



# Sustainability-oriented teacher education for inclusive education in Southern Africa

Ben de Souza

Department of Secondary and Post-School Education, Faculty of Education, Rhodes University, Makhanda, South Africa

[ben.souza@ru.ac.za](mailto:ben.souza@ru.ac.za)

<https://orcid.org/0000-0002-6746-9511>

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## Abstract

How do teacher educators prepare future teachers for inclusive education? This question is important since inclusive education is central to achieving Sustainable Development Goal 4. However, the realisation of inclusive education has been constrained by systemic inequalities, resource shortages, and unsustainable practices. Research recommends ongoing efforts to address the need for greater inclusivity. In Southern Africa, one such effort has been the Sustainability Starts with Teachers (SST) programme, which involved teacher educators in 11 countries in capacity building for Education for Sustainable Development (ESD) through Change Projects. This qualitative case study research involved SST teacher educators in Malawi, Tanzania, and Eswatini to develop their capacity to enhance inclusive education through ESD practices. Focusing on disability inclusion, the research generated data through semi-structured interviews and workshop observations. The study's main finding is that the ways in which teachers understood the concept of inclusive education influenced how they taught student teachers about inclusivity in the ESD context. Using Bronfenbrenner's bioecological systems theory to underline the sustainability-oriented teacher development, I argue that mainstreaming inclusivity in teacher education through ESD cultivates competencies and systemic changes that prepare teachers to embrace diversity as a resource. I conclude that inclusivity and sustainability are inseparable. Therefore, reorienting teacher education around this nexus is key to transforming education systems for more just and equitable futures.

**Keywords:** change project, education for sustainable development, inclusive education, southern Africa, teacher education

## Introduction

International educational reports, such as the *2020 Global Education Monitoring Report* of the United Nations Educational, Scientific and Cultural Organisation (UNESCO), have strongly highlighted that strengthening teacher education is fundamental to advancing inclusive education. This report emphasised that inclusive education can be realised only when teachers are equipped with inclusive pedagogical competencies. This emphasis makes

teacher education a critical site of intervention. At a global level, the United Nations (UN) Sustainable Development Goals link inclusive education with Education for Sustainable Development (ESD). Specifically, Sustainable Development Goal 4 on quality education commits to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” (United Nations, 2015, p. 21). At the regional level, the Southern African Development Community (SADC) has adopted ESD as a strategic pathway for strengthening inclusivity in education. Teachers are identified as central enablers of SDG 4 Target 4.7, which calls for education that promotes sustainable development (and also inclusivity) (Schudel et al., 2021).

The SADC *Regional Strategic Framework for ESD 2022–2030* (2022) explicitly recognises the important role of teacher educators in reshaping teacher education towards sustainability (and inclusivity). This policy emphasis resonates with my observation (de Souza 2024) that teacher educators and teachers are at the frontline of implementing SDG 4 in the region. However, the pursuit of inclusive education here is complicated by systemic inequalities, limited resources, and unsustainable practices that constrain access to quality education (de Souza et al., 2024; Tikly, 2019). In this context, Agbedahin and Lotz-Sisitka (2019) argued that mainstreaming sustainability (and, for me, inclusivity) in education systems is not merely a policy aspiration but a pressing necessity for addressing the developmental (and, for me, equity) needs of communities. As Purdy et al. (2023) noted in a European context, with much relevance to Southern Africa, teacher education must move beyond rhetorical commitments and focus instead on building practical competencies that can transform classrooms, schools, and societies.

This study is located in this policy and contextual framing. It examines how teacher educators in Malawi, Tanzania, and Eswatini engaged in the *Sustainability Starts with Teachers* (SST) programme to mainstream inclusive education through their ESD Change Projects. The SST was a partnership programme between the UNESCO Regional Office for Southern Africa and Rhodes University that ran from 2019 to 2023. The programme focused on capacitating teacher educators to take a leading role in ESD. Given this praxis, teacher educators formed communities of practice that implemented Change Projects. These projects were practical responses to the contextual problems of the teacher educators’ practice systems. For example, the Malawi Change Project reported on in this article focused on recycling waste into teaching aids to develop student teachers’ inclusivity proficiency. The Tanzania case involved integrating ICT into teacher education to reduce paper waste and enable greater inclusivity in the institution, serving as an exemplary practice for schools. Equally, the Eswatini Change Project advocated for infrastructural renovations to enable persons with disabilities to access the institution and, eventually, to benefit from its pedagogical offerings. Previously, I reported on the same Change Projects, but focused on different dimensions (see de Souza, 2024, 2025a, 2025b). In this article, I focus specifically on how teacher educators’ conceptualisations of inclusive education shaped their practices and how these practices, in turn, contributed to mainstreaming inclusivity in teacher education. In so doing, I advance understanding of how ESD can provide sustainability-oriented strategies to advance

inclusivity in and through teacher education in Southern Africa. In my contribution to this debate, I respond to the following research questions:

1. How does teacher educators' understanding of inclusive education shape its mainstreaming in teacher education through ESD Change Projects?
2. In turn, how do teacher educators develop the competences required to mainstream inclusive education in student teacher training through ESD Change Projects?

