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EXPLORING THE TEACHER EDUCATORS PRACTICES FOR INTEGRATING EDUCATION FOR SUSTAINABLE DEVELOPMENT CONCEPTIONS

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ABSTRACT

In the contemporary era, Education for Sustainable Development (ESD) has become a pivotal paradigm in global education, aiming to equip learners with essential knowledge, skills, and attitudes for a sustainable future. In Pakistan, embedding ESD within the education system is a national response to global sustainability challenges and the country's unique socio-economic and environmental issues. This study investigates the practices of teacher educators in integrating ESD into teacher education programs in Pakistan. Using the mixed-methods approach, research examines the practices about ESD and how these practices align with global ESD standards. Quantitative data were collected through a survey of 316 teacher educators from public universities in Punjab, while qualitative data was collected via interviews with 17 teacher educators. The findings reveal that many educators employ innovative methods such as project-based learning, collaborative tasks, and field trips, to ensure reliance on the traditional lecture-based approaches. It concludes with recommendations for enhancing ESD practices amid teacher educators, emphasizing the importance of training and awareness to foster SDE in Pakistan.

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INTRODUCTION

Education for Sustainable Development (ESD) has been identified as a key paradigm shift in the contemporary global educational scene to support learners with required fundamental knowledge, skills, and attitudes needed to contribute within their community to realize a sustainable future (Fischer, King, Marco, Barth, Ingrid & Bank, 2022). Thus, integrating education for sustainable development into teacher education is essential for fostering sustainability-oriented practices and

mindsets in future educators (Vincentas & Daiva, 2024). The embedding of ESD in the education system within Pakistan is a national response to global sustainability challenges, with respect also rumbling back to address unique socio-economic and environmental messes plaguing the nation. Ahmad, and Ali (2020), Teacher educators play key role in influencing pedagogical practices and curricula to be adopted by prospective teachers (Ahmad & Ali, 2020). Hence, their practices are vital factors to the success of ESD realization in education. The study aims to explore the provision of sustainability within teacher education in practice using in Pakistan. It analyses the difficulties that they encounter, responses adopted by them, and their relevance to the global ESD benchmarks (Awan & Saeed, 2019).

The education for sustainable development aims to equip learners with knowledge, skills, attitudes, and values necessary to shape sustainable future (Andrea, Mall & Rieckmann, 2024). The focus of article is to explore these practices in ESD and provide understandings for the successful or not-so-effective integration of education for sustainable development (ESD) within Pakistan, contributing towards some recommendations on how teacher educators can play a significant role in making our future better than today (Baig & Shams, 2021). This research, utilizing a mixed methods approach of qualitative and quantitative analysis, examines the crucial role that teacher educators play in achieving the sustainable development. This implies that there are systemic support and capacity-building mechanisms for the teachers to ensure the successful integration of ESD into their teaching (Hashmi, 2018). In this connection, integrating ESD into teacher education in Pakistan is crucial for developing educators who can promote sustainable development (Shakir, Naz & Ahmed, 2024). In this linking, there is a need to evaluate how the current teacher education curriculum addresses sustainability thereby identifying the gaps and areas for improvement. Thus, by exploring current practices, challenges, and opportunities, this study aims to contribute to effective implementation of education practices in teacher education programs, eventually leads to Pakistan's commitment to sustainable development.

LITERATURE REVIEW

The sustainable education is generally considered as a type of educational process that employs sustainable development principles; aims at preparing the individuals whose awareness, critical thinking, and problem-solving skills enable them to be informed about sustainability issues. This approach owes its origin to ESD practices which are externalized over activity-based, experimental teaching methodologies. Nonetheless, the questions of what promotes learning and how differences in teaching pedagogies might impact students are still debated. Finally, Evans and Ferreira (2020) argue how ESD should be included in teacher education as an integrated part of teaching practices research, emphasizing the interaction between pedagogy and curriculum. Sterling (2012) adds that SD requires adaptive processes embraced in more constructive, participatory, and technologically relevant ways which can be highly influential to mindsets of learners. Referred to as sustainability pedagogies (Cotton & Winter 2010; Sterling, Hillman & Wals, 2012), these practices extend beyond mere delivery of content toward creating prospects for students to engage in deep learning which has transformative impact on their views, values, and understanding of the world if it is learnt within this framework.

