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EXPLORING TEACHER EDUCATORS' CONCEPTIONS ON SUSTAINABLE DEVELOPMENT AND ITS INTEGRATION IN THE EDUCATION SYSTEM

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Abstract
This study explores the conceptions of sustainable development among teacher educators and their impact on the integration of Education for Sustainable Development (ESD) in teacher education programs. Understanding teacher educators' perspectives is crucial for fostering a comprehensive approach to sustainability, encompassing economic, environmental, and social dimensions. Utilizing a qualitative methodology, 34 structured interviews with teacher educators in Pakistan were analyzed thematically. The findings reveal that most educators emphasize the importance of meeting present needs without compromising future generations, efficient resource utilization, and the interconnectedness of sustainability dimensions. These insights align with international frameworks such as the Brundtland Report and the 2030 Agenda for Sustainable Development. The study underscores the necessity of a holistic and integrated approach to ESD, advocating for innovative pedagogical strategies and comprehensive curriculum design. By addressing existing challenges and leveraging opportunities for collaboration, this research aims to enhance the effectiveness of ESD in teacher education, preparing future educators to lead sustainable development initiatives in their communities and classrooms.

Keywords: *Sustainable Development, Education for Sustainable Development (ESD), Teacher Educators, Qualitative Research, Curriculum Integration, Resource Conservation*

Introduction

Understanding teacher educators' conceptions about sustainable development is crucial for effectively integrating Education for Sustainable Development (ESD) into teacher education. Teacher educators need to have a clear and comprehensive understanding of sustainable development, encompassing its three core dimensions: economic, environmental, and social

sustainability. Understanding sustainable development as an interconnected and systemic concept rather than in isolated terms. This paper investigates Teacher Educators' Conceptions of Sustainable Development and the Integration of Education for Sustainable Development (ESD) in Teacher Education. It adopts a holistic approach to Sustainable Development (SD), considering SD as an integrated concept encompassing three pillars: environment, economy, and society (Giddings et al., 2002). Consequently, ESD addresses sustainable development issues that include not only environmental problems but also social and economic ones (e.g., Corney and Reid, 2007). The Brundtland Report (1987), titled "Our Common Future," officially introduced the concept of sustainable development, acknowledging the interconnection between ecological, economic, and social systems (Evans, 2010). While the Belgrade and Tbilisi reports primarily focused on the environment, Agenda 21 expanded the scope to include both "environment and development" (Gough, 1997), thus incorporating social and economic issues more explicitly (Stevenson, 2006). Although previous documents had mentioned social and economic issues, they were not given as much emphasis (Stevenson, 2006). Agenda 21 (UN, 1992, p. 320) explicitly states that effective environmental and development education should address all aspects of our environment, including the ecological, physical/biological, and socio-economic dimensions.

In 1997, during the Stockholm conference, the primary concern was environmental degradation. However, the focus at the Rio conference expanded to include not only environmental protection but also social and economic development, which are considered the foundations of Sustainable Development (SD). This shift represents a more integrated view of SD, addressing it in a comprehensive manner. Thirty years ago in Stockholm, there was a consensus on the urgent need to tackle environmental deterioration. A decade ago, at the United Nations Conference on Environment and Development in Rio de Janeiro, it was agreed that environmental protection, along with social and economic development, are fundamental to sustainable development, as outlined by the Rio Principles.

The framework for the United Nations Decade of Education for Sustainable Development, outlined in the 'International Implementation Scheme' (UNESCO, 2006), aims to inspire behavioral changes towards a more sustainable world by promoting environmental integrity, viable economic activity, and social justice for both present and future generations. This framework indicates that SD issues emerge from all three dimensions of sustainable development. UNESCO (2006) further elaborates on these three dimensions by identifying fifteen subthemes related to education and learning for sustainable development. The Bonn Declaration, issued midway through the Decade in 2009, is an international policy document that underscores the necessity of a balanced relationship among environment, society, and economy to further advance sustainable development, as highlighted by Lotz-Sisitka (2009).