Before proceeding with the debate, I introduce the key concepts that shape the study. Many concepts are worth discussing, but I tackle some of them as I go along. In the next section, I briefly conceptualise inclusive education and ESD. Thereafter, I introduce the theoretical framework chosen for the study, followed by a discussion of the research design and methodology used. After that, I present the data analysis findings thematically before discussing their theoretical and practical implications. I conclude by concurring with the GEM report that education can be truly inclusive only when teachers are equipped with inclusive pedagogical proficiency, for which teacher education serves as a conduit.

## Key concepts in the study

### Inclusive education

Inclusive education is broadly understood as an approach that recognises and values the abilities of all learners, regardless of differences such as disability, gender, language, age, race, or social status (Mbewe et al., 2021; Koutsouris et al., 2020). It seeks to dismantle barriers that prevent the education system from responding to diverse needs (Gosbell, 2021), thereby providing learners with equal opportunities in the same learning environment (Graham, 2023). While historically linked to the social model of disability, inclusive education today extends beyond disability to a multidimensional agenda of social justice and equity (Spandagou, 2025). For example, the United Nations Educational, Scientific and Cultural Organisation's *Policy Guidelines on Inclusion in Education* (2009) define inclusion as "a process of strengthening the capacity of the education system to reach out to all learners" (p. 8). This process-orientation aligns with Bronfenbrenner's (2005) bioecological systems theory, which emphasises the interrelated influence of person, process, context, and time (PPCT) in shaping human development. From this perspective, inclusive education is not a static end-state but an ongoing systemic interaction among learners, teachers, policies, institutions, and broader sociocultural contexts. In this study, I narrowed the focus to disability inclusion to manage the scope of the Change Projects implemented in the SST programme. Accordingly, inclusive education is defined here as a transformative system of mainstreaming and supporting disability inclusion in regular schools while recognising that inclusivity is a broader and multidimensional concept. This limited focus is not intended to diminish other dimensions of inclusivity but, rather, to allow deeper exploration of disability inclusion in teacher education and its resonance with ESD.

## Education for Sustainable Development

ESD is rooted in the wider concept of sustainable development, defined as “development that meets the needs of the present without compromising the ability of the future generations to meet their own needs” (United Nations Educational, Scientific and Cultural Organisation, 2012, p. 1). Importantly, sustainable development requires balancing environmental, social and economic considerations in pursuit of improved quality of life. ESD operationalises this by empowering learners to “take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity” (United Nations Educational, Scientific and Cultural Organisation, 2014, p. 12). ESD is increasingly conceptualised as a learning process rather than a fixed body of content (Lotz-Sisitka et al., 2017). It prioritises collaborative learning, co-engagement, and human development (Agbedahin & Lotz-Sisitka, 2019). This orientation resonates with the PPCT model noted earlier since it highlights how transformative change emerges from ongoing interactions (processes) among learners, educators, and the contexts in which they are embedded over time. In this study, ESD is used not only as a sustainability framework but also as a pedagogical perspective through which disability inclusion can be mainstreamed in teacher education. Thus, ESD provides a viable platform for reorienting education systems towards more just and inclusive futures. Specifically, ESD enables teacher educators to explore innovative strategies, such as recycling local materials into inclusive learning aids or leveraging ICT for disability support, that simultaneously advance sustainability and inclusion (de Souza, 2025a).

## Theoretical framework

In this study, I employ Urie Bronfenbrenner’s bioecological systems theory (2005) as the guiding framework to explore how teacher educators in Southern Africa engage with inclusive education through ESD. Bronfenbrenner’s theory applies to this study because it conceptualises human development as the product of reciprocal interactions between individuals and their multi-layered environments over time (Bronfenbrenner, 2005; Bronfenbrenner & Morris, 2006; Shelton, 2018). This perspective allows for a holistic analysis of how teacher educators’ practices are shaped not only by their personal beliefs and actions, but also by institutional, societal, and policy contexts in which they operate. Central to Bronfenbrenner’s later work is the Process–Person–Context–Time (PPCT) model, which clarifies the mechanisms underlying development (Bronfenbrenner, 2005; Bronfenbrenner & Morris, 2006). Each dimension of the model is relevant for analysing how teacher educators mainstream inclusive education in their ESD practices.

### Process

Proximal processes, defined as the enduring forms of interaction between an individual and their environment, are considered “the primary engines of development” (Bronfenbrenner, 2005, p. 6). In this study, processes include how teacher educators engaged in workshops, collaborative activities, and reflective practices in the SST programme. These activities not

only shaped their professional growth but also influenced how inclusivity was enacted in their teaching practices.

