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A Holistic Review of Environmental and Skill-Based Education under Pakistan's Single National Curriculum: Policy Directions for Sustainable Development

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Abstract
The integration of environmental and skill-based education is critical for achieving sustainable development goals in Pakistan. This review evaluates the Single National Curriculum (SNC) from the perspectives of environmental education and skill-based learning. Drawing on existing literature and policy documents, it explores implementation gaps, assesses curriculum design, and proposes actionable policy recommendations. The findings highlight the SNC's potential to harmonize educational standards while addressing socio-environmental challenges. This paper concludes with strategies for enhancing teacher training and curriculum integration, ensuring sustainable educational reform.

Keywords: Skill-based Education, Single National Curriculum, SNC, Environmental Education, Sustainable Development

Introduction

Background
Environmental education is pivotal for addressing urban challenges like smog and waste management, as emphasized by Khalid et al. (2024). In urban areas of South Punjab, for example, integrating environmental awareness into education can play a transformative role in fostering proactive citizenship. However, despite its potential, environmental education in Pakistan often lacks practical application and is underrepresented in national curricula. The Single National Curriculum (SNC) offers an opportunity to mainstream this critical domain. Similarly, skill-based education, which is designed to equip students with practical competencies for the workforce, remains a cornerstone for achieving sustainable development goals. Comparative analyses indicate that countries prioritizing vocational education experience reduced unemployment and enhanced economic growth (Rafiq-uz-Zaman & Nadeem, 2024). In the context of Pakistan, the SNC seeks to address these gaps by incorporating vocational training modules and fostering gender-inclusive skill development programs.

Objectives

This review aims to assess the degree to which environmental and skill-based education has been integrated into the SNC. It explores the curriculum's ability to meet the educational needs of a rapidly changing socio-economic and environmental landscape. Specifically, this review addresses the following objectives:

- **Evaluate the Inclusion of Environmental Education:** Analyzing its thematic representation and practical applications within the SNC.
- **Assess Skill-Based Training Components:** Exploring how vocational training aligns with labor market demands and addresses gender disparities.
- **Identify Challenges and Opportunities:** Highlighting barriers to effective implementation and recommending actionable strategies for future policies.

Importance of the Study

The SNC represents a significant shift in Pakistan's educational paradigm, aiming to harmonize learning outcomes across diverse socio-economic groups. This review contributes to the discourse by critically analyzing whether the SNC effectively addresses two critical domains: environmental sustainability and employability through skills training. By linking these aspects to broader sustainable development goals, this study underscores the SNC's potential to serve as a model for educational reform in developing countries. Research suggests that interdisciplinary approaches combining environmental awareness and skill development could significantly enhance educational outcomes (Nadeem et al., 2024; Khalid et al., 2024).

Structure of the Review

The remainder of this paper is organized as follows: Section 3 outlines the methodology used for this narrative review, detailing the search strategies and inclusion criteria. Section 4 evaluates the current state of environmental education in the SNC, identifying gaps and opportunities. Section 5 delves into skill-based education, analyzing its alignment with market demands and socio-cultural dynamics. Section 6 discusses the policy implications of these findings, providing actionable recommendations for future reforms. Finally, Section 7 concludes with a summary of insights and policy directions. Environmental education is pivotal for addressing urban challenges like smog and waste management, as emphasized by Khalid et al. (2024).

Methodology

This review employs a structured narrative analysis approach to evaluate the integration of environmental and skill-based education within Pakistan's Single National Curriculum (SNC). The methodology is designed to systematically identify, analyze, and synthesize existing research, policy documents, and case studies relevant to the research objectives.

Research Design

This study uses a narrative review framework to provide a comprehensive and qualitative synthesis of existing literature. The narrative review allows for thematic categorization of topics, including:
Environmental education in SNC.
Skill-based education trends in SNC.
Policy implications and challenges.
The approach is exploratory, aiming to uncover gaps, alignments, and opportunities within current educational frameworks.

Search Strategy
The following databases were used to identify relevant literature:

- Scopus
- Google Scholar
- PubMed
- Search Keywords and Prompts:
- "Environmental education integration in national curricula"
- "Skill-based education trends in South Asia"
- "Challenges in implementing the Single National Curriculum in Pakistan"
- "Sustainable development through education in Pakistan"

Boolean operators (AND, OR) were applied to refine the search results. Search strings combined terms like "environmental education" AND "Single National Curriculum" OR "skill-based education" AND "vocational training in Pakistan."

