

A Study of the Concepts on Sustainable Development in the Curriculum of Teacher Education at the Secondary School Level in India

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Abstract

This study examines the incorporation of Education for Sustainable Development (ESD) in the teacher education curriculum at the secondary school level in India. The study aims to explore how sustainable development concepts are integrated into the curriculum, analyse the perceptions of teacher educators and student teachers, identify challenges in implementation, and suggest strategies for improvement. Findings indicate that sustainability concepts are present in the curriculum mainly through environmental education, but broader dimensions such as social, economic, and cultural aspects require stronger integration. The study also reveals that teacher educators and student teachers generally have positive perceptions towards sustainability education. Challenges such as limited training, insufficient resources, and lack of practical exposure hinder effective implementation. The study suggests curriculum reform, professional development for teacher educators, and the adoption of active learning strategies to strengthen the integration of ESD in teacher education.

Keywords: Education for Sustainable Development (ESD), Sustainable Development, Teacher Education, Curriculum Integration

1. Introduction

The most often used and discussed word these days is sustainable development. The Sustainable Development Goals (SDGs) are a set of global targets aimed at promoting sustainable development and eradicating poverty, hunger, and inequality by 2030. Most essential element of the SDGs is education. Educators hold a significant responsibility in educating students about the SDGs and their significance. This entails integrating SDG-related concepts into lessons, employing SDG-themed activities and projects, and encouraging students to critically consider sustainable challenges and solutions. Concurrently, educational establishments contribute by supporting teacher development on the SDGs, aiding teachers' comprehensive understanding and effective integration. Additionally, institutions offer resources promoting sustainability awareness to students, such as educational materials and online sources (Dhaka,2024).

Education for Sustainable Development (ESD) empowers individuals with the knowledge, skills, values, and attitudes to make informed decisions and take responsible actions for a sustainable future, encompassing environmental, economic, and social well-being.

Globally, there is a growing body of work surrounding education for ESD (UNESCO, 2012; UNESCO, 2014; UNESCO, 2017). While this is also true within the Caribbean context, much more research needs to be done to provide conceptions and practices that are contextually relevant, meeting the unique needs of Sustainable Development (Clark, 2022). UNESCO (2012) describes ESD as a process that focuses on increasing the public awareness and understanding of intricacies of SD, enhancing teaching and learning through reformed curricular experiences, equipping the workforce with the knowledge and skills to guarantee SD and providing access to quality basic education.

The study aims to explore how Education for Sustainable Development (ESD) concepts are incorporated into the secondary teacher education curriculum in India and to examine the perceptions, challenges, and strategies related to their effective integration. It seeks to provide insights from both teacher educators and student teachers to enhance sustainable development practices in teacher training programs.

2. Review of Related Literature within India and Abroad

This review synthesizes findings from 17 studies including 10 conducted in India and 7 from Abroad, to provide comprehensive understanding of concepts on sustainable development in the curriculum of teacher education at the secondary school level.

2.1 Review of Related Studies Conducted in India

- Bhattacharjee, D., & Nag, S. (2024) examined the knowledge and attitude of student teachers towards environmental sustainability in the teacher education curriculum of West Bengal. The findings revealed no significant difference in knowledge and attitude between universities and between male and female student teachers, although a significant difference was observed between government/government-aided and private colleges.
- Baibhav, A. (2024) explored sustainable development through teacher education programmes. The study emphasized that teachers play an important role in shaping students' personalities and should act as role models in promoting values such as social awareness, economic responsibility, and environmental protection.
- Dhaka, R. (2024) analysed the role of teachers and higher education institutions in achieving the Sustainable Development Goals (SDGs). The study highlighted that collaborative efforts and professional development related to SDGs can help educators integrate sustainability concepts into teaching.
- Radha, S., & Arumugam, R. (2023) discussed the integration of Sustainable Development Goals (SDGs) into the curriculum in alignment with NEP 2020. The study indicated that incorporating SDGs into higher education helps develop the knowledge, skills, and attitudes necessary for sustainable development.
- Kumari, S., & Kumar, P. (2023) investigated the role of teacher education in promoting sustainable development in India. The findings highlighted the importance of curriculum, pedagogy, and teaching practices in achieving educational development and sustainability.
- Bishnoi, S. (2023) examined environmental education in teacher education for sustainable development. The study emphasized that environmental education can help individuals understand environmental challenges and integrate environmental concerns into the curriculum.
- Singh, C. K., Singh, S. S., & Sharma, H. I. (2022) investigated sustainable development knowledge, attitudes, and behaviours among prospective teachers in Manipur. The findings showed that female

and older prospective teachers demonstrated more positive attitudes and behaviours towards sustainable development.

