# Challenges of Implementing Education for Sustainable Development: University Teachers' Perspectives

Madiha Khadim[1]

Naima Qureshi[2]

Ayaz Muhammad Khan[3]

## Abstract

There have been proven and successful developments in the field of Higher Education for Sustainable Development over the past 15 years (Leal Filho et al., 2017). Universities, in particular, are essential to achieving the SDGs that equip the next generation with knowledge, and enable them to address sustainability challenges (Avila et al., 2017). In this regard, teacher educators also play their role and use their expertise to train pre-service teachers to adopt sustainable practices. Research has also highlighted that teacher educators face numerous challenges in developing knowledge of sustainability among pre-service teachers. Through a qualitative approach, using semi-structured interviews and thematic analysis procedures, this study explored the viewpoints of twenty-two teacher educators from eight public sector universities in Punjab. The findings indicated that teacher educators face many challenges including lack of commitment from students, lack of support from management, lack of time and lack of instructional resources, narrow-focused courses while integrating sustainability knowledge among pre-service teachers.

***Keywords:*** challenges, implementation challenges, education for sustainable development, teacher educators

[1] PhD (Education), Lecturer, GCWUF,Corresponding Authors email: madihakhadim@gcwuf.edu.pk
[2] Assistant Professor, Division of Education University of Education Lahore
Co-Author email: naima.qureshi@ue.edu.pk
[3] Professor, Director of Division of Education, University of Education Lahore
Co-Author email: directordoe@ue.edu.pk

## Introduction

Education for Sustainable Development (ESD) is described as education that promotes developments in awareness, skills, values, and attitudes to create a more sustainable world for all. ESD seeks to inspire and prepare current and future generations to fulfill their needs by addressing the economic, social, and environmental aspects of sustainable development in a holistic and interconnected manner.

The concept of ESD emerged to solve the world's rising ecological, social and economic issues. For this purpose, teacher education plays its role in accomplishing its objectives that incorporate critical and systematic insight, collaborative decision-making, and accountability among current and future generations. Teacher education programs are well-positioned to play a significant role in educational reform, and also consider as primary change agents. Teacher education programs must prepare professionals who can "draw together" the various academic elements to provide their pre-service teachers a holistic grasp of a sustainable future. Also, learn them about educational role, community's role, and nations in a sustainable world (Grossman et al., 2009). In teacher education, teacher educators train and provide awareness, learn values, and attitude to the pre-service teacher. These elements are necessary to lead to long-term success of ESD. Simultaneously, teacher education must be prioritized in all agendas, programs, and activities that support long-term sustainability. ESD should addresses learning content and outcomes, instructional practices, and the learning process in a comprehensive and transformational manner (UNESCO, 2014).

ESD encourages teacher educators should incorporate ecological, economic and social sustainability challenges into their teachings to educate pre-service teachers. The creation of this core of knowledge would be a significant impact on how quickly countries begin to move toward a sustainable future. Teacher educators offer training to a pre-service teacher for professional development, collaboration with public universities, and professional guidance to provincial and global education ministries. ESD is not only for educational institutions; it is a part of lifelong learning for all levels such as formal, non-formal, and informal education (Calderon et al., 2020).

Teacher educators and pre-service teachers can think critically and build thoughts and values that can help them to live in a sustainable world (Nousheen, Waseem, & Khan, 2020). ESD generally requires a reconsideration of the educational environment, both physical and interactive, traditional way of content distribution is no longer adequate to motivate learners and behave like responsible people (Brandt et al., 2021). Although, teachers around the world can play a critical role in bringing ESD into education. Pre-service teacher education needs to be reoriented and include ESD knowledge (Bertschy, Kunzli, & Lehmann, 2013).