Inclusion Criteria
Articles published between 2018–2024.
Peer-reviewed journal articles and reports focused on environmental and skill-based education in Pakistan or similar contexts.
Research with direct relevance to SNC implementation.

Exclusion Criteria
Non-peer-reviewed materials or opinion pieces.
Studies not addressing education policies in Pakistan or South Asia.
Articles with insufficient methodological transparency.

Data Collection and Analysis
Data Collection Process:
A total of 200 articles were initially identified using the search strategy.
After applying the inclusion/exclusion criteria, 36 articles were shortlisted for detailed analysis.
Policy documents, case studies, and government reports on SNC were also included.

Thematic Analysis:
The reviewed articles were categorized into three thematic areas:

- **Environmental Education:** Focused on awareness campaigns, sustainability practices, and curriculum integration (e.g., Khalid et al., 2024; Bano et al., 2024).
- **Skill-Based Education**: Addressing vocational training, gender disparities, and comparative education (e.g., Rafiq-uz-Zaman & Nadeem, 2024; Rafiq-uz-Zaman et al., 2024).
- **Policy Challenges:** Highlighting gaps in teacher training, resource allocation, and implementation hurdles (e.g., Nadeem et al., 2024).

Data Extraction:
Key data points, including the scope of education reforms, implementation barriers, and policy recommendations, were extracted and synthesized for each thematic area.

Limitations
To address these limitations and enhance the robustness of the review, the following strategies were employed:

Incorporation of Comparative Studies: To provide broader insights and situate Pakistan's educational reforms in a global and regional context, comparative analyses—such as those between Pakistan and India—were integrated. This approach allows the review to highlight common challenges and shared strategies in implementing environmental and skill-based education within national curricula.

Thematic Search Prompts: Targeted search prompts were developed to ensure comprehensive coverage of relevant topics and minimize biases in data collection. Examples include:

- "Environmental education integration in national curricula": Explored frameworks and best practices globally to draw parallels with the SNC.
- "Skill-based education trends in South Asia": Focused on regional trends to identify shared barriers and solutions in vocational training and workforce alignment.
- "Challenges in implementing the Single National Curriculum in Pakistan": Highlighted policy, logistical, and socio-cultural issues unique to the Pakistani context.

By adopting these mitigation measures, the review not only addresses its inherent limitations but also provides a nuanced understanding of the opportunities for integrating environmental and skill-based education within the SNC. Future research should consider primary data collection and cross-country collaborations to further enrich the discourse on sustainable educational reform.

This review acknowledges several limitations:

- A reliance on secondary sources may omit unpublished or localized studies.
- The scope is restricted to Pakistan, limiting generalizability to other contexts.
- Mitigation Measures: To address these limitations, comparative studies (e.g., Pakistan and India) were incorporated to provide broader insights.
- "Environmental education integration in national curricula"
- "Skill-based education trends in South Asia"
- "Challenges in implementing the Single National Curriculum in Pakistan"

Environmental Education in the SNC

Current State

The Single National Curriculum (SNC) incorporates environmental topics with the goal of raising awareness about climate change, pollution, and sustainability. However, its practical implementation remains limited, particularly in urban areas where environmental issues such as air pollution and waste management are acute (Khalid et al., 2024). For instance, while smog mitigation strategies are critical for cities like Lahore and Multan, they are inadequately addressed in school curriculums. This gap reflects a broader trend of theoretical inclusion without corresponding practical applications or hands-on learning experiences. Khalid et al. (2024 and Salma et al. (2024) highlight the significant impacts of climate change on food security and wildlife, underlining the urgency of incorporating environmental education within Pakistan's Single National Curriculum (SNC) to address these challenges. These studies provide valuable insights and focus on evaluating the integration of environmental education within the SNC. The studies emphasize how climate change disrupts natural ecosystems and poses a direct threat to food production, food safety, and wildlife habitats. Rising temperatures and changing weather patterns lead to habitat loss, forcing wildlife to migrate, increasing the risk of human-wildlife conflicts, and exacerbating food insecurity in developing countries like Pakistan. These sources stress the importance of educating future generations about the intricate relationships between human actions, climate change, and their profound consequences on food systems and biodiversity. Ayub et al. (2022) focused on the impacts of climate change on food security and wildlife, this study seeks to evaluate the inclusion of environmental education within Pakistan's Single National Curriculum (SNC). While the studies highlight the SNC's focus on student-

centered learning and the development of 21st-century skills, they do not provide specific details on the thematic representation or practical application of environmental education within the SNC. A study by Javed et al. (2020), which predates the SNC, examined the infusion of environmental education in secondary school science curricula in Pakistan. They found that prior to the SNC:

- Environmental knowledge was emphasized more than skills or attitude development.
- Biology curriculum had the most extensive integration of environmental knowledge, particularly in topics like biodiversity, nutrition, and pollution.
- Chemistry curriculum addressed environmental knowledge in topics related to the atmosphere, water, and pollution.
- Physics curriculum had the least integration of environmental content.