At the outset of the document "Transforming Our World: The 2030 Agenda for Sustainable Development" (UN, 2015, para. 13), it is stated that sustainable development involves combating poverty, addressing inequalities, promoting social inclusion, protecting the environment, and developing viable economic strategies. These elements are interdependent. The document also emphasizes the importance of recognizing the link between sustainable development and other ongoing processes in the economic, social, and environmental fields (UN, 2015). Agenda 2030 sets forth 17 Sustainable Development Goals (SDGs) to be achieved by 2030 (UN, 2015).

The global urgency to address complex environmental, social, and economic challenges has heightened the importance of sustainable development across various sectors, including education. As the world contends with climate change, inequality, and resource depletion, the role of education in fostering a sustainable future has become increasingly critical (Khadim, Qureshi, & Khan, 2021). Education for Sustainable Development (ESD) provides a vital framework for equipping individuals with the knowledge, skills, values, and attitudes necessary to develop sustainable solutions (Khadim, Qureshi, & Khan, 2021).

Teacher educators play a pivotal role in this transformative process, acting as the bridge between sustainability concepts and future generations of learners (Khadim, Tahira, & Naz, 2023). Their understanding and interpretation of sustainable development are crucial for effectively integrating ESD into teacher education programs. Despite the recognized importance of ESD, there is a notable lack of research exploring teacher educators' conceptions of sustainable development and the implications for curriculum design and pedagogical practices.

This article aims to fill this gap by examining the conceptions of teacher educators regarding sustainable development. By exploring their perspectives, this study seeks to uncover the underlying factors that influence how sustainable development is taught and modeled in teacher education. Through a comprehensive analysis, we aim to identify the challenges and opportunities in embedding ESD within teacher education, ultimately contributing to the development of more effective and holistic educational practices. By highlighting the critical importance of understanding these conceptions, researcher hope to pave the way for a more robust and impactful integration of ESD in teacher education, ensuring that future educators are well-prepared to inspire and lead sustainable development initiatives in their classrooms and communities.

Literature review

Education for Sustainable Development (ESD) has garnered significant attention in recent years as a strategic approach to address global sustainability challenges. Central to the success of ESD is the role of teacher educators, whose conceptions and understanding of sustainable development significantly influence how these concepts are integrated into teacher education programs (Khadim, Jamil, & Rafiq, 2023). This literature review aims to synthesize existing research on teacher educators' conceptions of sustainable development, exploring how these conceptions impact ESD implementation and identifying gaps in the current body of knowledge.

Sustainable development, defined by the Brundtland Commission as development that meets the needs of the present without compromising the ability of future generations to meet their own needs, encompasses three core dimensions: economic, environmental, and social sustainability. ESD aims to integrate these dimensions into education, fostering critical thinking, problem-solving, and participatory skills essential for sustainability (Rafiq, Afzal, & Kamran, 2022). Key theoretical frameworks, such as transformative learning theory, emphasize the importance of shifts in perspectives and attitudes towards sustainability. Transformative learning theory suggests that profound learning experiences can lead to changes in beliefs and behaviors, making it particularly relevant for ESD.

Research on teacher educators' conceptions of sustainable development reveals a spectrum of understandings, ranging from a narrow focus on environmental issues to a more holistic view that includes social and economic dimensions. According to Summers et al. (2014), many teacher educators possess a fragmented understanding of sustainable development, often emphasizing ecological aspects while neglecting social and economic factors. This fragmented understanding can limit the effectiveness of ESD integration (Rafiq, Iqbal, & Afzal, 2024). Teacher educators' conceptions of sustainable development directly impact their teaching practices and curriculum development. Bourn, Hunt, and Bamber (2017) highlight that educators with a comprehensive understanding of sustainability are more likely to adopt interdisciplinary and participatory teaching methods, which are essential for ESD. Conversely, a narrow understanding can lead to a superficial integration of sustainability concepts, lacking depth and critical engagement (Rafiq, Kahdim, & Afzal, 2023).