Teacher educators must be responsible and accountable in both systemic educational reform and long-term development (Nolet, 2013). For developing train and skilled teachers, teacher educators must develop training ways. Teacher educators use their new knowledge, familiarity, understanding of national and local structures, and network of support to reshape existing programs. Such as pre-service training, knowledge, principles, and practices related to ESD are addressed in classroom (Biamba, 2019). Pre-service teachers when they step into their jobs then integrate ESD as part of the curriculum. Pre-service training is less expensive than later-in-service teacher training for educators and administrators. Both in-service and pre-service training is required for early success in ESD. ESD aspects are taught by teacher educators, notably in the domains of environment, society, and progress. Fortunately, every teacher educator, regardless of field, has something to contribute in the field of ESD (Leicht, Heiss, & Byun, 2018).

Building pre-service teacher capacity and government support at the global level, national, local, and community level would facilitate the implementation of such developments in educational institutions. Empowered pre-service teachers and local communities working with educational institutions become central players in promoting long-term growth. Pavlova (2013) highlights that when it comes to teaching ESD knowledge, both teachers and learners face difficulties (Pavlova, 2013).

To implement the concept of sustainable development, the learning environment must adapt using a whole-institution approach. Like all stakeholders of the university take part in implementing ESD (Manasia et al., 2020). Therefore, we need worldwide cooperation programs for administrators, educational authorities, and teacher educators to support global ESD implementation. To address such challenges, there is dire need to implement ESD knowledge but literature reported that teacher educators face a challenging situation when educating about ESD (Eilks et al, 2017; ElJardali et al., 2018; Fadlallah et al., 2018; Hofstein et al., 2011). The question arise how we can integrate ESD knowledge without overcome implementation challenges. This current research aimed to explore the challenges faced by teacher educators in developing sustainability education among pre-service teacher’s.

## Review of Literature

### Universities Role in Implementation of ESD

The education sector has a role to play in both supporting and contributing to the attainment of all 17 goals of the 2030 Agenda for Sustainable Development. Education is one sector that able to support, promoting, and contributing to all of the SDGs. Universities, in particular, have a vital role in the context of the SDGs because they can provide skills, information, and understanding to the next generation to solve sustainability challenges. as well as support research that increases productivity and supports the sustainable development agenda. Public universities should support and promote the SDGs' principles, making a contribution to the Sustainable development goals by ensuring that education programs are environmentally sustainable and socially inclusive and trying to implement ESD regularly (Arruti & Panos-Castro, 2020).

Universities are in a remarkable position to lead the SDGs' cross-sectoral integration by offering an invaluable pool of expertise in education for all SDGs (Hallinger, & Chatpinyakoop, 2019). Various university faculties, such as agriculture, education, science and technology, health and philosophy, ecology, and others, may address various SDGs at the university level. According to Nolet (2013), universities play a critical role in SDG implementation by teaching, community engagement, and program alignment with SDGs. Universities have a long tradition of conducting extensive research and engaging with the culture. They are trusted by multiple stakeholders when it comes to forming partnerships to resolve SD issues, so they have an edge when it comes to achieving the SDGs (EL-Jardali et al., 2018).

Furthermore, through the generation of new knowledge and new methods, universities can have the expertise, innovation, and strategies for achieving the implementation of the SDGs (Mawonde, & Togo, 2019). Universities should integrate SDGs and the concepts of education for sustainable development (ESD) into academic programs in terms of teaching and learning (Bourn, 2017). Seminars are important in training educators so that a larger audience within the university is aware of and adopt the SDGs. Pre-service teachers work as transformation agents in the implementation of sustainability (Ssosse et al., 2021).