The study by Javed et al. (2020) recommended a stronger focus on developing problem-solving skills and environmental appreciation among students, as well as assessing teachers' competencies to deliver environmental education.9 This suggestion could be valuable for the implementation of the SNC.

Assess Skill-Based Training Components

- The sources do not explicitly discuss vocational training or its alignment with labor market demands under the SNC.
- The sources do not provide information about the SNC's approach to addressing gender disparities in skill-based training.

Identify Challenges and Opportunities

Lack of Teacher Training: The sources identify the lack of adequate teacher training as a significant challenge to implementing the SNC effectively (Batool 2020, Batool et al. 2023) Teachers need training on the new pedagogical approaches emphasized by the SNC, such as student-centered and activity-based learning, which could impact the effective delivery of both environmental and skill-based education. Inadequate Resources: The lack of resources, particularly in public schools, is another barrier to SNC implementation (Batool 2020, Batool et al. 2023) This shortage could impact the practical application of environmental education and the provision of skill-based training. For example, Javed et al. (2020) found that limited resources and overburdened textbooks restricted the time available for experiments, hindering the effective delivery of environmental education. Resistance from Private Schools: Private schools, particularly those following international curricula, have expressed concerns about the SNC's quality and its potential impact on their students' learning outcomes (Batool 2020) This resistance could limit the uniform implementation of environmental and skill-based education across all schools in Pakistan. One significant effort under the SNC is the introduction of content on environmental preservation and climate change awareness. Despite this, teacher training programs lack sufficient focus on delivering this content effectively (Nadeem et al., 2024). Furthermore, urban schools face challenges such as overcrowding and limited access to resources, which hinder the integration of outdoor activities or practical lessons on sustainability (Bano et al., 2024).

Studies have emphasized the critical need for pre-emptive environmental strategies in educational settings. For example, Khalid et al. (2024) highlight the importance of embedding localized issues such as smog mitigation and water conservation into lesson plans. However, a disconnect persists between policy frameworks and their on-ground implementation, leaving students underprepared to tackle pressing environmental challenges. The SNC incorporates environmental topics to raise awareness about climate change, pollution, and sustainability. However, practical implementation remains limited, particularly in urban areas (Khalid et al., 2024). For instance, smog mitigation strategies are inadequately addressed in school curriculums despite their relevance in cities like Lahore and Multan.

Gaps and Challenges

Despite the theoretical inclusion of environmental education in Pakistan's Single National Curriculum (SNC), several critical gaps impede its effectiveness.

Insufficient Teacher Training on Environmental Topics

Many educators lack the specialized knowledge and pedagogical skills required to effectively teach environmental concepts. Studies by Blom and Karrow (2024) highlight this global challenge, emphasizing the need for robust teacher training in environmental sustainability topics, particularly in developing countries. A lack of in-service training further limits educators' ability to integrate climate change and sustainability issues into practical lessons. The study underscores that targeted teacher education is essential to fulfilling sustainable development goals (Blom & Karrow, 2024).

Minimal Integration of Actionable Environmental Practices

While the SNC includes environmental topics, actionable practices like recycling initiatives, urban gardening, and water conservation campaigns are often overlooked. Practical learning activities, critical to fostering environmental stewardship, are constrained by resource limitations and a lack of institutional focus (Bano et al., 2024). Recent research highlights the growing focus on environmental practices in Pakistan across various sectors. In the banking industry, green banking practices are emerging, with stakeholders playing a mediating role in influencing bank performance (Jillani et al., 2024). In the leather industry, SMEs' environmental engagement is primarily driven by environmentally-conscious customers, with owner-managers' education level influencing awareness and adoption of eco-friendly practices (Wahga et al., 2018). Educational institutions are exploring pedagogical approaches to integrate green and clean land practices, aiming to instill ecologically friendly attitudes (Dastgeer, 2024). Universities are also investigating environmental practices among teachers, examining their behaviors and attitudes towards the environment (Malik & Kalsoom, 2020). While these studies indicate a growing awareness of environmental issues in Pakistan, they also reveal that the integration of actionable environmental practices remains limited and sector-specific, suggesting a need for more comprehensive and widespread adoption across industries and institutions.