### Person

The model highlights the role of individual characteristics, such as dispositions, resources and demand traits, in shaping developmental outcomes (Bronfenbrenner & Morris, 2006). In this study, the dimension of person includes teacher educators' professional backgrounds, pedagogical orientations and personal commitments to inclusive education. Importantly, the notion of person is extended to collectives, such as teams of educators working together on Change Projects, whose shared agency contributes to inclusivity practices.

### Context

Bronfenbrenner described nested systems of influence—the microsystem, mesosystem, exosystem and macrosystem that shape human development (Bronfenbrenner, 2005; Bronfenbrenner & Morris, 2006). For this study, teacher education institutions (microsystem), the SST programme (mesosystem), national teacher education policies (exosystem) and global ESD and inclusivity discourses (macrosystem) interact to provide the context in which inclusive pedagogical practices are developed. Positioning ESD as the broader contextual framework leads to understanding how inclusivity is negotiated across these systems.

### Time

Development is dynamic and must be understood across many different temporal dimensions: micro-time (specific learning events); meso-time (cycles of training and workshops); and macro-time (longer historical and policy developments) (Bronfenbrenner & Morris, 2006). In this study, the time element captures how teacher educators' inclusive practices evolved over the course of the SST programme, as well as how systemic changes in Southern Africa's education systems unfold in alignment with global policy agendas such as SDG 4.

In the discussion, I use the PPCT model to situate teacher educators' efforts to mainstream inclusivity through ESD as a product of ongoing, reciprocal interactions between and among individual agency, institutional practices, and broader socio-political contexts. This framework enables an analysis that goes beyond description to highlight the systemic nature of inclusive teacher education in Malawi, Tanzania, and Eswatini.

## Research methodology

In this section, I report on the research design and methodology used in the study. The specific focus is on the research approach and design, where the research was conducted, and how participants were selected. I also report on how the data was generated, analysed, and interpreted. Ethical considerations that pertained to the study are also reported on here.

## Research approach and design

This study adopted a qualitative case study design (Creswell & Creswell, 2018) to explore how teacher educators prepare future teachers for inclusive education in the context of ESD. A qualitative case study was most appropriate because it enabled an in-depth investigation of teacher educators' practices and meanings across three different countries (Malawi, Tanzania, and Eswatini) while allowing for comparative insights. This approach also resonated with Bronfenbrenner's (2005) bioecological systems theory, particularly the PPCT model, which emphasises the dynamic interaction of individuals with their immediate and broader contexts over time. Using the chosen research approach and design, I analysed not only individual practices but also the systems and interactions that shape inclusive education through ESD Change Projects.

## Research sites and participants

The study was conducted in three teacher training colleges, one each in Malawi, Tanzania, and Eswatini. Participants were teacher educators involved in the SST programme, which supported ESD Change Projects. Purposive sampling was used to ensure participants were directly involved in or committed to mainstreaming inclusive education through their ESD Change Projects. In Malawi, five participants took part in interviews and 12 in workshops; in Tanzania, four participated in interviews and five in workshops; and in Eswatini, three participated in interviews and seven in workshops. Although the total sample size was relatively small, it was appropriate for this qualitative research because (i) the participant group was relatively homogenous (teacher educators working in ESD Change Projects), and (ii) the study prioritised depth of engagement over breadth (Tutelman & Webster, 2020). Small yet information-rich samples are consistent with qualitative case study logic, particularly when one is investigating complex processes such as inclusive pedagogy.

## Data generation methods

Two qualitative methods (interviews and workshop observations) were employed to enhance triangulation and trustworthiness (see Lemon & Hayes, 2020). Semi-structured interviews captured teacher educators' perspectives on inclusivity and sustainability. Workshop observations documented collective practices, dialogues, and co-learning processes. Beyond this, in my research journal I recorded reflexive notes, contextual insights, and emergent analytical themes. Together, these methods captured both individual perspectives and collective process-oriented interactions.

## Data analysis

Data was analysed thematically, following Braun and Clarke's (2006) iterative process of coding, categorising, and theme development. Analysis was guided by Bronfenbrenner's PPCT model, which provided a way of interpreting how individual characteristics (Person), institutional environments (Context), temporal dimensions of project participation (Time) and interactive practices (Process) shaped the mainstreaming of inclusive education through ESD.

This dual focus on inductive coding and theoretical framing strengthened analytical depth and ensured coherence between the theoretical framework and the methodology.