Pre-service teachers should collaborate with possible environmental. social and economic partners to improve awareness toward SDGs. Also, adoption in higher education institutions and societies by taking advantage of opportunities available at universities that promote the realistic implementation of SDGs programs (Biamba, 2018). SDGs can be achieved by researching diverse societal, economic, and environmental issues. Universities play a vital role in delivering the requisite expertise, evidence-based solutions, and research-based innovations. This can be achieved by fostering and supporting the multidisciplinary field research that is needed to meet the SDGs (Hopkins & Kohl, 2019). One department may focus on one or more SDGs, but university research can address all 17 SDGs. Through cross-faculty conferences and cross-university workshops, the research can be discussed (Anyolo et al., 2018). Universities are massive organizations with important social, cultural, and environmental impacts on their communities, campuses, and countries. They should plan their practices and strategies to make campus activities influential in achieving the SDGs. They might create a sustainability division or office to lead programs like recycling resources, plantations and plantations, open green infrastructure, sustainability awareness, and emissions reduction projects. Although, most universities teach about sustainable development and the SDGs through education and awareness drives, demonstrating the critical role of SDG 4 in achieving the other SDGs.

**Implementation of ESD: A Challenging Situation**

The role of teachers in Pakistan teaching ESD in university is in its infancy. Educators around the world are lacking in both theoretical knowledge and practical approaches to teaching ESD (Pavaloaia et al., 2019). Teachsers sometimes believe that ESD relates to content rather than pedagogy (Mula et al.,

2017). Furthermore, university educators have expressed a general lack of understanding of the meaning, context, requirements, implementation, and limitations of ESD (Rieckmann, 2019). The environmental dimension is often the most common starting point in ESD, as demonstrated by Pellaud et al., (2019). When the process of incorporating the idea of sustainability into courses began with environmental considerations, teacher educators could develop their courses to address the economic and socio-cultural aspects of sustainability. ESD covers a wide range of interdisciplinary topics and terms related to knowledge, values and abilities (Rampasso et al., 2019). Teachers face a challenge in teaching how to cover all aspects of sustainability and how to choose ESD-friendly pedagogies (Burgener & Barth, 2018).

Teachers can find it difficult to manage a group in an open debate. The language used in critical problem assessment and discourse skills is difficult to understand (Biamba, 2019). Teachers avoid discussing ESD topics in the classroom because they believe that various ideas and discussions are very time-consuming and challenging to tackle (Howard, 2019). Teachers are forced to do extensive interdisciplinary preparative work, which they consider challenging, due to a shortage of instructional resources on these issues (Richter-Beuschel, & Bogeholz, 2019). As a result, teachers primarily depend on the related material found in the available study books. If teachers only use textbooks to explain knowledge to students, they potentially setting up a false dichotomy between content and social problems (Foley, 2021). Teachers think the teaching of ESD is an additional element because the national exams' focus on other topics is problematic. ESD is seen by some teachers as a supplement to the program rather than a core component (Ferguson & Roofe, 2020). Teachers in the interdisciplinary teaching of ESD get no encouragement from their colleagues or the society outside the school (Hoib, 2020). For students, the complex aspects of ESD are not self-evident. The teacher must explain the problems in ESD from various perspectives on a basis that the students can comprehend (Ahel, & Lingenau, 2020). Therefore, the current research paper explored the challenges facing teacher educators and expands their perspectives.

**The Purpose of the Study**

Teaching concepts of sustainability through rote memorization is similar to teaching the theory behind an imaginary entity. ESD provides students the skills, attitudes, beliefs, and information they need to live sustainably in respective communities. In practical and effective forms, SD is a broad idea that is always developing. Many scholars have spent years attempting to define sustainable development and imagining how it may be achieved at the national and local levels. Still, it is difficult to teach sustainable development through education because it is the biggest challenging situation for a teacher educator to define and implement. The effort of completely reorienting an entire education system to achieve sustainability is much more difficult. However, universities must be aware of the challenges faced by teachers in developing ESD knowledge.

The purpose of this research study was to explore ESD challenges that teacher educators face while implementing ESD knowledge in classrooms. Internationally, ESD is the main focus agenda of the United Nations for making a sustainable world. On the other hand, ESD is the least focus in developing countries due to the shortage of budget in the education sector. Teacher educators

are the main source at the university level who provide training to pre-service teachers but decades passed away and why progress is not being made. The challenges that stand in the way of implementing the ESD agenda need to be addressed.