Urban Education and Smog Mitigation

Urban schools in cities such as Lahore and Karachi face specific environmental challenges, including severe air pollution. Khalid et al. (2024) recommend proactive strategies like integrating smog monitoring into science curricula and implementing student-led awareness campaigns. However, these recommendations remain largely unimplemented due to gaps in curriculum design and limited collaboration with environmental organizations. Many other Recent studies highlight significant gaps in urban education and smog mitigation strategies. Studies reveal a lack of public education on urban heat island (UHI) mitigation measures and ineffective communication between researchers and policymakers (Wang et al., 2021). Urban heat mitigation and adaptation (UHMA) research tends to focus more on causes and effects rather than implementation, with limited attention to water features and urban form (He et al., 2023). In India, indoor air pollution (IAP) research in urban environments is underdeveloped, with insufficient measurements restricting robust modeling and mitigation studies (Thakur & Patel, 2023). Urban form indicators (UFIs) play a crucial role in air quality optimization, but there's a lack of consistency in their selection and application across different scales (Li et al., 2023). These gaps underscore the need for transdisciplinary research, improved public engagement, and the development of comprehensive, multi-scale tools for effective urban air quality management and heat mitigation.

Recommendations

Enhanced Training Programs: Teacher education institutions should adopt sustainability-focused modules to equip educators with the tools needed to deliver environmental content effectively (Blom & Karrow, 2024).

Localized Curriculum Design: The SNC should incorporate region-specific challenges, such as urban air pollution and rural deforestation, into its environmental components.

Promoting Experiential Learning: Schools must adopt practices like eco-projects and sustainability workshops to bridge the gap between theory and actionable environmental education (Bano et al., 2024).

Enhanced Training Programs: Dedicated modules focusing on environmental sustainability should be integrated into teacher training curricula, supported by collaborations with NGOs and international organizations for capacity building (Hinduja et al., 2023).

Practical Engagement: Schools should adopt project-based learning approaches that encourage students to address environmental challenges in their communities, such as organizing tree plantations or measuring air quality.

Localized Curriculum Development: The SNC must prioritize contextualized content that addresses region-specific challenges, such as smog in urban areas or deforestation in rural regions, fostering a more relevant and engaging educational experience (Khalid et al., 2024).

Lack of Teacher Training: The sources identify the lack of adequate teacher training as a significant challenge to implementing the SNC effectively. [Batool 2020, Batool et al. 2023] Teachers need training on the new pedagogical approaches emphasized by the SNC, such as student-centered and activity-based learning, which could impact the effective delivery of both environmental and skill-based education.

Inadequate Resources: The lack of resources, particularly in public schools, is another barrier to SNC implementation. [Batool 2020, Batool et al. 2023] This shortage could impact the practical application of environmental education and the provision of skill-based training. For example, Javed et al. (2020) found that limited resources and overburdened textbooks restricted the time available for experiments, hindering the effective delivery of environmental education.10

Resistance from Private Schools: Private schools, particularly those following international curricula, have expressed concerns about the SNC's quality and its potential impact on their students' learning outcomes. [Batool 2020] This resistance could limit the uniform implementation of environmental and skill-based education across all schools in Pakistan.

Teacher Capacity Building: Prioritize teacher training programs that focus on:

- Effective pedagogical approaches for environmental education, including experiential learning and problem-solving.
- Integrating skill-based training into the curriculum and aligning it with labor market demands.

Resource Allocation: Ensure adequate resource allocation to all schools, particularly public schools, to support:

- Hands-on activities and field trips related to environmental education.
- The development of skill-based training programs and workshops.

Curriculum Development: Clearly articulate the thematic representation of environmental education within the SNC and provide specific guidelines for practical applications. Develop vocational training components within the SNC framework, ensuring alignment with current and future labor market needs.

Addressing Gender Disparities: Integrate strategies to address gender disparities in access to and participation in skill-based training programs.

Khalid et al. (2024) underline the importance of proactive environmental strategies, recommending their inclusion in urban education to combat smog effectively. By addressing these gaps, the SNC can evolve into a robust framework that not only educates students about environmental issues but also equips them with the skills and mindset to address these challenges proactively.

