllabus Outline.* SCERT, New Delhi, 53-56. Retrieved from https://scert.delhi.gov.in/sites/default/files/SCERT/basic/B.Ed%20Syllabus/D.El.ED.%20Curriculum.pdf

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(b) Review of the objectives

	B.Ed. (Environmental Education)	B.El.Ed. (PEVS)	D.El.Ed. (ESE)
Objectives	*-To make student-teachers aware and understand the concept of environment and development* *-Conflicts and inequalities resulting from the complex interaction of social and environmental factors* *-Dealing with environment-related curricular areas.*	*To expose students to the significance of EVS as a curricular area at the primary level. While engaging in critical inquiry of EVS as a school subject, students also learn to develop insights into the issue of curriculum design and implementation*	*-Reflect on the concept of environmental studies (EVS).* *-Appreciate the need and importance and preservation of physical and social environment.* *-Understand the major content areas of EVS curriculum.* *-Organise the classroom transaction of EVS in the light of recommendations of NCF-2005.* *-Organise transaction of content in an inclusive learner friendly environment.* *-Use CCE for the assessment of children's learning in EVS.*

The Environmental Education course's objectives focus on developing student-teachers' awareness regarding environmental concepts and related social factors, which seems to highlight educating them "about" the environment. The PEVS course objectives focus on recognising the importance of the subject as a bridge between science and social science, emphasising the preparation of student-teachers "about" the environment by engaging them in studying EE as both a field of study and practice. The ESE course objectives likewise emphasises on developing the theoretical understanding of the concept of EVS that recognises ecological (physical) and human (social) dimensions of the environment, highlighting the inclination towards educating "about" the environment. The objectives also focus on facilitating student-teachers with pedagogical approaches aligned with the National Curriculum Framework- 2005 and the content of the EVS curriculum which would make them aware of the structure of the core content of EVS at different levels (primary, secondary, senior secondary) and its interconnections with other subjects. The emphasise on creating an inclusive and learner-friendly environment implies moving beyond merely transmitting facts to fostering critical thinking and educating them in the environment.

Despite their distinct emphasis, the objectives of all three courses demonstrate an inclination towards educating "about" the environment that significantly includes social, and pedagogical approaches and less in scientific, and socio-scientific approaches in EE. This convergence reflects that an effective EE requires an integration of scientific, social and cultural dimensions.

EE-related courses: Theoretical components

	B.Ed.	B.El.Ed.	D.El.Ed.
No. of units	*3*	*3*	*5*
Course Content	*-Meaning of Environment and its relation to human, its historical and conceptual antecedents, Assessing the state of the environment, environmental concerns from social, natural sciences, interdisciplinary perspective.*	*-Evolution, significance, scope*' of EVS as a "*curricular area at primary level", EE and EVS* *-Relating cognitive growth of child with development of concept; alternative framework; curricular material and it approaches to transact it at*	*-Concept, significance and objectives of EVS; need to preserve nature; issues and implication of teaching EVS at primary level* *-EVS themes/ content area; Integration of EVS with math and language at classes 1 & 2; biographies of great leaders*

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-Understanding Development as social, political and economic progress; Significance of "well-being" of the global community, Issues of sustainable development, challenges and alternative approaches -Studying "environment-related policy documents, it's formulation and analysis, Environmental issues at the global, national & local levels in school curriculum. Role of teachers and development of their skills and abilities to deal with environment related curricular areas"	classes 1-2 and 3-5 -Understanding the method of science', including process approach, lesson, unit and activities planning in EVS	-Lesson, unit Planning, approaches, techniques,to teach EVS for inclusive setup -Environment as a resource to the teaching-learning of EVS -Continuous and comprehensive evaluation, Use of various tools and techniques in EVS,