Similarly, Öhman and Östman (2019) argue that teacher educators' personal values and beliefs about sustainability shape their pedagogical approaches. Educators who view sustainability as a critical and urgent issue are more likely to engage students in transformative learning experiences that challenge existing paradigms and promote sustainable behaviors (Rafiq, Kamran, & Afzal, 2023).

A comprehensive review highlights the need for a holistic integration of sustainability concepts into higher education. This involves embedding ESD into curricula across disciplines to ensure that students gain the necessary knowledge and skills to address sustainability challenges. The focus is on creating an academia-wide collective curriculum that fosters sustainability awareness and commitment among students and staff (Tan et al., 2022). There is a growing emphasis on innovative pedagogical approaches in ESD (Rafiq, Kamran, & Afzal, 2024).). This includes experiential learning, project-based learning, and the use of digital technologies to enhance the learning experience. These methods aim to engage students actively and foster critical thinking, problem-solving, and collaborative skills essential for sustainable development (Yang & Xiu, 2023). Recent studies underscore the importance of empowering educators and non-academic staff in implementing sustainability initiatives. Training programs and professional development opportunities are crucial for equipping these individuals with the knowledge and tools to promote sustainable practices within educational institutions (UNESCO, 2023).

Effective ESD involves not only educational institutions but also community engagement and policy development. Collaboration with local communities and stakeholders is essential for addressing real-world sustainability issues and fostering a culture of sustainability. Policies that support ESD integration into national education systems are also critical for its success (Mogren, 2024). Despite the progress, several challenges remain, including limited resources, lack of awareness, and resistance to change. However, these challenges also present opportunities for innovation and collaboration (Afzal, & Rafiq, 2022). Addressing these issues requires a concerted effort from educators, policymakers, and communities to create a supportive environment for ESD (UNESCO, 2023). These all studies provide a comprehensive overview of the current state of ESD and highlight the importance of a multi-faceted approach to embedding sustainability in education.

Research Objective

The primary objective of this research is to explore and analyze teacher educators' conceptions of sustainable development, with a focus on how these conceptions influence the integration and implementation of Education for Sustainable Development (ESD) within teacher education programs. Specifically, the research aims to explore the breadth and depth of teacher educators' understandings of sustainable development, including their awareness of its environmental, economic, and social dimensions.

Methodology

This research employed a qualitative methodology approach to investigate conceptions of teacher educators related to Sustainable Development operating within the interpretivism research paradigm and using a thematic analysis technique. Qualitative data provided a deeper understanding and comprehensive view of findings. The qualitative lens was selected to achieve the research objective of understanding sustainable development conceptions among teacher educators in Pakistan comprehensively. The study aimed to provide a holistic view of the phenomena. For data collection eight public sector universities were selected. The convenient sampling was used. For data collection 34 structured interviews were conducted of teacher educators. Interviews were recorded with the permission of participant. Afterwards, interviews were transcribed. Data was analyzed through thematic analysis technique.

Analysis and Findings

In the current study, teacher educators' understanding of sustainable development revolves around four main themes. All themes discussed below one by one in detail.

Theme 1: Awareness about Future Generations' Needs

Most participants agreed that sustainable development involves meeting present needs without compromising the ability of future generations to meet theirs, aligning with the Brundtland definition of sustainable development. Twelve participants emphasized the importance of using resources judiciously to cater to both current and future needs. For instance, one participant (P1), with four years of university teaching experience but no experience teaching ESD subjects, stated, "Sustainable development is defined as development that meets the needs of the current generation without adversely affecting the needs of the next generation. It is a tool used for awareness in society, focusing on resource utilization and conservation." This reflects a commitment to responsible resource management and intergenerational equity.