- Jetly, R., & Singh, M. (2019) analysed teacher educators' perspectives regarding Education for Sustainable Development (ESD) in India using qualitative content analysis. The study revealed that ESD indicators were reflected through knowledge, skills, and values in teacher education programmes.
- Mohanty, S., & Dash, S. (2018) examined the gap between school curriculum and teacher education programmes in India. The study suggested strategies such as curriculum revision, contextualized teaching, and innovative evaluation methods to promote sustainable education.
- Das, B., Halder, S., & Bairagya, R. (2014) investigated awareness of sustainable development among school students. The findings indicated no significant difference in awareness between boys and girls or between urban and rural students.

2.2 Review of related studies conducted in abroad

- Clark, K. (2022) examined education for sustainable development, curriculum reform, and its implications for teacher education in a small island developing state. The study highlighted that curriculum reforms can improve educational outcomes and encourage students to contribute to sustainable development.
- Valdivia, E. M., Palomino, M. C. P., & Garcia, A. B. (2022) analysed active methodologies and curricular sustainability in teacher training through a systematic review. The findings emphasized the need for higher education institutions to integrate sustainability-focused teaching approaches.
- Amara, K., & Altinay, F. (2021) reviewed literature on integrating education for sustainable development competencies into teacher education. The study found increasing attention toward developing ESD competencies for teachers, although a unified framework is still lacking.
- Nketsia, W., et al. (2020) explored teacher educators' and teacher trainees' perspectives on teacher training for sustainable development in Ghana. The study highlighted the importance of teacher education in achieving SDG-4 while indicating the need for improved inclusive pedagogical practices.
- Anyolo, E., et al. (2018) investigated teachers' perceptions and teaching practices related to education for sustainable development in Namibia. The findings revealed that teachers supported the integration of ESD into the school curriculum.
- Andersson, K., et al. (2013) examined the effects of education for sustainable development on teacher education students. The results indicated positive effects on students' attitudes, responsibility, and willingness to contribute to sustainable development.
- Sisitka, L. (2011) explored teacher professional development with an education for sustainable development focus in South Africa. The study emphasized the importance of curriculum frameworks, networks, and resources in strengthening sustainability-related teaching practices.

3. Summary of the Review

- Reviewing a number of studies demonstrates how important it is for teachers to be competent and to receive in-service training in order to improve student results. The researcher has studied the various aspects and matters regarding Sustainable development in the curriculum of teacher education. To assess the awareness of teacher educators and student teachers towards the concepts of education for sustainable development a study reveals that there is no significant difference between Knowledge and Attitude towards Environmental Sustainability in Teacher Education curriculum of West Bengal between two universities and between male and female student- teachers in general. But, there found

significant difference between Govt. & Govt. aided and private colleges (Bhattacharjee and Nag,2024) Another study shows that Graduate degree holder prospective teachers had better Sustainable Development knowledge than their postgraduate degree holder counterparts, female prospective teachers had better Sustainable Development attitudes than their male counterparts(Singh et al.,2022) There was no significant difference between boys and girls student in urban and rural areas. It was also clear that there was no significant difference between urban students and rural students in respect to awareness of Sustainable Development (Das et al.,2014). A study has revealed that teachers have positive sentiment toward the inclusion of ESD into the senior secondary school curriculum (Anyolo et.al.,2018). A study discussed about positive Effects (Andersson et al.,2013) of Education for Sustainable Development (ESD) on Teacher Education Students.So researcher found that knowledge of teacher educators and students teachers towards the concepts of education for sustainable development is very much present.