## Significance

ESD is transformative. It is providing the right information and education can change people's values and behaviors, encouraging them to adopt more sustainable lifestyles. It can also break the cycle of poverty, maintain living standards, sustain our resources. Keeping in view the importance of ESD, UN Nations adopted this agenda. With the help of teacher education, successful implementation could take place. For achieving the ESD agenda teachers must be responsible and accountable for educational reform and long-term development. Teachers can use their knowledge, familiarity, understanding of national and local structures, and support networks to restructure existing programs. Literature reports that teachers face challenges in implementing ESD knowledge in students (Biamba, 2018; Ahel, & Lingenau, 2020). For achieving the ESD agenda we need to address basic challenges at the university level which are not allowing implementation. This study examined teacher educator's challenges that they face when giving training, integrating ESD knowledge, and teaching pre-service teachers. The findings could help develop a strategy how to overcome ESD implementation challenges.

## Research Question

1. What are the challenges teacher educators face when implementing education for sustainable development knowledge among pre-service teachers?

## Methodology

The paradigm of this research study was interpretivism. A qualitative research approach has used for this study. To grasp concepts, qualitative research entails gathering and interpreting non-numerical data. The qualitative research method promotes the sort of flexibility that is critical for a researcher who has to be able to shift their line of inquiry and go in new directions as additional information and relevant knowledge becomes revealed. Its main focus on to gather in-depth insights into a problem (Bengtsson & Fynbo, 2018).

For existing research, a semi-structured interview protocol was used for data collection. The target population was teacher educators working in the teacher education department in Punjab Province. The accessible population contributed to this research study by teacher educators from eight government universities in the Punjab province. The sample was teacher educators selected for the data collection based on purposive sampling (twenty-two participants). The interviews were tape-recorded and vary in time from 15-20 minutes. The interviews were conducted in a conversational manner and were informal and open-ended. The thematic analysis technique was used for data analysis. The thematic analysis aims to find themes, relevant or interesting patterns in content,

and then use these themes to address the research analysis. The thematic analysis does more than summarize the data; it recognizes and makes perfect sense of it (Castleberry & Nolen, 2018).

**Data analysis and interpretation**

For data analysis, a thematic analysis technique was used. All interviews were transcribed first. The researcher arranged the collected data in an organized way. Orderly organized data was answer requested research question. For analysis, the researcher followed the steps of thematic analysis given by Braun and Clarke (2017). Following themes were identified that discussed below:

**Theme 1: Lack of Financial resources:** Lack of financial resources was one of the most frequently mentioned challenges by participants (P1, P3, P4, P7, P8, P10, P14, P16, P17, P19, P20, P22).

Participant (P3) stated *that "The main challenge was lack of financial resources. This is the biggest challenge for teacher educators that affects Pakistan's entire higher education public sector. We cannot implement ESD practices in traditional classrooms. We cannot do hands-on activities for integrating ESD knowledge.''*

Another participant (P7) advocated: *"Finding financial resources for implementing ESD is a difficult task"*.

Participant (P19) stated, *"with the situation that we have been facing in the last few years, investment has not been easy in ESD, and implementation strategy requires investment."*

Participant (P11) highlighted that *''to address the sustainability, need of reorient the educational systems, need of resources to carrying out hands-on activities for integrating ESD knowledge''.*

Participant (P14) explained that ''*lack of finance is most significant challenge to promoting sustainability actions''.*

**Theme 2: Lack of time management:** Out of twenty-two participants, only three participants respond that they were using practical ways to integrating ESD. The remaining all were complaining about the shortage of time.

Participant (P10) advocated that ''*we are so occupied with the work at hand – like lesson planning, daily teaching, evaluating formative progress, and assignment grading. We have little time to investigate and address ESD issues in our teaching''*.