In particular, Mckeown (2014) remarked why ESD pedagogical responses are crucial to prepare students for difficult sustainability challenges that they may face in future, such as climate change, biodiversity loss, and growing social inequity. These lecture-based methods are seen as hindering students from attaining a conceptual grasp of the nature, potential, and relevance of sustainability (Svanstrom et al., 2012). Rather, collaboration and learning techniques such as role play, simulation, group discussions, game playing, and design methods of practice; case studies in point: sustainable communities that focus on the adult education motivation; reflective writing across the curriculum moves into awareness rather than action-oriented problem solving alongside the research-based discoveries have been advanced to build sustainability capacity for resilience as shown between these literatures noted by Winter (2010) and Sterling (2012). So, while the innovative methods have enormous potential, they cannot be a standard solution to teaching ESD. Westwood continues to say that the student learning is a complex process, influenced by many developmental, social, and contextual factors, and consequently educators should aim to employ the practices based upon the proven research (2008).

The concept of sustainability pedagogies extends beyond merely educating for sustainability; it encompasses complex interactions between teachers and students (Loughran, 2013; Wink, 2010). Transformative learning, as discussed by Blake, Sterling, and Goodson (2013), aims to effect the fundamental changes in learners' capacities, beliefs, behaviors, and relationships, contributing to personal and social transformation (Mezirow, 2009). Sterling (2011) defines this as the higher-order learning, essential for achieving the transformational educational goals. Thus, Christie et al. (2013) examined sustainability education, where dynamic teaching strategies as well as concepts-based learning were key ways in which teacher educators recommended the facilitation for ESD to occur along with availability of financial, technological, and human resources to support ESD initiatives. Nonetheless, despite recognizing the importance of higher education in fostering the innovative learning (Setter, 2017), modernist principles have been variably applied towards the sustainability educational programs at this level (Ceulemans et al., 2017). The implementation of the sustainable teaching methods is both challenging and rich in possibilities. Issues related to the short duration of SD programs and preparation time have been noted by Aleixandre and Gayoso (1996) as well as Figueroa (2012).

There is also the risk of offering prescriptive answers or moral agendas, as discussed by Preston (2011) and Preston and Griffiths (2004), who outline the fundamental educational predicaments. To guide students beyond their immediate experiences and challenge their foundational beliefs, it is vital to employ collaborative, inquiry-based methods. Conversely to Cotton (2009) and Winter (2010), Christie et al. (2013) found that ESD in the higher education is frequently lecture-oriented, with innovative practices being more theoretical than practical (Cotton et al., 2009). Evans et al. (2017) argued that teacher educators often provide only superficial critical reflections or evaluations of the processes required to transform the knowledge, skills, and values. Avon and Ferreira (2020) identified a disconnect between teachers' views on importance of ESD and their sympathetic of its practical implementation. The role of innovative teaching methods that are participatory has been underscored by all literature research on ESD. Government policies and institutional mandates that

support the integration of ESD in teacher education. Despite continued challenges, transformative pedagogies are vital to teach educators & learners to respond efficiently to complex sustainability concerns facing society.

Research Gap

Despite the global emphasis on Education for Sustainable Development (ESD), studies in Pakistan have largely overlooked this critical area, particularly in context of teacher education. Research on sustainability practices among teacher educators exists but is sparse and lacks depth. Notably, there is an absence of local studies investigating the practices related sustainability courses, such as environmental education, education for the sustainable development within teacher education programs. In this connection, practices related to ESD, a dynamic component but unfortunately has been neglected in Pakistan's teacher education system. This neglect has led to outdated teaching practices that fail to address current sustainable development challenges. Recognizing this gap, the current research investigates teacher educators' practices regarding ESD. By focusing on practices of teacher educators, this research aims to fill the existing gap in literature, providing insights into how education for sustainable development can be effectively integrated into teacher education programs in Pakistan.