- Through collaborative efforts, teachers and institutions shape a generation capable of addressing global issues and creating a sustainable future (Dhaka2024). By integrating the SDGs into their curricula and operations, higher education institutions in India can help their students develop the knowledge, skills, and attitudes required to contribute to sustainable development in India and globally (Radha & Arumugam,2023), A study in abroad also mention Integrating Education for Sustainable Development competencies in Teacher Education(Imara and Fahriye Altinay,2021)So we can say integration of sustainable development goals in curriculum of teacher education is essential for education sector.
- A Study in abroad shows Curriculum reform is viewed as a means of improving educational outcomes and the abilities of students and youths to function within societies while making positive contributions(Clark,2022).Some studies have suggested few steps (Continuous revision of the curriculum, Teaching for construction of knowledge, Contextualizing Education, Innovative changes in the process of evaluation both at school and teacher education level, Pragmatism in curriculum etc.)to bridge these gaps and bring some innovative changes by adopting a sustainable approach (Mohanty& Dash,2018).A study in abroad(Nketsiaet al.,2020) suggested Teacher Training course for Sustainable Development Understanding Environmental education in teacher education for sustainable development(Bishnoi,2023) help to evaluate how far the existing teacher education curriculum reflects the concepts of sustainable development. Above studies suggested strategies for improvement of the existing curriculum towards Education for Sustainable Development.

4. Identification of research gap

The study about knowledge and attitude of teacher educators and student teachers towards the concepts of education for sustainable development is present. But more study is required about the awareness of teacher educators and student teachers towards the concepts of education for sustainable development in India.

Study about education for sustainable development in India is need to be studied more. More suggestion and recommend strategies needed for improvement of the existing curriculum in teacher education towards Education for Sustainable Development.

5. Research Questions

- How are the concepts of Education for Sustainable Development incorporated in the teacher education curriculum at the secondary school level in India?

- What are the perceptions of teacher educators and student teachers regarding the integration of sustainable development in the teacher education curriculum?
- What challenges are encountered in implementing sustainable development concepts in teacher education programmes?
- What strategies can be suggested to strengthen the integration of Education for Sustainable Development in teacher education curriculum?

6. Methodology

6.1 Research Design

The present study adopted a qualitative research design. It mainly focuses on analysing existing literature and documents related to Education for Sustainable Development (ESD) in the teacher education curriculum at the secondary school level in India. The study also examines perceptions, challenges, and strategies related to the integration of sustainable development in teacher education.

6.2 Sources of Data

The study is based on secondary data. Relevant research articles, journals, books, policy documents, and reports related to sustainable development and teacher education were collected from academic databases and educational publications. A total of 17 studies (10 from India and 7 from abroad) were reviewed to understand the integration of ESD in teacher education.

6.3 Method of Data Analysis

The collected literature was analysed using qualitative content analysis. The studies were examined to identify key themes such as the incorporation of sustainable development in curriculum, perceptions of teacher educators and student teachers, challenges in implementation, and strategies for improvement.