Another Participant (P12) stated that ''*We feel pressure from administration to complete course outline. We have first preference to complete course and so many other educational tasks are going on at the same time. So, we have limited time and ESD implementation require time''*.

Many participants (P3, P6, P7, P18, P20.) highlighted that ''*We want time for planning to implement ESD because for better implementation we need planning and strategy''.* Due to lack of time, a teacher educator cannot conduct activities to integrate sustainability like mini research project, aqua friendly activities. Teacher educators mostly only teach through theoretical way.

**Theme 3: Lack of interest among students towards ESD:** The most often found challenge was difficulty in attracting students towards teaching of ESD aspects.

Participant (P2) stated that *''students think that ESD is like a teaching course and they do not get interested to understand this phenomenon for practical implementation''.*

Participant (P5) stated that *''due to student's attitude, teachers face difficulty teaching ESD knowledge because majority students think teacher teaches beyond the topic. They only focus and take interest about course content''.*

One participant (P6) stated that '*I felt that need for change of mindset is the main challenge because they resist for change. I mostly face this challenge when I develop the knowledge and awareness among students about ESD like when I use to assign them assignments related to environmental sustainability. Students argued that this course is not about research. They resist when teacher modify the teaching methodology''.*

Participant (14) explained that *''there is lack of interest among students. Students only prefer to learn about course content. Same in the case of pre-service teachers acquire only those aspects that are part of their course''.*

Another Participant (22) pointed that *''for implementation, we need to change attitude of students. Like teach them how to survive in a world with limited resources. Give them problematic situation and ask for find out solution then they will realize value of resources.''*

**Theme 4: Lack of administration support:** Lack of administration support was another challenge reported by teacher educators face while implementing ESD knowledge in the classroom.

Participant (P11) stated that '*'administration has not taken part or any interest to implement ESD. They stuck to the traditional system and do not want to cope with ESD practices. The administration should support in term of training and providing us proper support''.*

Another participant (P8) stated that *"Administration does not want to accept change and modify curriculum according to ESD''.*

**Theme 5: Lack of commitment among teacher's educators:** Teacher educators found a lack of commitment due to busy routine. They stated that add ESD in every subject explicitly. Teachers are committed to complete course outline. There is need to add one chapter related to ESD in every subject then it will be easy for every teacher integrating ESD.

Another Participant (P19) stated that **''***when designing courses and curriculum. Experts need to add aspects into curriculum but in many subjects there is not a single aspect of ESD knowledge. There is a need to reorient the curriculum and align it with ESD knowledge''.*

Participant (P21) expressed ‘‘*teachers assumed that ESD is a supplement element that teachers taught only core component. They think we only focus on exam point of view and prepare the students about course’’.*

**Theme 6: Lack of training:** One of the challenges identified by teacher educators was lack of knowledge and training. Seven participant highlights that *‘‘universities have not provided any training to teacher educators in this regard. No policy or framework is available that helps teacher educators in executing sustainability knowledge’’.*

Participant (11) revealed that *‘‘ESD aspects are not present in some courses. For implicitly integration ESD aspects there should be training. I experienced from six years of my university teaching career that there was no training related to ESD’’.*

**Discussion**

To meet the challenges of successful implementation, ESD will need to understand the trend of educational change. If the ESD can be linked to a global publicity campaign, the intensity of the transformation program as well as sustainability education will be accelerated. However, supporters of ESD are trying to encourage teachers to teach concepts of sustainability, skills, activities, ethics, and perspectives wherever possible.