RESEARCH METHODOLOGY

The present research utilized mixed-methodology approach to investigate the practices associated with ESD among teacher educators. The study was led within the pragmatism research paradigm, guided by convergent parallel design. In this design, also known as integration design, quantitative and qualitative methods are implemented concurrently during the same phase of research process. This approach allows for independent optimization and analysis of qualitative and quantitative data (Creswell & Clark, 2017). The mixed-method strategy was deemed appropriate to achieve the research objective of understanding the ESD practices among teacher educators in Pakistan. By integrating both quantitative and qualitative interpretations, study aimed to offer comprehensive view of the phenomena. Data collection and analysis were conducted separately for each method. The results of data analysis were discussed separately to respect the unique features of quantitative and qualitative data. The quantitative component was examined empirically using primary tools to study teacher educators' practices related to ESD. Qualitative data were used to develop a more complete empathetic and to validate quantitative results. Mixed research values both quantitative and qualitative approaches equally. Before discussing the benefits of combined use in this analysis, it was important to clarify the ideological or paradigmatic distinctions between qualitative and quantitative approaches.

Instruments, Data Collection & Analysis

Quantitative data: For quantitative data collection, adapted scale was used as data collection tool. The scale comprised 13 statements investigating the ESD Practices. The participants were asked to select one of the given responses (never=1, rarely=2, sometimes=3, often=4, always=5) as per the practices they use in classroom for integrating ESD conceptions. The 8 Public universities of Punjab were selected and teacher educators were sample of the study. For pilot testing, the questionnaire

was filled by 60 teacher educators teaching in public sector universities. In this connection, the construct's reliability was evaluated using the Cronbach-alpha. The Cronbach's alpha scores were more than 0.875.

Table 1 Reliability Statistics

Reliability statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
.875	.875	13

QUANTITATIVE RESULTS

Teacher educators used practices for developing ESD conceptions among pre-service teachers. This study findings highlight that the university teacher educators use demonstration, project-based learning, collaborative, and discussion methods. Therefore, these approaches are thus specific and disproportionately employed by teacher educators in universities. However, some educators use dialogue method. Therefore, the mentioned practices were analyzed based on the mean score given below in the table.

Table 2 Descriptive Statistics

Descriptive Statistics			
	N	Mean	Std. Deviation
Discussion	316	4.48	.560
Collaborative task	316	4.47	.582
Encourage dialogue	316	4.42	.555
Problem solving task	316	4.38	.592
Field trip	316	4.30	.623
Activity method	316	4.30	.623
Economic issues debate	316	4.27	.611
Demonstration method	316	4.25	.619
Project method	316	4.24	.721
Open debate	316	4.13	.734
Environment task	316	4.09	.570
Research based task	316	3.94	.770
Role play	316	3.58	1.038
Valid N (list wise)	316		

Qualitative Data Collection

Participants opened up more in interviews, sharing experiences and thoughts about sustainability practices. Purposive sampling was used in choosing participants for interviews. Purposive sampling occurs when the participants are selected for their expert knowledge of the phenomenon under investigation and the particular purpose of this study. Researchers select subjects based on their own personal judgment that the patterned knowledge and experience exist in them (Fraenkel et al., 2012). Semi structured Interviews were conducted with 17 teacher educators. An interview protocol has two main questions, which would take roughly fifteen minutes. In this linking, participants gave their consent to being audio-recorded during interview in addition to note-taking. The following question was asked:

- Which practices that teacher educators use in classroom for integrating ESD?
- What methods of teaching do you prefer to use in classrooms for teaching about ESD?