The "Environmental Education" course reflects an interdisciplinary approach that acknowledges the complex interconnections between human and natural systems. Topics like "*Development* as .... *progress*," centres on human advancement as the primary goal. Though "*sustainable development issues*" are introduced, they primarily serve as a bridge to reconcile human aspirations with the environment. The focus on "*alternative approaches to sustainable development*" appears to search for models that primarily serve human interests while minimising environmental harm. "W*ell-being of the global community*," is highlighting the about improving human lives. Such topics seem to carry an anthropocentric viewpoint. Topics like issues of sustainable development, studying environmental concerns from social and natural sciences perspectives, notions and issues of development and its relationship to the natural and social systems, etc. given in the course, highlight the presence of socio-scientific viewpoints. The topics deliberately integrate "*economics, political, social progress*," with the environment to critically examine the notion of development and explore alternative approaches, reflecting the possibility of using a multidisciplinary approach. Studying "*policy, documents*," "*curriculum*," appears to develop an understanding of theoretical and practical aspects that shape the decisions related to the environment at different levels (national or international). Hence, the course demonstrates underpinnings in inter-and multi-disciplinary approaches by explicitly drawing upon relevant socio-scientific viewpoints like social and natural sciences, particularly biophysical environment concerns like pollution, biodiversity loss, climate change, etc. in the course.

Meanwhile, the PEVS course's topics appear to imply the value of understanding the conceptual underpinning of EVS as a curricular area. There is a dearth of topics related to environmental issues which focus on "educating for the environment." The PEVS course emphasises contextualising EE within children's immediate surroundings and fostering harmonious environmental relationships through processes like observations and prediction. Incorporating "*inquiry-based learning, discussions, and experiments*" provides the potential for learning about pedagogical approaches but does not focus on philosophical perspectives (anthropocentric or ecocentric). The course draws insights from social and pedagogical aspects of the environment to understand EVS, demonstrating an inclination towards an interdisciplinary approach with a focus on "educating about the environment."

Whereas, the ESE course topics emphasising social harmony while incorporating discussions on the preservation of nature suggest the integration of social and ecological dimensions. Whereas, topics like "emerging issues and implication of EVS" imply a scope to use a socio-scientific approach to understand EVS which may include aspects related to educating for environment. However, the scientific aspects are not evident in any unit of the ESE course. Although commemorative elements and biographical studies of leaders like Gandhi potentially illustrate human-ecological interconnectedness. However, subsequent

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units primarily focused on pedagogical approaches. The curriculum explicitly provides for diverse teaching approaches (*scientific, integrated, inclusive*), demonstrating methodological versatility for prospective teachers. The integration of EVS with mathematics and language establishes a clear commitment to interdisciplinary learning enabling students to make connections between subjects and with environmental concerns. Only one topic "*environment as a resource*" demonstrates an inclination towards an anthropocentric approach in the ESE course.

While all three courses incorporate largely an interdisciplinary approach, a concerning pattern emerges in their curricula. Their major focus on social and pedagogical aspects neglects scientific foundations, particularly biophysical environmental concerns. The emphasis on educating "about" the environment is also prevalent in the three courses. Equally concerning was the absence of ecocentric viewpoints within all three courses and the limited presence of an anthropocentric approach in the Environmental Education and ESE courses. This misses an opportunity to foster ethical considerations in environmental decision-making by neglecting to engage the prospective teachers with environmental philosophy perspectives.

EE-related courses: Practicums

	B.Ed.	B.El.Ed.	D.El.Ed.
Suggested Practicums	*-Analysis of documents depicting concern for environment* *-Analysis of case-studies from different contexts symbolising traditions and attitudes to environment.* *-Project-work dealing with any one topic related to issues of environment in the school curriculum*	*-Organising, planning visits* *-Using equipment, materials- films, reports, etc.* *-Collection, presentation of specimens, maintaining museum* *-Project task- e.g. planting tree, oral history*	*-Visit a historical monument in Delhi. Write about its history and ways to use as resource in teaching learning EVS at primary level.* *OR* *Visit a museum in Delhi and write a detailed report on its upkeep by the Government for its maintenance* *-Prepare teaching aids to teach EVS at the primary level* *OR* *-Undertake local weather analysis based on newspaper reports and make a scrapbook on climate change and efforts to conserve green environment*

