

EDUCATION FOR SUSTAINABLE DEVELOPMENT: NATIONAL CURRICULUM ANALYSIS AND STUDENTS' CONSCIOUSNESS PERSPECTIVE AT ELEMENTARY LEVEL

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Abstract

This study used a mixed-methods approach to evaluate the integration of Education for Sustainable Development (ESD) in Grade 8 Geography and General Science curriculum documents and textbooks in Pakistan and to assess students' sustainability consciousness (SC). Qualitative content analysis assessed the alignment of curriculum documents with ESD themes using concept mapping and dimensional description to evaluate the depth and breadth of sustainable development content. Quantitative data were gathered from surveys of 1,800 Grade 8 students from public schools in Punjab, selected through multi-stage random sampling. The Sustainability Consciousness Questionnaire, "validated for the local context, measured students' knowledge, attitudes, and behaviors, demonstrating high internal consistency.

The findings revealed significant gaps in ESD integration, particularly in areas like human rights, climate change, and economic efficiency. While students exhibited strong economic and social consciousness, environmental awareness was less pronounced. Data were analyzed using SPSS for descriptive and inferential statistics, and qualitative content intensity was categorized as explicit, implicit, brief, or extensive. The study offers insights for revising curriculum documents and improving educational strategies to promote holistic SC among students, contributing to the broader discourse on ESD in developing context.

Introduction

Education for Sustainable Development (ESD) has emerged as a critical topic over the past few decades, emphasizing the importance of education in achieving sustainability. Sustainable Development (SD) gained international prominence through the World Commission on Environment and Development's report, *Our Common Future*, which defined SD as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Recognizing the pivotal role of education, scholars like (Kalsoom & Khanam, 2017) have stressed the necessity of an education system that fosters environmental responsibility and resource preservation.

The 1992 UN Conference on Environment and Development (UNCED) in Rio de Janeiro established ESD as a global educational vision to address sustainability and poverty challenges. Building on this foundation, the United Nations declared 2005–2014 as the Decade of Education for Sustainable Development (DESD). This initiative aimed to integrate SD principles into educational frameworks, envisioning a world where education fosters values, behaviours, and lifestyles supportive of a sustainable future (UNESCO, 2005b).

(Barth, Michelsen, Rieckmann, & Thomas, 2015) highlighted ESD's role in cultivating competencies for active participation in socio-political processes related to sustainability. As a multidimensional process, ESD equips individuals with critical thinking skills and knowledge essential for economic prosperity and environmental stewardship. It also emphasizes awareness of human impacts on the environment and the development of skills for monitoring, analysis, and intervention (Geiser, 2006). Furthermore, ESD promotes future-oriented learning, encouraging students to address current and emerging challenges across environmental, social, and economic dimensions (Greene & Silverthorn, 2004). A key outcome of ESD is fostering sustainability consciousness (SC), a holistic construct

encompassing knowledge, attitudes, and behaviors toward sustainable practices (Kollmuss & Agyeman, 2002) (Pauw et al., 2015).

In Pakistan, efforts to integrate ESD into the national curriculum have been limited. A 2003 review by the Sustainable Development Policy Institute (SDPI) identified significant gaps in incorporating sustainability concepts into textbooks (Hussain, Salim, & Naveed, 2011). (Mughal, Qaisrani, Solangi, & Faiz, 2011) emphasized the urgent need to align Pakistan's education system with SD goals to cultivate environmentally conscious and socially responsible citizens. Despite global advancements, research on ESD in Pakistan, particularly at the elementary level, remains scarce. Elementary education, which forms the foundation for lifelong learning, is critical for shaping students' attitudes and behaviors toward sustainability (Corney & Reid, 2007; Feiman-Nemser, 2018).

This study addresses these gaps by analyzing ESD content in Pakistan's National Curriculum Document (2006–07) for Grade 8 General Science and Geography subjects. It evaluates textbooks to assess how sustainability concepts are presented and measures elementary students' sustainability consciousness. This focus underscores the importance of curriculum reforms and teacher training to align educational practices with ESD objectives.