QUALITATIVE RESULTS

The qualitative analysis section focuses on pedagogy practices (activities) that teacher educators employ for teaching ESD conceptions in the classroom. Every participant mentioned contemporary methodologies for teaching ESD in the classroom. In this connection, mainly mentioned teaching methods were:
Activity method (P1, P4, P5, P7, P9, P12), Project method (P1, P7, P8, P9, P10, P12, P15, P16, P14, P15), Discussion (P3, P12, P15, P17, P14, P15), Demonstration method (P1, P17, P14), Collaborative teaching (P7, P10, P5), Field trips (P3, P14, P5). Dialogue (P15, P5), Constructivism approach (P10, P11), Blended teaching (P4, P13), Reflection (P5).

One of the teacher educators (P15), who is also the Professor and Head of the Department, reported involving decision-making, developing problem-solving skills, enhancing critical thinking ability, and working through group tasks with pre-service teachers. This approach, especially when time is given for collaborative project work, fosters individual development by making communication more transparent and always creating opportunities for dialogues that could improve relationships among student-teachers. Participant (P1), who has school experience and focuses on experiential learning methods, stated, "I mostly prefer the activity method, project or the assignment method because these methods allow students to think about how they will solve problems. A small project is essential for teaching sustainable development to integrate knowledge. Group discussions, field trips, & blended teaching methods are also used for engaging the students and developing critical thinking." In this linking, one participant (P8) proposed the methodology of a project for developing critical sympathetic. In this drive, participant (P8) has thirteen years of experience & specialization in the sustainability.

The participant stated: "For teaching sustainability, I conduct research project using many practices based on the research questions, such as 'Why do we buy more than we need?' In a survey research study, students gathered on-site information regarding strategies used by the sales departments (supermarkets, clothing stores, big hotel chains) to encourage consumption. They also analyzed the campaign tactics used to promote consumption and explored how these tactics could be used to tackle overconsumption. The students then presented their research findings. I encourage students to send me assignments in soft form instead of hard copy. Through my practices, my students learn how to save resources." Participant (P9) reported that they have never taught sustainable growth as a subject but integrated it through practical methods. P9 stated, "I never teach SD as a subject, but I introduce moral values & environmental lessons with practical approach. This includes activities like cleaning your environment, drinking clean water, switching off lights, not wasting paper, and avoiding waste in general.

In my teaching experience, I rely more on the practical methods like the project method, activity method, running assignments, observation, and demonstration method." Masking the constructivist pedagogical practices of participant (P12), an Assistant Professor with no ESD teaching experience, who said: "I follow a constructivist approach. I prefer methods of self-learning, joint learning, mixed

and the diverse group learning, co-teaching, presentations, question-and-answer methods, model growth, and project methods. An instructor has to build up sustainable development conceptions, sometimes incorporating individual awareness of the environment, attitudes towards it, and actions. Constructivist learning allows students an approach to be aware of their environmental, economic, and social conceptions, helping them think and question flaws in these conceptions." Thus, another participant (P14) stated that the active involvement is significant to acquiring knowledge about sustainable development.

P14 said, "As a teacher, I think teaching sustainable development should use methods that promote student activity, such as research projects and model building for solving social problems. Inclusive and participatory methods like these will help students see that they have a role in organizing, administering, and evaluating their educational experiences. These methods will be practical, keep students engaged in their studies, link academic learning to real-life problems, and teach them how individual actions can affect community." Participant (P16), with nine years of experience, teaches sustainable development concepts in an integrated manner. P16 stated: "I was offered to undertake research project focus on research questions using many practices to teach sustainable education, such as data collection, observation, and the survey method. This also involves strategies like field visits, discussions about local environment, real examples, role-playing, demonstration methods, and museum visits. The pre-service teachers should be taught about daily life problems and their solutions in class."