Participant P7, an Assistant Professor who has taught an ESD course once, stated,

> *"The philosophy of sustainable development defines that human societies must survive and respond to future generations' needs without compromising their capabilities."*

The majority of participants focused primarily on the needs of both present and future generations. Participant P8 emphasized this by stating,

> *"The sustainable development agenda focuses on meeting the needs of the present generation without compromising the needs of future generations."*

These findings indicate that most participants shared similar views on sustainable development, emphasizing intergenerational equity. Additional views further reinforce this consensus among the participants.

Participant P15, an Assistant Professor who had never taught an ESD subject, remarked,

> "*Sustainability is a paradigm for considering the needs of the present generation without compromising the needs of future generations. A prosperous and sustainable society, for example, is based on a healthy and protective environment, adequate food and environmental assets, safe water and clean air, zero hunger, poverty reduction, quality education, and reduced gender inequality."*

Similarly, Participant P16, a lecturer who had never taught an ESD subject, stated,

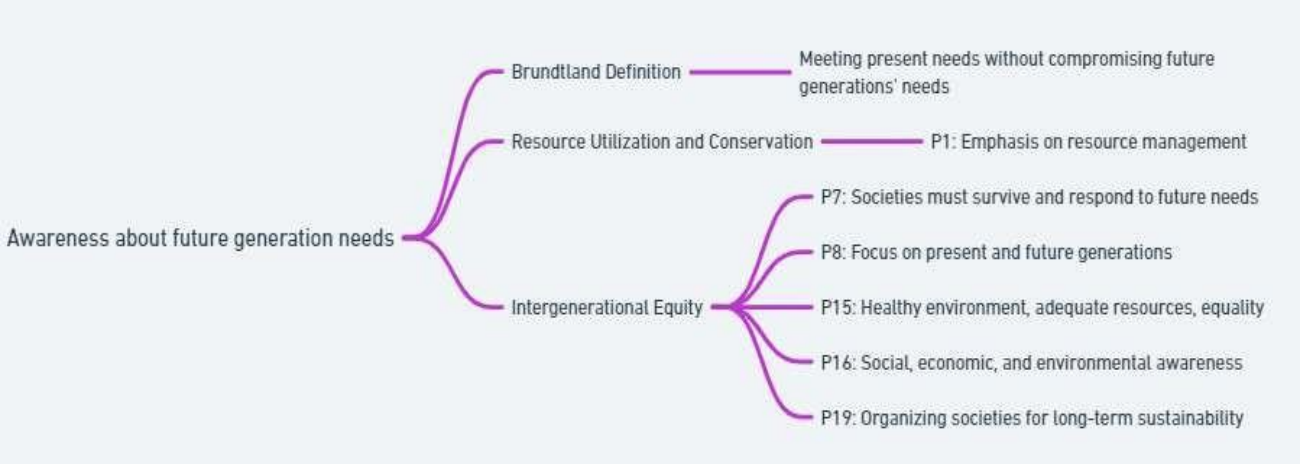
> *"The sustainable development agenda focuses on meeting present generation needs without compromising future generation needs. SD is a paradigm that raises awareness of social, economic, and environmental problems at a global level."*

This participant also highlighted the three dimensions of sustainable development.

Participant P19 emphasized,

> *"It is an idea to organize societies and sustain them for a longer period. As far as the definition is concerned, SD is development that meets the needs of future generations without compromising their ability to meet their own needs."*

These perspectives illustrate a common understanding among the participants about the importance of balancing the needs of present and future generations, highlighting the interconnected dimensions of sustainability.



The theme of "awareness of future generation needs" emerged from the data. Participants' views consistently emphasized the importance of addressing the needs of both present and future generations. Notably, these 12 participants frequently referenced Brundtland's definition of sustainable development. For instance, Participant P7, an Assistant Professor who has taught an ESD course once, provided an in-depth perspective on the survival of human society and the necessity of meeting future generations' needs without compromising the capabilities of the present generation.

Theme 2: Saving resources

The second theme that emerged was "saving resources." Seventeen percent of participants (6 participants) emphasized that sustainable development involves awareness about using resources efficiently without wasting them. For example, Participant P2, a lecturer with seven years of university teaching experience who had never taught an ESD-related course, stated, "Sustainable development emphasizes saving resources not only for today but also for the future."