The Environmental Education course of B.Ed. appear to encourage student-teachers to explore real-world environmental issues, fostering critical thinking and problem-solving skills, demonstrating a commendable emphasis on a socio-scientific approach. Practicum tasks appear to bridge theoretical knowledge with practical application through inquiry-based exploration, preparing student-teachers to address local environmental challenges. Whereas, the PEVS course's practicum used a project-based approach which aligns with the National Curriculum Framework 2005. It emphasised community engagement, with projects like "*oral history*" and "*planning excursions*" providing opportunities for student-teachers to contribute to broader societal contexts. However, the practicum's focus on social aspects with project like *oral history* that appears to overshadows the natural environment dimensions. While tasks like tree plantation appear to address this dimension, the practicum lacks such natural environmental exploration activities. Hence, a limited socio-scientific approach is reflected in the PEVS practicum. In contrast, the ESE course's practicum emphasis on structured tasks like "*visit a museum or historical monument*," demonstrates significant limitations in providing comprehensive environmental education. While practicum appears to address social environmental dimensions, it neglects natural environmental aspects, hindering student-teachers understanding of social-scientific interconnections in a balanced way. Viewing places primarily as resources appears to

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represent an anthropocentric orientation by limiting natural environmental understanding. Furthermore, both the ESE and PEVS practicums suffer from restricted task flexibility, where major assigned tasks focus narrowly on developing teaching resources for EVS, restricting student-teachers' freedom to explore other areas of EE.

Despite the alignment between theory and practice across all three courses, reveal insufficient practicum depth. This inadequacy reinforces a lack of balance between social and scientific aspects particularly in the activities under PEVS and ESE courses.

EE-related courses: Pedagogical and assessment approaches

(a) Pedagogical focus and incorporation of contemporary issues and concern

The Environmental Education course in B.Ed. allocates limited space to explicit pedagogical instruction. The course prioritises developing student teachers' understanding about the environment and development. This lack of explicit pedagogical approaches like "infusion" could potentially hinder student teachers' ability to infuse environmental topics effectively into their teaching that is required to teach secondary and senior secondary classes. In contrast, the ESE and PEVS courses demonstrate a highly structured and robust pedagogical approach. These courses dedicate significant time to "*lesson, unit, pedagogy planning,*" and teaching through practical activities like "*excursions and resource development*." The explicit pedagogical focus ensures prospective teachers acquire essential skills for effective teaching of EVS at the primary-level.

While the Environmental Education course incorporates contemporary issues like development and sustainability, the other two courses lack engagement with these crucial topics. All three courses inadequately incorporate emerging concepts (SDGs, ESD) and current environmental challenges (climate change, biodiversity loss etc.), recent international/national initiatives, and policies. These topics are critical elements for addressing 21st-century environmental challenges highlighted in NEP 2020. These limitations raise questions about achieving an optimal balance between pedagogical instruction and contemporary environmental content knowledge, issues and concerns in teacher education.

(b) Assessment practices

Despite Environmental Education's action-oriented nature, the assessment methods across all courses predominantly rely on traditional written examinations that evaluate knowledge while neglecting attitude and behavioural dimensions. The ESE and PEVS courses formally bifurcate marks (75%–25%), whereas the B.Ed.'s EE course lacks explicit theoretical-practical assessment distribution, potentially allowing teachers to bifurcate the marks according to the needs and demands of the course. This over reliance on conventional evaluation approach, and limited scope to engage with the community and action-based projects, creates a troubling disconnect between theory, practicum and assessment methodologies. This misalignment raises significant concerns about these programmes' capacity to adequately prepare future teachers to implement comprehensive, action-oriented EE that effectively cultivates critical thinking, problem-solving and environmental action among students.

Findings and discussion

The finding regarding the "status" of EE-related courses under teacher education programmes reveals that the course is still not a compulsory component, similar to the findings of the previous studies (Hamalosmanoglu, 2012; Shimray, 2016; Dull & Verma, 2017). This suggests that EE is still not considered essential for all pre-service teachers.