These steps will help address systemic gaps, ensuring the SNC achieves its goal of creating environmentally aware and proactive citizens.

- Insufficient teacher training on environmental topics.
- Minimal integration of actionable environmental practices.

Skill-Based Education in the SNC

Current State

Skill-based education is a key component of the Single National Curriculum (SNC), designed to enhance vocational competencies and address the growing concern of youth unemployment. It emphasizes practical, hands-on learning experiences that equip students with marketable skills, which are crucial for personal and national economic development. However, while Pakistan has made some progress in developing skill-oriented curricula, implementation remains inconsistent and often lags behind neighboring countries like India, where vocational education has been more deeply embedded into the national curriculum. Moreover, while certain sectors, such as information technology, are gaining traction, many other vocational fields such as carpentry, plumbing, and agriculture—still lack comprehensive and standardized training modules. This gap in sectoral coverage means that many students are not fully prepared to enter the workforce with the necessary skills (Rafiq-uz-Zaman & Nadeem, 2024).

The Single National Curriculum (SNC) in Pakistan aims to bridge educational gaps and promote equity, but faces challenges in implementation. While aligned with Sustainable Development Goals, the SNC's integration of inclusion and global citizenship education is limited, focusing more on knowledge than skill development (Hanif, 2023). The curriculum attempts to incorporate 21st-century skills, particularly in science education, but lacks sufficient teacher training and resources (Mansoor & Din, 2023). Critics argue that the SNC's uniformity and emphasis on Islamic doctrines may marginalize certain student groups in Pakistan's diverse society (Shaikh & Benedetti, 2024). However, the English as a Second Language (ESL) component of the SNC aims to infuse ethical and universal values, promote technology use, and improve teacher evaluation methods (Irfan, 2021). Overall, while the SNC shows promise in addressing educational disparities, it requires further development to meet the diverse needs of Pakistani students and enhance skill-based education. The SNC’s current focus on skill development includes various initiatives, such as introducing technical education in secondary schools and aligning academic programs with industry needs. Despite these efforts, the scope of skill-based education remains limited by several challenges. For instance, there is a lack of proper infrastructure, trained teachers, and industry collaboration, all of which hinder the effectiveness of vocational education programs (Rafiq-uz-Zaman et al., 2024). The gap between policy intentions and practical outcomes is evident in the uneven adoption of skill-based education

across various regions of Pakistan. Rural areas, in particular, face greater barriers to accessing vocational training due to insufficient resources, lack of awareness, and limited exposure to modern industry standards. These challenges contribute to the country's growing skills gap and highlight the urgent need for more integrated and accessible vocational education strategies.

Gender Dynamics in Skill Development

Recent studies highlight the importance of skill development programs in empowering women and promoting gender equality in Pakistan. These programs, such as those offered by BBSHRRDB and NAVTTC, have a significant impact on the development and performance of female entrepreneurs (Batada, 2022). The Punjab Skills Development Fund (PSDF) has launched training schemes targeting rural areas, small towns, and the formal sector. Research indicates that skills development and technical training significantly influence rural women's development, while access to finance and social networking contribute to economic development in rural areas (Zhou et al., 2023). Microfinancing initiatives, coupled with skill development programs, play a crucial role in enhancing women's empowerment across personal, relational, and economic dimensions. However, challenges persist, as only 25-30% of women participate in Pakistan's economic development, emphasizing the need for continued efforts to promote gender equality and women's empowerment through education and skill development initiatives (Sabir and Majid, 2023).

Women, especially in rural areas, face significant barriers to accessing vocational training programs, despite the growing emphasis on skill-based education. These barriers include social norms, limited mobility, and a lack of appropriate facilities or female trainers in rural regions. As a result, women remain underrepresented in many vocational fields, particularly those in non-traditional sectors like technology or construction. Targeted programs, designed specifically for women, could offer transformative economic and social benefits. Empowering women through vocational education not only enhances their personal economic stability but also contributes to broader social and community development (Rafiq-uz-Zaman et al., 2024). Rafiq-uz-Zaman et al. (2024) emphasize the role of skill-based education in empowering women and advocate for gender-inclusive policies that can bridge the gap in vocational training accessibility.