Participant P3, with five years of teaching experience and an additional three years of school teaching, highlighted that

> *"Sustainable development means using resources in the right way for future generations and using them in limitation for the present generation."*

Participant P6, an Assistant Professor, stated,

> *"Sustainable development involves making adequate energy available for future generations and setting limitations for current generations."*

These views reflect a common understanding among some participants that sustainable development is fundamentally about conserving resources for both present and future generations. Participant P12 reinforced this by stating,

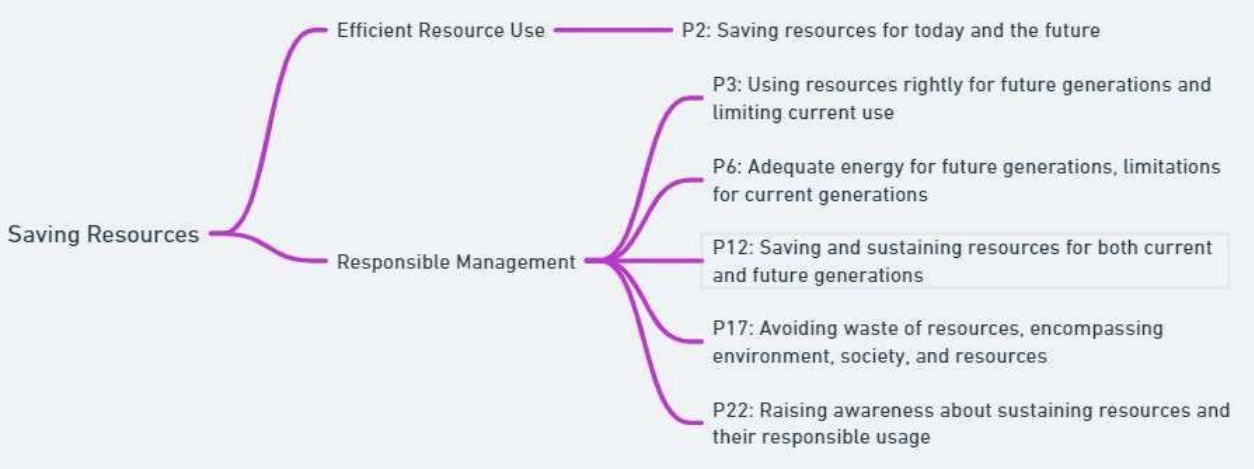
"Sustainable development is defined as saving and sustaining resources for current and future generations."

Participant P17 emphasized,

"Sustainable development relates to environment, society, and resources. Its main purpose is to use our resources without wasting them."

Similarly, Participant P22 stated,

"The SD agenda is about raising awareness. In my opinion, sustainable development involves awareness about sustaining our resources and their development and usage." These comments reflect a broader understanding that sustainable development encompasses environmental conservation, social equity, and efficient resource use. The focus is on promoting awareness and responsible management of resources to ensure their availability for future generations."



Theme 3: Integrated view of sustainable development

Seven participants discussed the three integrated dimensions of economic, ecological, and social sustainability, emphasizing their interrelated nature and the necessity of balancing them. These insights align with the sustainable development agenda, which calls for long-term planning in these three areas. Below are the views of the participants:

Participant P4**,** an Assistant Professor with six years of teaching experience at a public sector university, stated,

"Sustainable development requires a long-term systemic plan for global economic and social structures. This approach aims to reduce pressures on natural and environmental capital to a more sustainable level while ensuring economic growth,

environmental, and social stability. Long-term growth can only be maintained by balancing these three dimensions."