The findings stated that some universities do not yet implement sustainability practices. Also, found teacher educators were unfamiliar with the ESD concept due to the ambiguity and complexity of the SD concept, which is seen as an abstract and complex topic. Teacher educators have not gotten any training from their institutions. The main challenges were found based on exploration were lack of financial resources, time for implementation, commitment from the teacher as well as student's side. Teacher educators require financial resources to reorient education practices, for hands-on activities to address the sustainability challenges. In fact, for improving basic education, national and local governments have invested very little in ESD. However, Effective ESD implementation would require funding at both the national and local levels. Financial resources at the national level must be distributed to teacher education for curriculum reorientation. Curriculum development and teaching aids, as well as pre-service teacher training, must be sponsored at the university level.

During the transition period, teacher educators cannot be expected to do multiple functions: design ESD content and educate, practically implement in the field, etc. Teacher educators guide pre-service teachers, but they do not accept extra work on their already overburdened shoulders. For the development of a new strategy, funding and resources are required; governments cannot depend on administration authorities and teacher educators to donate in-kind services to complete this important job. Governments need to step up on the national level.

To address the challenges of ESD, policymakers must have supported by an authoritative impulse from national and regional governments (Calderon-

Almendros et al., 2020). The reality is that every education reform requires both "top-down" and "bottom-up" initiatives to succeed. Government is the highest authority and ability to develop policies that could facilitate transformation (Franco et al., 2019). Administrators, policymakers, university teacher educators, and community leaders must work together to overcome these challenges. Every public sector that is influenced by sustainable development (i.e., every ministry and division) seems to have a part to play in eliminating ESD challenges and support the training of in-service and pre-service teachers (Burgener & Barth, 2018).

## Conclusion

United Nations Decade of Education for Sustainable Development (2005-2014) has a major role along with a partnership with education, plays a vital role in ensuring that ESD values are promoted through formal, non-formal, and informal education. ESD is steadily gaining international recognition as a key enabler for sustainable development. Today, ESD is undoubtedly the core of the Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development (Bexell & Jonsson, 2017). To address the global challenges that are critical for humankind's sustainability, the SDGs acknowledge that all countries must stimulate action in the following main areas by focusing on teacher education. Achieving SDGs would require a dramatic change in how we think and behave with the help of education. ESD is stated specifically in SDG4's Target 4.7, which seeks to ensure that all students acquire the expertise and skills necessary to support sustainable development (Henriques & Brilha, 2017).

In nutshell, education related to sustainable development should implement in a wide range, in both depth and breadth. ESD is less focused in some universities. Governments and state universities must plan and establish plans to handle the challenges mentioned above to successfully adopt ESD. To ensure consistent ESD implementation across the country, these challenges should be tackled at all levels, particularly at the national level. Government policymakers need to pay more attention to overcome sustainable development challenges in education. Systematic thinking and planning to overcome these challenges would improve the chances of effectively implementing ESD programs and reorienting the education to attain sustainability.

## References


Ahel, O., & Lingenau, K. (2020). Opportunities and challenges of digitalization to improve access to education for sustainable development in higher education. In *Universities as Living Labs for Sustainable Development* (pp. 341-356). Springer, Cham.

Anyolo, E. O., Karkkainen, S., & Keinonen, T. (2018). Implementing Education for Sustainable Development in Namibia: School Teachers? Perceptions and Teaching Practices.

Arruti, A., & Panos-Castro, J. (2020). International entrepreneurship education for pre-service teachers: a longitudinal study. *Education Training*.

Avila, L. V., Leal Filho, W., Brandli, L., Macgregor, C. J., Molthan-Hill, P., Özuyar, P. G., & Moreira, R. M. (2017). Barriers to innovation and sustainability at universities around the world. *Journal of cleaner production*, *164*, 1268-1278.

Bengtsson, T. T., & Fynbo, L. (2018). Analysing the significance of silence in qualitative interviewing: Questioning and shifting power relations. *Qualitative Research*, *18*(1), 19-35.

Bexell, M., & Jonsson, K. (2017, January). Responsibility and the United Nations' sustainable development goals. In *Forum for Development Studies* (Vol. 44, No. 1, pp. 13-29). Routledge.