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The analysis of the three EE courses reveals a significant trend regarding the "orientation" of the courses. Environmental Education course emphasis on socio-scientific perspective, whereas PEVS and ESE course emphasised on social and pedagogical perspective. However, less focus on scientific principles, particularly the biophysical foundations of environmental issues, raises concerns about potentially fostering a superficial understanding of ecological principles and processes among prospective teachers. This contrasts with the findings of (Lucas, 1980, 1983; Dillon, 2023) that highlighted a prevalent overemphasis on scientific content within EE.

A significant finding across Environmental Education and ESE courses is the prevalence of an anthropocentric approach within some topics, with no integration of an ecocentric approach in any of the courses. This suggests a focus on human impact and well-being in understanding the environment. Furthermore, the content of all three courses does not address the theoretical frameworks of ecocentrism and anthropocentrism. Neglecting these philosophical perspectives may limit the ability of these courses to equip future teachers with the tools necessary to guide students in critically examining the complex ethical dilemmas inherent in environmental issues.

Also, variations in disciplinary perspective have been found across the courses. EE course demonstrates a strong commitment to both an inter and multidisciplinary approaches, while PEVS and ESE reflects interdisciplinary approach to explore environmental studies. This raises concerns about the potential impact on teacher preparedness, specifically teachers ability to relate EE with their own disciplinary areas and effectively address the complexity of EE.

EE, inherently a practice-based discipline, operates on a "small core, big periphery" (Lucas, 1972, Palmer, 1998) model emphasising experiential learning and aiming to bring a behavioural change towards the environment. Analysis of the assessment methods employed in the "Environmental Education," "PEVS" and "ESE" courses reveals a concerning gap between the theoretical aspect and assessment practices. This implies a limited understanding of EE's aims given within the courses.

An important finding pertains to the "responsiveness" of EE-related courses to contemporary environmental issues and concerns. It was observed that the current topics of EE, such as sustainable development, ESD, green practices, national-international initiatives and actions for conserving the environment, etc. either, could not find adequate space in the course (Taylor *et al.*, 2003) or were deliberately missed out by the curriculum developer to keep up the course duration. The three courses, having remained unrevised for a significant period, are misaligned with contemporary educational advancements, emerging ideas and vision outlined in the National Education Policy, Ministry of Human Resource Development, Government of India (2020), and the National Curriculum Framework for Foundational Stage 2022 (NCERT, 2022). This implies an urgent need to update these courses to address the current demands of 21st-century education and equip teachers with the knowledge and skills to address pressing environmental challenges.

Conclusion and suggestions

This study addressed a significant research gap by analysing the status, orientation and responsiveness of environmental education courses within pre-service teacher education programmes in the Indian context — an interface that has received minimal scholarly attention. The study found that the "status" of the EE-related courses was not compulsory in all pre-service teacher education programmes. The courses that were analysed were not able to give a balanced "orientation" of pedagogical, epistemological and philosophical perspectives in their theoretical as well as practical components. The courses include most of the concepts, issues and contemporary environmental concerns in a very limited way. This shows that the courses are not able to reflect the evolving nature of EE vis-a-vis contemporary time.

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Education has an instrumental role in addressing environment-related issues. The present research recommends that EE-related courses should become an integral and compulsory component of all pre-service teacher education programmes and should be offered as full credit papers. The courses should be developed in the light of diverse pedagogical perspectives (interdisciplinary, multidisciplinary and transdisciplinary), epistemological viewpoints (social, scientific and socio-scientific) and philosophical orientations (ecocentric and anthropocentric) so that they offer a comprehensive understanding to the prospective teachers. It is essential to move beyond the narrow association of EE with science alone and establish its cross-curricular relevance, so that prospective teachers across all subject areas can develop conviction towards EE. EE-related courses should be designed to make them understand nature and its evolution over the years. Involvement of research scholars and practitioners actively working in the area of environmental education would further ensure that courses are responsive to contemporary environmental concerns and issues.

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