Participant P8**,** a lecturer at a public sector university with experience in teaching Education for Sustainable Development (ESD), explained,

> *"Sustainable development is a model that promotes a global understanding of social, economic, and environmental issues. These three dimensions are intertwined, and the disappearance of any one dimension can adversely affect the entire production process."*

Participant P11**,** also an Assistant Professor with experience teaching ESD, highlighted the three-dimensional relationship and added,

> *"Economic growth activities are beneficial for development, but those that harm the environment should be avoided. Sustainable development is a multidisciplinary term revolving around social, economic, and environmental pillars. All developments must avoid harming living species. Although the conceptions of sustainable development vary by context, the economic philosophy of sustainability primarily considers the living environment, the social principle is essential for well-being, and irreversible global nuisances are very natural."*

Participant P13**,** an Associate Professor, emphasized the importance of balancing the three dimensions for a quality life, stating,

> *"Sustainability is a way of thinking about the future in which environmental, societal, and economic concerns are balanced in pursuit of a better quality of life. A progressive society relies on a healthy environment to provide its citizens with food, resources, drinkable water, and fresh air."*

All participants described sustainable development in alignment with the UN agenda, with one participant providing specific insights on its perception in Pakistan:

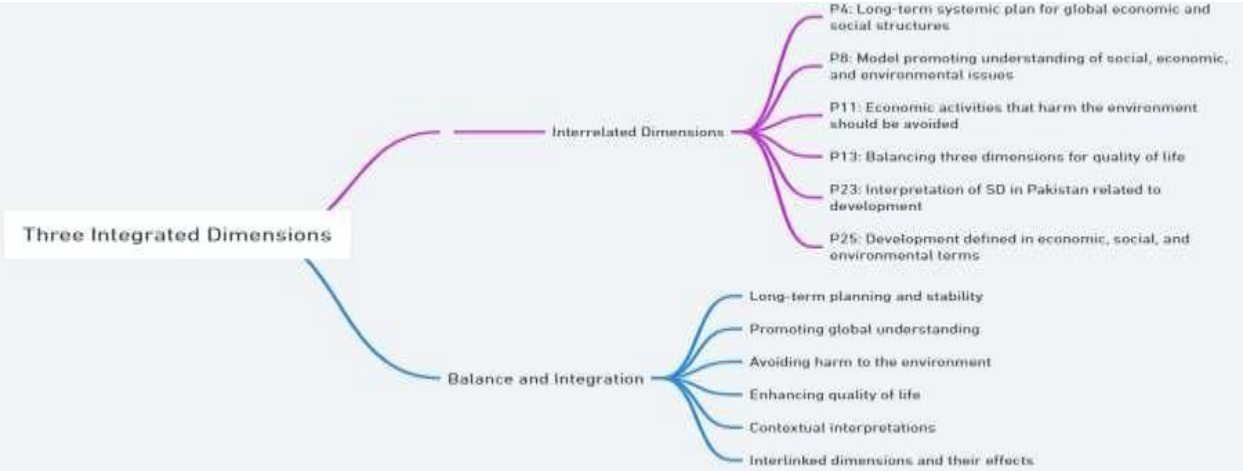
Participant P23 advocated,

> *"Sustainable development is a broad concept interpreted differently around the world. In Pakistan, it is related to development in environmental, economic, and social terms. There is a need to strike a balance between these three dimensions."*

Participant P25**,** a professor with over twenty years of experience, expressed that the three dimensions are interlinked. He stated,

> *"Sustainable development is defined in economic, social, and environmental terms. Development involves economics and includes the human element—it is not mechanical. Development relates to increased production and capital, but*

consumption also increases. Over time, we purchase things as needed or not needed. If production is lower, the unemployment rate rises. If production is higher, employment increases, but we use environmental resources like natural resources to increase production. We can save our environment by producing less because we would use fewer natural resources. However, if production decreases, social development does not occur. These dimensions are deeply interlinked."



Theme: 4. Save planet and society

Nine participants discussed the sustainable development agenda focused on saving and maintaining the planet. Their views are summarized below:

Participant P9**,** with thirteen years of experience in school teaching and recently appointed as a university lecturer, stated,

"Sustainable development is related to a healthy life and a good environment. In my view, the SD term is about maintaining a sustainable planet for living beings."