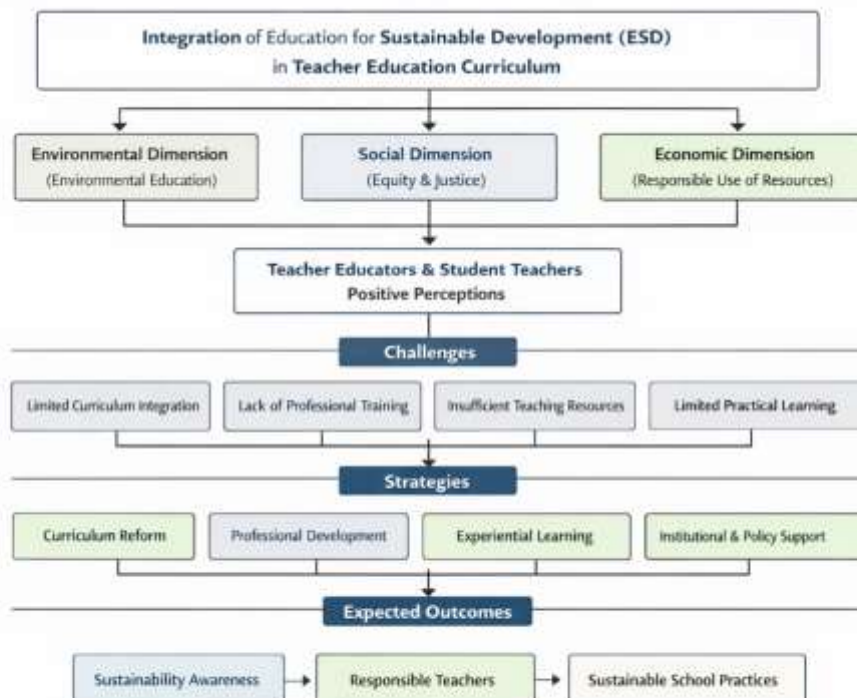
7. Analysis of the Study

- Teacher education curriculum often emphasize environmental awareness and ecological protection, which are important components of sustainability. Nevertheless, the multidimensional nature of sustainable development requires the inclusion of social, economic, and cultural aspects as well. According to **Bishnoi (2023)**, environmental education has been integrated into teacher education programs in India, particularly after the implementation of the National Curriculum Framework for Teacher Education (NCFTE, 2010), but the broader perspective of sustainability still needs stronger curricular representation. **Clark (2022)** emphasizes that curriculum reform is essential for strengthening Education for Sustainable Development, as it enables learners to develop knowledge, skills, and values required for sustainable lifestyles. The analysis suggests that while certain sustainability concepts are present in the curriculum, they are not systematically integrated across different courses and pedagogical practices. Therefore, there is a need to redesign the teacher education curriculum to incorporate sustainable development more comprehensively.
- The perceptions of teacher educators and student teachers play a crucial role in determining the effectiveness of integrating sustainable development in teacher education programs. The analysis suggests that both groups generally hold positive attitudes toward the inclusion of sustainable development concepts in the curriculum. According to **Dhaka (2024)**, educators have a significant responsibility in promoting awareness of the Sustainable Development Goals (SDGs) and encouraging students to think critically about sustainability issues. Similarly, **Bhattacharjee and Nag (2024)** found that student teachers demonstrate considerable knowledge and positive attitudes toward environmental

sustainability, although variations exist across different institutions. In addition, **Singh et al. (2022)** reported that prospective teachers generally possess moderate to high levels of knowledge, attitudes, and behaviours related to sustainable development.

- Despite the growing recognition of the importance of sustainable development, several challenges hinder its effective implementation in teacher education programs. According to **Altinay and Amara (2021)**, there is still a lack of a unified framework for integrating ESD competencies into teacher education programs globally. Another challenge is the **lack of adequate training and professional development opportunities for teacher educators**. Without proper training, educators may find it difficult to incorporate sustainability-related topics effectively into their teaching practices. **Nketsia et al. (2020)** also highlighted that teacher training programs often fail to fully equip teacher trainees with the knowledge and pedagogical skills required to address sustainability issues in classrooms. **Mohanty and Dash (2018)** emphasized that gaps between school curriculum and teacher education programs need to be addressed through innovative reforms and sustainable approaches.
- The analysis suggests several strategies that can strengthen the integration of Education for Sustainable Development in teacher education curriculum at the secondary school level. **Radha and Arumugam (2023)** highlight that aligning educational curricula with the Sustainable Development Goals (SDGs) and national policies such as the National Education Policy (NEP) 2020 can significantly promote sustainable development in higher education. **Valdivia et al. (2022)** emphasized that active learning methodologies are effective in developing sustainability competencies among future teachers.

8. Conceptual Framework of Education for Sustainable Development in Teacher Education



The conceptual framework illustrates the integration of Education for Sustainable Development (ESD) in the teacher education curriculum. It shows the key dimensions of sustainability—environmental, social, and economic—and highlights the role of teacher educators and student teachers. The framework also

identifies challenges such as limited curriculum integration and lack of training, and suggests strategies including curriculum reform, professional development, and experiential learning to achieve sustainable educational outcomes.

9. Findings of the Study

1. Incorporation of Education for Sustainable Development in the Teacher Education Curriculum

The study reveals that the concepts of Education for Sustainable Development (ESD) are present in the teacher education curriculum at the secondary school level in India, but their integration is limited and not comprehensive. The curriculum mainly focuses on environmental awareness and environmental education, while other important dimensions of sustainable development such as social responsibility, economic sustainability, cultural diversity, and ethical decision-making receive comparatively less attention. It was also found that sustainability-related topics are often included indirectly within subjects such as environmental education, social studies, and pedagogy courses rather than being addressed as a separate or integrated framework across the entire curriculum. Therefore, the incorporation of ESD in teacher education programmes exists but requires more systematic and interdisciplinary integration.

2. Perceptions of Teacher Educators and Student Teachers Regarding Sustainable Development

The findings of the study indicate that both teacher educators and student teachers hold positive perceptions toward the inclusion of sustainable development concepts in the teacher education curriculum. They recognize that sustainability education is essential for developing responsible citizens and for addressing contemporary global challenges such as climate change, environmental degradation, and social inequality. Student teachers expressed interest in learning about sustainable practices and acknowledged that teachers play an important role in promoting sustainable values among school students. Teacher educators also agreed that integrating sustainable development concepts can enhance critical thinking, problem-solving skills, and social responsibility among future teachers.