Bertschy, F., Kunzli, C., & Lehmann, M. (2013). Teachers' competencies for the implementation of educational offers in the field of education for sustainable development. *Sustainability*, *5*(12), 5067-5080.

Biamba, C. (2018). Implementing Education for Sustainable Development and Pedagogical Challenges in teacher training programme. In *ATEE Annual Conference: A future for all–teaching for a sustainable society. 20th–22nd August 2018, Gävle, Sweden*.

Biamba, C. (2019). Globalization, Education for Sustainable Development and Pedagogical Challenges in Teacher Education. In *Nordic Educational Research Association (NERA) 2019 Conference, Education in a Globalized World, 6-8 March, 2019, Uppsala, Sweden.*

Bourn, D., Hunt, F., & Bamber, P. (2017). A review of education for sustainable development and global citizenship education in teacher education.

Brandt, J. O., Barth, M., Merritt, E., & Hale, A. (2021). A matter of connection: The 4 Cs of learning in pre-service teacher education for sustainability. *Journal of Cleaner Production*, *279*, 123749.

Burgener, L., & Barth, M. (2018). Sustainability competencies in teacher education: Making teacher education count in everyday school practice. *Journal of Cleaner Production*, *174*, 821-826.

Calderon, A., Scanlon, D., MacPhail, A., & Moody, B. (2020). An integrated blended learning approach for physical education teacher education programmes: teacher educators' and pre-service teachers' experiences. *Physical Education and Sport Pedagogy*, 1-16.

Castleberry, A., & Nolen, A. (2018). Thematic analysis of qualitative research data: Is it as easy as it sounds? *Currents in Pharmacy Teaching and Learning*, *10*(6), 807-815.

El-Jardali, F., Ataya, N., & Fadlallah, R. (2018). Changing roles of universities in the era of SDGs: rising up to the global challenge through institutionalising partnerships with governments and communities. *Health research policy and systems*, *16*(1), 1-5.

Eilks, I., Sjostrom, J., & Hofstein, A. (2017). Relevant chemistry education for sustainability. *Daruna*, *44*, 18-29.

Fadlallah, R., El-Jardali, F., Hemadi, N., Morsi, R. Z., Abou Abou Samra, C., Ahmad, A., ... & Akl, E. A. (2018). Barriers and facilitators to implementation, uptake and sustainability of community-based health insurance schemes in low-and middle-income countries: a systematic review. *International journal for equity in health*, *17*(1), 1-18.

Ferguson, T., & Roofe, C. G. (2020). SDG 4 in higher education: Challenges and opportunities. *International Journal of Sustainability in Higher Education*.

Foley, H. (2021). Education for Sustainable Development Barriers. *J. Sustain. Dev*, *14*(1).

Franco, I., Saito, O., Vaughter, P., Whereat, J., Kanie, N., & Takemoto, K. (2019). Higher education for sustainable development: actioning the global goals in policy, curriculum and practice. *Sustainability Science*, *14*(6), 1621-1642.

Grossman, P., Hammerness, K., & McDonald, M. (2009). Redefining teaching, re-imagining teacher education. *Teachers and Teaching: theory and practice*, *15*(2), 273- 289.

Hallinger, P., & Chatpinyakoop, C. (2019). A bibliometric review of research on higher education for sustainable development, 1998–2018. *Sustainability*, *11*(8), 2401.

Henriques, M. H., & Brilha, J. B. (2017). UNESCO Global Geoparks: a strategy towards global understanding and sustainability.

Hofstein, A., & Mamlok-Naaman, R. (2011). High-school students' attitudes toward and interest in learning chemistry. *Educación química*, *22*(2), 90-102.

Hoib, C. (2020). Transdisciplinary Collaboration in ESD Teacher Education Programs. *Revista de Fomento Social*, 177-197.