Participant P10 explained that sustainable development is based on set standards that help maintain the planet:

"According to my opinion, sustainable development is about setting standards we should achieve for sustaining society, such as tolerance, peace education, quality education, and societal peace. It is related to the expansion of a maintainable society and how we can improve our society through education. Sustainable development is not about achieving a certain level; it is about sustaining society."

Participant P13 emphasized the wise use of resources:

"Utilize resources wisely and without waste for present and future generations. Also, take care of the planet and organize societies for long-term survival."

Participant P18 highlighted resource conservation:

> *"Sustainable development means utilizing our resources wisely and saving our earth. It teaches us how to conserve and preserve natural and economic resources for the upcoming generation."*

Participant P20 focused on global awareness:

> *"SD is about reserving and storing our resources without wasting them for present and future generations. The SD agenda is concerned with global issues like climate change, saving natural resources, and protecting the environment. We aim to achieve the SD agenda to create a sustainable world."*

Participant P24 supported the long-term perspective:

> *"Sustainable development is a way of organizing society to ensure long-term preservation. It involves considering current and future implications, such as environmental and natural resource planning, or social equity for the planet's survival."*

Participant P27 related SD to continuous development:

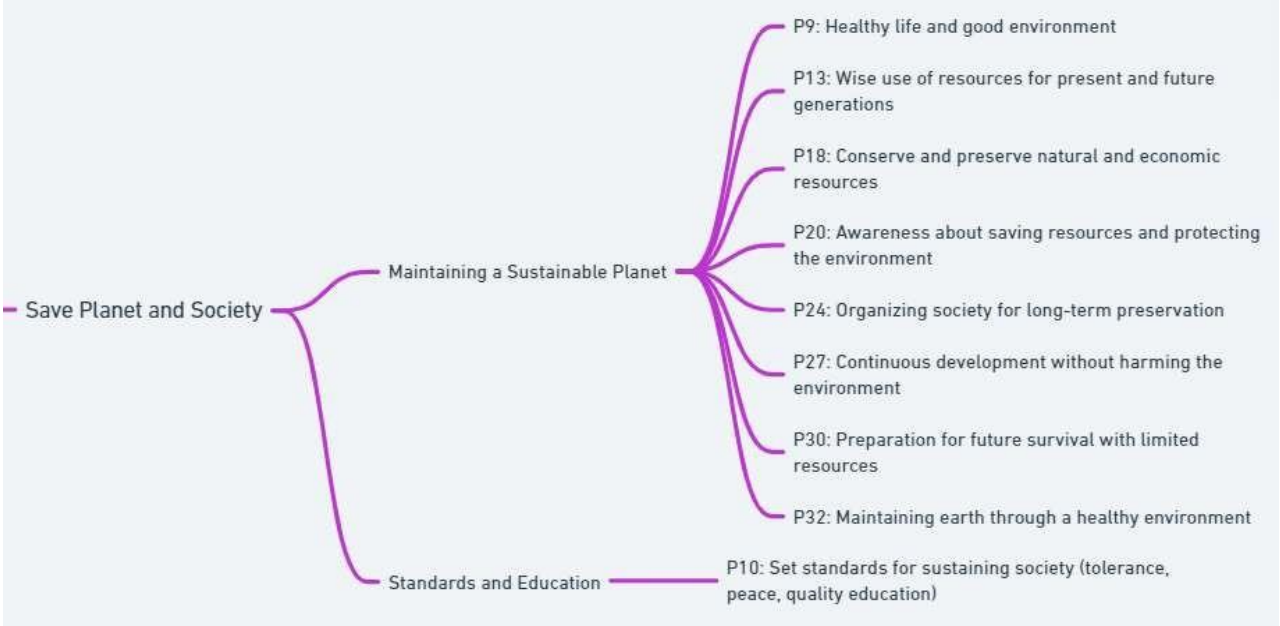
> *"Sustainable development is a terminology and approach that enables continuous societal development. It involves saving and maintaining the planet, including economic development without harming the environment and preserving natural resources. In a nutshell, we need to save our planet for future generations."*