DISCUSSION

The teacher educators' practices related to ESD conceptions among pre-service teachers revealed consistent groups of responses from both the experienced and less experienced educators regarding individual practices for developing sustainable concepts. On the other hand, few teacher educators reported using research-based projects and assignments to integrate ESD conceptions among pre-service teachers. Furthermore, the investigation revealed that teacher educators recognize variety of constructivist-oriented practices and pedagogies tested for developing these concepts among the pre-service teachers; however, these were not specifically aimed at fostering ESD. The detailed analysis of the study pointed out that a few teacher educators are not as acquainted and appear less conscious about applying these practices for nurturing ESD. Teaching methods are an integral part of any learning process and the training experience of pre-service teachers. Scholars studying ESD have long argued for changing curricula and practices that are related to the application of ESD. Despite this desire, teacher educators are still using outdated methods with newly developed curriculum materials, as per Rampsoo et al. (2018), whether curriculum is changing and responding to policy discourse.

Cotton (2007) emphasizes that teaching the concepts of the sustainable development and ESD is difficult due to their complexity, especially when it comes to operationalizing the different ways in which sustainable development principles and practices are incorporated into teaching. is added. The conceptual dimensions of the SD and ESD are often used to describe their ideas and practices. Cotton et al. (2007) state that the ESD concept can be included into routine procedures. In a similar vein, the results of current study showed that teacher educators concurred on everyday integration

of the ESD concept. They were more focused on workable solutions, but it was discovered that there was a lack of appropriate guidelines and a policy framework. This study explores how pre-service teachers incorporate ESD concepts and provides insightful information about ESD techniques used in classrooms. In this linking, the findings reveal different pedagogies and strategies that teacher educators use for integrated ESD. The findings of this study are consistent with research by Carney and Reeds (2007), which indicated that the meanings of ESD are nuanced and debated, making it difficult to choose teaching strategies. In this connection, in this present study, the complexity of ESD subjects is also seen.

Huckel (2019) indorsed ESD teaching methods in geography classes, including diverse perspectives and positions, as well as discussions, debates and debates, and experiential or fieldwork activities. Through these exercises, students can frame, articulate and defend their opinions on sustainability-related topics. Thus, Huckle focused on geography education, while this study on higher education emphasized ESD practices in teacher education. The findings of another study by Eilam and Trop (2010) resonate with the present study. They identified three main ESD methods: the student-based learning, hands-on learning & active participation. Many teachers in the present study mentioned these practices. The current study found that teacher educators used various ESD practices in the classrooms, such as plantation, recycling activities, limited use of resources, low-cost materials for teaching, field trips, and visits to cultural places. Besides, the findings of the current study highlight that university teacher educators often use the demonstration, project, collaborative and discussion methods. Thus, these methods are more focused and widely used by most teachers in universities. However, some teacher educators mentioned that a dialogue approach might be more appropriate for ESD education.

Both quantitative and qualitative findings suggested different methods, including the discussion, collaborative work, encouraging the classroom dialogue, problem-solving tasks, field trips, activity method, discussion of economic problems, demonstration method, project method, open discussion on the current and pressing issues, research-based work, and role-playing. Participant (P15) further suggested that ESD pedagogy should be consciously linked to local cultural, social, environmental, and economic practices and aspirations. The study's conclusions and new information revealed the methods that are applied in teacher education to help students form ESD ideas. Thus, the results confirmed that social science disciplines including chemistry, biology, management, management, economics, current issues in education, school community, and education are all taught by teacher educators. In this connection, these disciplines incorporate the described features of ESD. While some teacher educators teach education for sustainable development explicitly, others provide it as the stand-alone course. The teacher educators recommended incorporating ESD into everyday activities in both explicit and implicit ways. Quantitative research showed that clear instruction in ESD is necessary.

Recommendations

1. Practicing ESD is beneficial for instilling ESD conceptions in the pre-service teachers. It is recommended that knowledge about ESD should be integrated in all the teacher education programs in order to improve awareness.

2. Administrators need to be aware to ESD to enable, inspire teacher educators to integrate ESD knowledge. The study recommends providing training to educators about ESD and how they can incorporate it into daily classroom teaching.

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