3. Challenges in Implementing Sustainable Development Concepts in Teacher Education

The study identifies several challenges in effectively implementing sustainable development concepts within teacher education programmes. One major challenge is the limited integration of sustainability topics across different courses in the curriculum. In many cases, sustainability is treated as a supplementary topic rather than a central theme. Another challenge is the lack of adequate training and professional development opportunities for teacher educators related to Education for Sustainable Development. Additionally, limited availability of teaching resources, insufficient institutional support, and lack of practical exposure to sustainability-related activities restrict the effective implementation of ESD. Student teachers also reported that theoretical knowledge about sustainability is not always supported by practical experiences or field-based learning.

4. Strategies to Strengthen the Integration of Education for Sustainable Development in Teacher Education

Based on the analysis of the study, several strategies can be suggested to strengthen the integration of Education for Sustainable Development in the teacher education curriculum. First, sustainability concepts should be integrated across different subjects and courses rather than being limited to environmental education alone. Second, teacher educators should receive regular professional development and training programmes to enhance their understanding of ESD and effective teaching strategies related to sustainability. Third, teacher education institutions should promote experiential learning through activities such as project work, community engagement, environmental campaigns, and sustainability-focused

fieldwork. Finally, periodic review and revision of the curriculum is necessary to ensure that sustainability concepts are effectively incorporated and aligned with national educational policies and global sustainability goals.

10. Discussion

The findings of the study indicate that the concepts of Education for Sustainable Development (ESD) are present in the teacher education curriculum at the secondary school level in India, but their integration is mainly limited to environmental education. Other important dimensions of sustainable development, such as social, economic, and ethical aspects, are not adequately represented in the curriculum. This suggests that although sustainability awareness exists, a comprehensive and interdisciplinary approach to ESD is still lacking in teacher education programmes.

The study also reveals that both teacher educators and student teachers have positive perceptions toward the inclusion of sustainable development concepts in the curriculum. They recognize the importance of sustainability education in addressing global challenges and in developing responsible future citizens. However, several challenges hinder effective implementation, including limited curriculum integration, lack of professional training for teacher educators, insufficient teaching resources, and limited opportunities for practical learning.

Strengthening the integration of ESD in teacher education requires curriculum reform, professional development for teacher educators, and the adoption of experiential learning approaches. These measures can help prepare future teachers who are capable of promoting sustainable development in school education.

11. Implications

The findings of this study have several implications for teacher education and curriculum development:

1. **Curriculum Enhancement:** The teacher education curriculum must be restructured to include all dimensions of sustainability—environmental, social, economic, and ethical—across multiple subjects and teaching methods.
2. **Teacher Preparation:** Professional development and training programs for teacher educators are essential to equip them with the knowledge and skills to teach ESD effectively.
3. **Active Learning:** Incorporating experiential learning, project-based activities, and community engagement into teacher education can provide student teachers with practical understanding and critical thinking skills related to sustainable development.
4. **Awareness and Motivation:** Raising awareness among teacher educators and student teachers about sustainability principles will enhance positive attitudes and the willingness to implement ESD in classrooms.
5. **Institutional Support:** Schools and teacher education institutions should provide resources, materials, and supportive policies to encourage sustainability integration and interdisciplinary collaboration.

12. Recommendations

Based on the findings and implications, the following recommendations are proposed:

1. **Integrate Sustainability Across Curriculum:** Expand the inclusion of ESD concepts beyond environmental education to include social, economic, and ethical dimensions, ensuring holistic teacher preparation.

2. **Professional Development:** Conduct regular workshops, training sessions, and seminars for teacher educators to improve competency in delivering sustainability education.
3. **Experiential Learning Opportunities:** Introduce project-based learning, community initiatives, and reflective exercises for student teachers to connect theory with practice.
4. **Periodic Curriculum Review:** Continuously evaluate and update the teacher education curriculum to address gaps in ESD content and teaching strategies.
5. **Resource Provision:** Provide access to teaching materials, digital content, and collaborative platforms to support educators in implementing ESD.
6. **Promote Reflective Practice:** Encourage student teachers to engage in self-reflection, group discussions, and journaling on sustainability topics to internalize and apply sustainable development principles.

By implementing these recommendations, teacher education programs in India can cultivate educators who are not only aware of sustainable development concepts but are also capable of fostering responsible, informed, and proactive students. This comprehensive approach is essential for contributing to sustainable education and achieving long-term societal benefits.

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