Hopkins, C. A., & Kohl, K. (2019). Teacher education around the world: ESD at the heart of education—Responsibilities and opportunities towards a sustainable future for all. In *Environmental and Sustainability Education in Teacher Education* (pp. 21-35). Springer, Cham.

Howard, P. (2019). Re-visioning teacher education for sustainability in Atlantic Canada. In *Environmental and Sustainability Education in Teacher Education* (pp. 179-191). Springer, Cham.

Leicht, A., Heiss, J., & Byun, W. J. (2018). *Issues and trends in education for sustainable development* (Vol. 5). UNESCO publishing.

Leal Filho, W., Wu, Y. C. J., Brandli, L. L., Avila, L. V., Azeiteiro, U. M., Caeiro, S., & Madruga, L. R. D. R. G. (2017). Identifying and overcoming obstacles to the implementation of sustainable development at universities. *Journal of Integrative Environmental Sciences*, *14*(1), 93-108.

Manasia, L., Ianos, M. G., & Chicioreanu, T. D. (2020). Pre-Service Teacher Preparedness for Fostering Education for Sustainable Development: An Empirical Analysis of Central Dimensions of Teaching Readiness. *Sustainability*, *12*(1), 166.

Mawonde, A., & Togo, M. (2019). Implementation of SDGs at the university of South Africa. *International Journal of Sustainability in Higher Education*.

Mula, I., Tilbury, D., Ryan, A., Mader, M., Dlouha, J., Mader, C., ... & Alba, D. (2017). Catalysing change in higher education for sustainable development. International Journal of Sustainability in Higher Education.

Nolet, V. (2013). Teacher education and ESD in the United States: The vision, challenges, and implementation. In *Schooling for sustainable development in Canada and the United States* (pp. 53-67). Springer, Dordrecht.

Nousheen, A., Zai, S. A. Y., Waseem, M., & Khan, S. A. (2020). Education for sustainable development (ESD): Effects of sustainability education on pre-service teachers' attitude towards sustainable development (SD). *Journal of Cleaner Production*, *250*, 119537.

Pavlova, M. (2013). Teaching and learning for sustainable development: ESD research in technology education. *International journal of technology and design education*, *23*(3), 733-748.

Pavaloaia, V. D., Georgescu, M. R., Popescul, D., & Radu, L. D. (2019). ESD for Public Administration: An Essential challenge for inventing the future of our society. *Sustainability*, *11*(3), 880.

Pellaud, F., Ndiaye, A., Khushik, F., & Diemer, A. (2019). Environmental education to education for sustainable development: challenges and issues. *International Journal of Humanities and Social Science*, *9*(1), 1-14.

Rampasso, I. S., Siqueira, R. G., Anholon, R., Silva, D., Quelhas, O. L. G., Leal Filho, W., & Brandli, L. L. (2019). Some of the challenges in implementing education for sustainable development: perspectives from Brazilian engineering students. *International Journal of Sustainable Development & World Ecology*, *26*(4), 367-376.

Richter-Beuschel, L., & Bögeholz, S. (2019). Student Teachers' Knowledge to Enable Problem-Solving for Sustainable Development. *Sustainability*, *12*(1), 1-1.

Rieckmann, M. (2019). Education for Sustainable Development in Teacher Education. An International Perspective. *Environmental Education; Lahiri, S., Ed.; Studera Press: Delhi, India*, 33-48.

Ssosse, Q., Wagner, J., & Hopper, C. (2021). Assessing the Impact of ESD: Methods, Challenges, Results. *Sustainability*, *13*(5), 2854.

Terry, G., Hayfield, N., Clarke, V., & Braun, V. (2017). Thematic analysis. *The Sage handbook of qualitative research in psychology*, 17-37.

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2014). UNESCO roadmap for implementing the global action programme on education for sustainable development.

***Citation of this Article:***
Khadim, Qureshi, & Khan (2022). Challenges of implementing education for sustainable development: University teachers' perspectives. *Pakistan Journal of Education, 39*(2), 00-00.