The significance of ESD lies in its ability to foster competencies for addressing socio-political challenges and advancing sustainability. By integrating ESD into curricula, students gain the knowledge, skills, attitudes, and behaviors necessary for responsible resource use and environmental stewardship. This approach prepares them to balance economic, environmental, and societal dimensions, enabling transformative contributions to sustainable development.

However, Pakistan faces several challenges in advancing ESD. The national curriculum and textbooks lack adequate sustainability content, and there is limited research on students' sustainability consciousness, particularly at the elementary level. This study seeks to highlight these gaps and propose actionable solutions for curriculum reforms and teacher training, emphasizing the need to align educational strategies with global sustainability goals.

Material and Methods

The study employed a mixed-method design combining qualitative and quantitative approaches to explore the integration of Education for Sustainable Development (ESD) within curriculum documents and assess students' sustainability consciousness. Qualitative content analysis focused on evaluating the alignment of Grade 8 Geography and General Science curriculum documents and textbooks with ESD themes, examining their depth, breadth, and intensity using frameworks like concept mapping and dimensional description. Quantitative data, on the other hand, were collected through surveys administered to 1,800 Grade 8 students selected via multi-stage random sampling from public schools in Punjab, Pakistan. This dual approach ensured a comprehensive exploration of the research objectives. Data sources included the National Curriculum Documents (2006-07) for Geography and General Science and their corresponding textbooks published by the Punjab Textbook Board. The curriculum documents were analyzed for thematic alignment with sustainable development perspectives, such as human rights, climate change, natural disasters, and economic efficiency. Surveys assessed students' knowledge, attitudes, and behaviors regarding sustainability, utilizing the "Sustainability Consciousness Questionnaire" validated for the local context. Reliability analysis indicated high internal consistency across dimensions of sustainability knowingness, attitudes, and behaviors. The data collection process adhered to ethical considerations, ensuring confidentiality and voluntary participation.

Quantitative data analysis using SPSS involved descriptive statistics and inferential techniques, while qualitative analysis categorized content intensity into explicit, implicit, brief, or extensive dimensions. The study highlighted the gaps and strengths in ESD integration within the curriculum, providing insights into improving educational strategies to foster sustainability consciousness among students. This robust methodological framework allowed for the generalization of findings while ensuring relevance to the local educational context.

Literature Review

This section covers various research and studies that are of particular interest in this study. Most of the literature review is related to the major themes and topics in this study. Sustainability integrates human, environmental, and economic systems, striving to balance development with environmental protection. It addresses environmental impacts of human activities and emphasizes harmony between nature and society. Sustainability prioritizes reducing fossil fuel dependency, conserving biodiversity, and maintaining ecological balance (Baumgärtner & Quaas, 2010; Owens & Halfacre-Hitchcock, 2006).

Sustainability Consciousness (SC)

SC reflects an awareness of sustainability across environmental, social, and economic dimensions, encompassing knowledge, attitudes, and behaviours (Olsson, 2018) (Olsson & Gericke, 2016). Developed by researchers at Karlstad University, SC integrates cognitive and affective learning to encourage pro-sustainability actions (Kollmuss & Agyeman, 2002; Michalos et al., 2012). It bridges gaps in Education for Sustainable Development (ESD) by promoting awareness and action for environmental protection (Gericke, Hudson, Olin-Scheller, & Stolare, 2018).

Sustainable Development (SD)

SD emerged as a response to environmental degradation and social inequalities. Defined as development meeting present needs without compromising future generations, SD encompasses ecological, social, and economic goals (WCED, 1987; IUCN/UNEP/WWF, 1991). Key milestones include the UN's Decade of Education for Sustainable Development (2005–2014), emphasizing education's role in global challenges (UNESCO, 2005; Wals & Kieft, 2010). Despite progress, higher education institutions often prioritize social and economic dimensions over environmental ones (Aleixo, Azeiteiro, & Leal, 2020).

Education for Sustainable Development (ESD)

ESD integrates environmental, societal, and economic dimensions into education, addressing global sustainability challenges (Leal Filho et al., 2018; Rauch, 2002). By fostering critical thinking, participatory decision-making, and social learning, ESD equips individuals to address sustainability issues (Hopkins & McKeown, 2002; Wals, 2012). It aligns with global goals like Education for All (EFA) and the Millennium Development Goals (UNESCO, 2014a). While effective, ESD implementation faces institutional and regulatory challenges, with narrow focuses on environmental issues limiting broader objectives (Didham, 2012; Farinha, Azeiteiro, & Caeiro, 2018).