Participant P30 discussed preparation for future survival:

> *"Sustainable development is about preparing for the future. The goal is to prepare for the future using limited resources. We will achieve this goal when everyone understands how to create a long-lasting, safe, and healthy sustainable world."*

Participant P32 specified three critical aspects for maintaining the planet:

> *"Sustainable development revolves around three aspects: a prosperous society relies on a healthy environment to provide citizens with food and resources, safe water, and clean air."*



Discussion

This study delved into the conceptions of sustainable development among teacher educators, highlighting their perspectives on integrating Education for Sustainable Development (ESD) into teacher education programs. The findings reveal a broad understanding of sustainable development, encompassing economic, environmental, and social dimensions. This holistic view aligns with the definitions and frameworks established by international bodies such as UNESCO and the United Nations.

The majority of participants emphasized the importance of meeting present needs without compromising future generations' ability to meet their own. This aligns with the Brundtland Report's (1987) definition of sustainable development and underscores the critical notion of intergenerational equity. Such an understanding is essential for fostering a long-term perspective in future educators, ensuring they impart the values of sustainability to their students. Participants stressed the necessity of using resources judiciously, reflecting a widespread recognition of the need to conserve natural and economic resources for future generations. This theme resonates with research emphasizing the importance of resource efficiency in achieving sustainability goals (Rockström et al., 2009).

The interconnectedness of economic, social, and environmental dimensions was a recurring theme. Participants acknowledged that long-term growth and stability depend on balancing these three dimensions. This perspective is crucial for comprehensive ESD integration, as highlighted by Summers et al. (2014), who found that a holistic understanding of sustainability enhances the effectiveness of ESD. The study participants articulated a commitment to maintaining a sustainable planet, advocating for standards that promote social equity, peace, and quality education. This aligns with the 2030 Agenda for Sustainable Development, which outlines 17 Sustainable Development Goals (SDGs) aimed at promoting a sustainable and inclusive world (UN, 2015).

Recent studies reinforce the importance of the themes identified in this research. For instance, UNESCO's (2023) emphasis on innovative pedagogical approaches in ESD, such as experiential learning and project-based learning, aligns with participants' views on the necessity of an integrated and participatory approach to teaching sustainability. Moreover, the transformative learning theory, which posits that profound learning experiences can lead to changes in beliefs and behaviors, is particularly relevant for ESD (Mezirow, 1997). Yang and Xiu (2023) underscore the need for active engagement and critical thinking in sustainability education, echoing participants' calls for resource conservation and balanced development. Additionally, Tan et al. (2022) advocate for embedding sustainability concepts across all disciplines in higher education, highlighting the necessity of a collective curriculum that fosters sustainability awareness. Furthermore, the importance of empowering educators, as noted by UNESCO (2023), aligns with this study's findings that teacher educators' understanding of sustainable development significantly influences their teaching practices. Professional development and training programs are crucial for equipping educators with the tools needed to effectively integrate ESD into their curricula.

Despite the progress, Khadim, Qureshi and Khan (2022) advocated that challenges remain in effectively integrating ESD into teacher education. Limited resources, lack of awareness, and resistance to change are common barriers, as noted by Mogren (2024). However, these challenges also present opportunities for innovation and collaboration. Addressing these issues requires a concerted effort from educators, policymakers, and communities to create a supportive environment for ESD (Khadim, Qureshi & Khan, 2022).

Conclusion

This study highlights the critical role of teacher educators in promoting sustainable development through education. By understanding their conceptions of sustainable development, we can better integrate ESD into teacher education programs, ensuring that future educators are well-prepared to lead sustainability initiatives. As the world faces increasingly complex environmental, social, and economic challenges, the role of education in fostering a sustainable future has never been more vital. This research contributes to the ongoing dialogue on sustainability in education and underscores the need for a holistic, integrated approach to ESD.

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