Challenges

The Single National Curriculum (SNC) in Pakistan aims to bridge educational gaps and promote inclusion, but faces several challenges in implementation. While it aligns with Sustainable Development Goals, the SNC's approach to inclusion and global citizenship education is limited and lacks rigor. The curriculum focuses more on knowledge than skill development, which is crucial for active societal participation (Hanif, 2023). Challenges include class inequality, gender imbalance, and financial constraints (Thakur et al., 2021). However, successful implementation of comprehensive education programs is possible with careful design and stakeholder collaboration, as demonstrated by a life skills-based education initiative (Svanemyr et al., 2015). To enhance effectiveness, the SNC could benefit from incorporating elements of Massive Open Online Courses (MOOCs), which have shown potential in Pakistan despite infrastructure challenges. Offering MOOCs in regional languages with improved internet connectivity could particularly benefit rural areas (Ahmed et al., 2017).

- **Resource Constraints:** A major barrier to the successful implementation of vocational training programs is the lack of financial and infrastructural resources. Many schools, particularly those in rural and underdeveloped areas, lack the equipment, facilities, or trained instructors needed to offer meaningful skill-based education. This leads to a gap between the demand for skilled workers and the availability of trained professionals (Rafiq-uz-Zaman & Nadeem, 2024).

- **Lack of Collaboration Between Industry and Educational Institutions:** There is a noticeable disconnect between the educational system and industry requirements. Vocational programs often fail to align with current job market needs, leading to skill mismatches. The absence of collaboration between educational institutions and industries makes it difficult to provide students with real-world training and up-to-date industry insights, reducing their employability after graduation (Rafiq-uz-Zaman et al., 2024).

The narrative by Rafiq-uz-Zaman et al. (2024) underscores the transformative role of skill-based education in empowering marginalized communities, urging for more gender-inclusive policies and collaborations between educational and industrial sectors to address existing gaps.

Policy Implications and Recommendations

Future Policy Directions

To address the challenges identified in skill-based education and environmental integration, several policy directions should be pursued:

Develop Interdisciplinary Curricula:

Recent research highlights the importance of integrating sustainability and environmental education into higher education curricula, particularly in engineering fields. Studies emphasize the need for developing both technical and soft skills to address complex sustainability challenges (Barna & Csete, 2022; Perpignan et al., 2020). Life skills are identified as crucial for empowering individuals to tackle sustainability issues effectively (Singh & Agarwal, 2024). The transition from environmental education to education for sustainable development is gaining momentum globally, with regional variations in adoption (Castellanos & Queiruga-Dios, 2021). However, the integration of sustainability concepts and skills into engineering curricula remains a slow process in some countries, requiring further efforts to bridge the gap between academic training and industry needs (Barna & Csete, 2022; C. Perpignan et al., 2020). These findings underscore the importance of interdisciplinary approaches and skill-based training in preparing students to address sustainable development challenges.

Establish Partnerships with Industries for Practical Training:

Vocational programs should be developed in close collaboration with industry stakeholders. These partnerships will ensure that students receive up-to-date training and gain hands-on experience that directly aligns with labor market demands.

Recommendations

To overcome the barriers to effective implementation, the following recommendations are proposed:

- **Introduce Green Certifications for Schools:** Schools that adopt sustainable practices, such as recycling programs, energy-efficient infrastructure, or community-based environmental projects, should be awarded green certifications to incentivize environmental responsibility within the education system.
- **Enhance Teacher Training Programs:** Professional development programs for teachers should include specialized training on environmental sustainability and skill-based education. This will help improve the delivery of content and prepare educators to integrate environmental awareness with vocational training more effectively.
- **Promote Equitable Access to Vocational Training:** Government and educational policymakers should prioritize marginalized groups, such as women and rural communities, in vocational training programs. By offering targeted scholarships, mentorship, and tailored learning experiences, these groups can be better integrated into the national workforce.

Bano et al. (2024) recommend comprehensive educational campaigns to promote waste management and environmental stewardship among students, which can complement skill-based training initiatives by emphasizing sustainability.

Conclusion

The Single National Curriculum (SNC) represents a significant opportunity to align Pakistan's education system with global sustainability and development goals. However, challenges in its implementation; such as insufficient teacher training, inadequate resources, and gender inequities; must be addressed to fully realize its potential. Future reforms should prioritize interdisciplinary curricula, robust teacher training, and gender-sensitive policies to ensure that both environmental education and skill-based training contribute to holistic educational outcomes. By integrating these components, the SNC can better prepare students to navigate and address the complex challenges of the 21st century, creating a more sustainable and equitable future.

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