Key Pillars of Sustainability

The social pillar emphasizes equity, poverty reduction, education access, gender equality, and health care. UNESCO's ESD framework advocates a shift from growth-driven to well-being-driven models, reducing overconsumption and fostering sustainable practices (UNESCO, 2014) (UNESCO, 2019). The economic pillar tackles poverty, inequality, and employment, promoting fair taxation and living wages.

Critical Consciousness and Theory

Paulo Freire's critical consciousness emphasizes understanding and addressing social, political, and economic inequalities. It involves social analysis, political agency, and social action, fostering self-reflection and active citizenship (Seider, 1996; Goldstein, 2013). Rooted in critical theory, it critiques societal structures and calls for transformative education to dismantle power dynamics and inspire social change (Sharifi Darvazeh, Nateghi, & Hasham Rezaei, 2017)(Brookfield, 2005).

National Curriculum & Textbooks

A national curriculum provides a standardized educational framework aimed at ensuring consistency across schools in a country. It includes guidelines for subjects, teaching methods, assessments, and educational standards, typically overseen by federal or state governments. In Pakistan, education is primarily a provincial responsibility under the 1973 Constitution; however, the Federal Ministry of Education ensures nationwide cohesion in curriculum development, textbook preparation, and maintaining standards. A centralized National Bureau of Curriculum and Textbooks (NBCT) collaborates with provincial curriculum centers and textbook boards to develop, approve, and distribute high-quality teaching materials (Khosro et al., 2010).

Textbooks play a critical role in Pakistan's education system, serving as the primary teaching tool for instructors and learning material for students. They align with national curriculum goals, facilitating cognitive, emotional, and social development (Haq & Haq, 1998). In developing countries, textbooks are often the sole resource available for learning due to a lack of supplementary materials. Therefore, their content, design, and presentation significantly impact educational outcomes.

Modern textbooks should be accurate, engaging, and relevant, containing activities to encourage interaction and critical thinking. They must be inclusive, free from bias, and linguistically age-appropriate while fostering problem-solving skills and real-life applications. Additionally, they should support both students and teachers by providing structured guidelines, exercises, and resources for enhanced learning experiences(Hussain et al., 2011).

Education for Sustainable Development (ESD) is increasingly integrated into curricula to promote interdisciplinary learning and empower students to make informed decisions for a sustainable future. Subjects like General Science and Geography now include sustainability topics such as environmental conservation, energy production, and social responsibility. These changes aim to foster a holistic understanding of sustainability and develop students' capacity for future-oriented problem-solving (Pakistan, 2006) (UNESCO, 1997; Moore, 2005).

Student consciousness

Student consciousness may be described as the development of the whole hidden potential of consciousness that makes student master and controlled of their own life. The behavior of the student is always beneficial to themselves as well to their environment. Such conscious students command situation and control the circumstances. Their increased awareness of their surrounding helps them to resolve their immediate environmental problems. If student become aware of the need for protecting their natural resources they will find ways of preserving their natural resources (Özmen & Karamustafaoğlu, 2006).

Research Gaps and Future Directions

While ESD has made strides in enhancing educational quality and promoting sustainable practices, gaps remain in integrating sustainability across educational frameworks. Challenges include diverse stakeholder perspectives, institutional constraints, and limited

research on holistic implementation (Farinha et al., 2018; Vargas et al., 2019). Strengthening individual awareness, leadership skills, and interdisciplinary approaches is crucial for achieving Sustainable Development Goals (Rieckmann, 2018).

By embedding sustainability into formal and non-formal education, fostering critical consciousness, and addressing systemic barriers, education can transform societal attitudes and practices toward global sustainability.

Results and Discussion

data analysis and interpretation, divided into two main sections: qualitative and quantitative data analysis. The qualitative section examines the National Curriculum Documents of Geography and Science (2006-07) for 8th grade, along with their corresponding textbooks, through the Concept Mapping Framework (CMF) and the Dimensional Description Framework (DDF). These analyses investigate the alignment, expansion, and intensity of content related to Education for Sustainable Development (ESD). The ESD framework, introduced by UNESCO in 2005, emphasizes three main dimensions: social fortitude, natural obligation, and economic efficiency, with 15 sub-themes such as human rights, climate change, and poverty reduction.

The quantitative analysis involves a survey of 1800 students from 60 schools in three districts of Punjab, using the "Sustainability Consciousness Questionnaire" developed by (Michalos et al., 2012), which assesses sustainability knowingsness, attitudes, and behaviors. SPSS 21 software was used for both descriptive and inferential statistical analyses.

The qualitative content analysis of the 8th-grade Geography and Science National Curriculum Documents (2006-07) and textbooks focuses on whether these documents address key aspects of ESD. The results indicate that while the curriculum highlights the importance of social and problem-solving skills, it lacks specific mentions of human rights in relation to sustainable development. The Concept Mapping Framework (CMF) was used to assess the alignment of curriculum content with sustainable development themes, suggesting that further integration of these critical topics into educational materials is necessary.

The study aims to evaluate the extent to which these educational resources prepare students to engage with global sustainability challenges, fostering critical thinking and problem-solving skills necessary for the future.

The qualitative analysis of the 8th-grade Geography National Curriculum (2006-07) reveals key aspects of Education for Sustainable Development (ESD). While the curriculum emphasizes individual learning rights, it lacks explicit reference to human rights in the context of ESD. Peace is indirectly supported through guidelines promoting neutrality and tolerance. Human security is addressed through discussions of natural disasters and environmental issues, though no specific instructions are provided. Gender equality is acknowledged through the promotion of women's education. Cultural diversity and intercultural understanding are emphasized through cooperative learning and respect for diversity. However, the curriculum lacks direct content on critical health issues like HIV/AIDS, and although natural resources and climate change are covered, biodiversity and agriculture are not explicitly addressed. Rural development is notably absent, despite its importance in Pakistan, and sustainable urbanization is only indirectly referenced in the context of international trade. Disaster prevention is well-covered, but poverty reduction, a crucial component of sustainable development, is largely neglected. Overall, while the curriculum addresses environmental and safety-related aspects of ESD, it overlooks key areas such as human rights, gender equality, and poverty reduction.

Conclusion and Recommendations

The National Curriculum Document 2006-07 and 8th-grade Geography and Science textbooks in Pakistan lack adequate content on critical areas like health, HIV/AIDS, gender equality, and rural development. These omissions hinder the development of students' knowledge, attitudes, and behaviours essential for Sustainable Development (SD). Revising the curriculum to include comprehensive and detailed content aligned with SD goals is crucial for fostering holistic sustainability consciousness (SC) among students.

Pakistani elementary students exhibit significant SC across economic, environmental, and social dimensions. They show strong economic consciousness by emphasizing poverty reduction and accountability, actively engage in environmental preservation, and demonstrate responsiveness to social responsibilities like respecting diversity and promoting human rights. Despite differences in knowledge, attitude, and behaviour across these dimensions, the current education system positively impacts students by fostering awareness and enthusiasm for SD. To build on this progress, further curriculum improvements and comparative research on SC across different educational contexts and demographics are recommended.

References

- Aleixo, A. M., Azeiteiro, U. M., & Leal, S. (2020). Are the sustainable development goals being implemented in the Portuguese higher education formative offer? *International Journal of Sustainability in Higher Education*, 21(2), 336-352.
- Barth, M., Michelsen, G., Rieckmann, M., & Thomas, I. (2015). *Routledge handbook of higher education for sustainable development*: Routledge.
- Baumgärtner, S., & Quaas, M. (2010). Sustainability economics—General versus specific, and conceptual versus practical. *Ecological Economics*, 69(11), 2056-2059.
- Corney, G., & Reid, A. (2007). Student teachers' learning about subject matter and pedagogy in education for sustainable development. *Environmental education research*, 13(1), 33-54.
- Didham, R. J. (2012). *Education for sustainable development country status reports: An evaluation of national implementation during the UN Decade of Education for Sustainable Development (2005-2014) in East and Southeast Asia*: Institute for Global Environmental Strategies.
- Farinha, C. S., Azeiteiro, U., & Caeiro, S. S. (2018). Education for sustainable development in Portuguese universities: The key actors' opinions. *International Journal of Sustainability in Higher Education*, 19(5), 912-941.
- Feiman-Nemser, S. (2018). What does research tell us about educating mainstream teachers to work with ELLs? Paper presented at the The Educational Forum.
- Geiser, K. (2006). Education for a transition to sustainability. *Inside and out: Universities and education for sustainable development*, 29-40.
- Gericke, N., Hudson, B., Olin-Scheller, C., & Stolare, M. (2018). Powerful knowledge, transformations and the need for empirical studies across school subjects. *London Review of Education*, 16(3).
- Greene, G., & Silverthorn, B. (2004). The end of suburbia: Oil depletion and the collapse of the American dream.
- Hopkins, C., & McKeown, R. (2002). Education for sustainable development: an international perspective. *Education and sustainability: Responding to the global challenge*, 13, 13-24.
- Hussain, A., Salim, A., & Naveed, A. (2011). Connecting the Dots: Education and religious discrimination in Pakistan: A study of public schools and madrasahs.
- Kalsoom, Q., & Khanam, A. (2017). Inquiry into sustainability issues by preservice teachers: A pedagogy to enhance sustainability consciousness. *Journal of cleaner production*, 164, 1301-1311.
- Kollmuss, A., & Agyeman, J. (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental education research*, 8(3), 239-260.

- Leal Filho, W., Azeiteiro, U., Alves, F., Pace, P., Mifsud, M., Brandli, L., . . . Disterheft, A. (2018). Reinvigorating the sustainable development research agenda: the role of the sustainable development goals (SDG). *International Journal of Sustainable Development & World Ecology*, 25(2), 131-142.
- Michalos, A. C., Creech, H., Swayze, N., Maurine Kahlke, P., Buckler, C., & Rempel, K. (2012). Measuring knowledge, attitudes and behaviours concerning sustainable development among tenth grade students in Manitoba. *Social indicators research*, 106, 213-238.
- Mughal, S. H., Qaisrani, N., Solangi, G., & Faiz, S. (2011). Promoting education for sustainable development: Challenges and issues for higher education institutions in Pakistan. *International Journal of Learning & Development*, 1(1), 159-165.
- Olsson, D. (2018). Student sustainability consciousness: Investigating effects of education for sustainable development in Sweden and Beyond. *Karlstads universitet*.
- Olsson, D., & Gericke, N. (2016). The adolescent dip in students' sustainability consciousness—Implications for education for sustainable development. *The Journal of Environmental Education*, 47(1), 35-51.
- Owens, K. A., & Halfacre-Hitchcock, A. (2006). As green as we think? The case of the College of Charleston green building initiative. *International Journal of Sustainability in Higher Education*, 7(2), 114-128.
- Özmen, H., & Karamustafaoğlu, O. (2006). Environmental consciousness and education relationship: Determination of how environment-based concepts are placed in Turkish science curricula. Paper presented at the Asia-Pacific Forum on Science Learning and Teaching.
- Pakistan, U. (2006). Situation analysis of teacher education in Pakistan: towards a strategic framework for teacher education and professional development. Government of Pakistan 2006c, 2002a.
- Rauch, F. (2002). The potential of education for sustainable development for reform in schools. *Environmental education research*, 8(1), 43-51.
- Rieckmann, M. (2018). Learning to transform the world: Key competencies in Education for Sustainable Development. *Issues and trends in education for sustainable development*, 39(1), 39-59.
- Sharifi Darvazeh, M., Nateghi, F., & Hasham Rezaei, M. (2017). Analysis and Review of Critical Theory in the Curriculum. *Iranian journal of educational sociology*, 1(4), 175-184.
- UNESCO, U. (2014). Roadmap for implementing the global action programme on education for sustainable development. <http://Unesdoc.unesco.org>.
- Wals, A. E. (2012). Shaping the education of tomorrow: 2012 full-length report on the UN decade of education for sustainable development. Retrieved from