### Ethical considerations

Gatekeeper permission was secured from the UNESCO Regional Office for Southern Africa, given that participants were engaged through the SST programme. Institutional approval was obtained from the heads of participating teacher training colleges. Ethics clearance was granted by the Rhodes University Education Faculty Ethics Committee (2021-4989-6408) for a doctoral study. I have adapted this article from a doctoral thesis under which the ethical approval was granted. Written informed consent was obtained from all participants who were assured of confidentiality and anonymity. Henceforth, cases are anonymised as Case A (Malawi), Case B (Tanzania), and Case C (Eswatini). Pseudonyms were assigned to participants, with identifiers linked to the data collection method (e.g., AI1 Malawi Interview Participant 1; CW1 Eswatini Workshop Participant 1).

### Research findings

In this section, I present the findings thematically to draw together insights across Malawi, Tanzania, and Eswatini. Instead of reporting country cases separately, the themes highlight how teacher educators in different contexts engaged with the Change Projects to develop strategies for inclusive education through ESD. Participant voices are interwoven to demonstrate similarities and differences across settings. This approach illustrates how sustainability-oriented inclusion strategies have emerged in practice.

#### Using locally available and sustainable resources for inclusive education

Across all three countries, participants identified the effective use of locally available materials and sustainable practices as a central learning outcome of the ESD Change Projects. In Malawi (Case A), participants noted that utilising locally available resources could support inclusive education, particularly in schools that lack materials for learners with disabilities. As one participant<sup>1</sup> (AW1) stated,

The ESD Change Project uses locally available resources. I think we can apply the same to issues in inclusive education, because the story I have heard in schools is about the lack of resources to support learners with disabilities. Still, we have never thought about what local resources we can use to come up with materials that can support these learners with disabilities.

Participants in Malawi also demonstrated creativity in transforming waste into teaching and learning aids. This creativity links sustainability with inclusive pedagogy. One teacher educator noted, “The skill of using papers I did not have in the first place. . . we can also use the papers to make teaching and learning aids. So, I have learnt a lot from them” (AI1). The production of briquettes (cooking charcoal) from waste further reinforced the idea of

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1 Participant responses have not been edited.

sustainability beyond the classroom, as highlighted by AI4, who said, “I have gained the skill of how to make the briquettes, and I also heard that we may use, can also use leaves, grass, even rice husks, we can use them to make briquettes.” Producing briquettes was part of the Malawi Change Project, a response to society’s challenges in relation to a reliable energy source. In addition to creating inclusive education materials, the Change Project produced these briquettes to serve the community.

Similarly, in Tanzania (Case B), sustainability was emphasised as a concept that can be integrated into any inclusive teaching context. Participants learned that small actions can initiate meaningful change. As BW2 said, “Now if I have an idea, I start the project; I don’t look for funds first. I have to do it even in a single class or to some four people.” Participant B12 explained the integration of sustainability into linguistic studies in saying, “Like the illustrations, the examples, and the materials I am using for teaching, they should be based on sustainable development issues.”

In Eswatini (Case C), sustainability was illustrated through infrastructure improvements and the recognition of the interrelatedness of the SDGs. Participant CI2 highlighted learning about “poverty, waste management, political issues and climate change.” This shows an understanding that inclusive education and sustainability are interconnected. Participant CW4 added that education should be “solution-oriented” thus addressing inclusivity and climate change simultaneously.

### Promoting inclusivity and independent living for persons with disabilities

Promoting inclusivity and supporting independent living for persons with disabilities were central across all Change Projects. In Malawi, participants linked inclusive education to the creative use of waste and locally available resources. One participant, AW3, noted, “At first, I did not know that we could produce teaching and learning aids for inclusive teaching from waste. Now I know this, and I am also training my student teachers to do the same.” This practical inclusion promoted awareness that all learners, including those with disabilities, should actively participate. AW5 said, “Learners [pre-service teachers] share ideas and interact in the project. They help each other with the project activities. Even those with disabilities are involved in sharing ideas and doing the activities.”

In Tanzania, participants reported a shift in perceptions of disability. They recognised that, with appropriate support, individuals with disabilities can lead independent lives. As B11 put it, “I have learnt that individuals with disabilities, when included, can be independent to a greater degree, which I could not expect.” This was accompanied by institutional reflections, with BW3 stating that there was now intent “to convince the university to incorporate ICT in special needs training.” These efforts recognise gaps in teacher education for inclusive education. Improved attitudes toward disabilities were also evident. Participant B11 said, “When they are included, they instantly forget that they have a disability.”

In Eswatini, inclusivity was addressed both at the institutional and infrastructural levels. Participants identified the need to “accommodate every individual learner” (CI2) and

affirmed that “education is a right of all people” (CI3). Concrete steps were taken to admit students with disabilities for the first time, which participant CW5 described as “a step in the right direction.” Additionally, as CW 1 pointed out, “Infrastructure upgrades, such as ramps and accessible bathrooms, were introduced.” This development reflects a tangible commitment to inclusivity.

### Collaboration, participation, and experiential learning

Collaboration and active participation emerged as essential drivers of inclusive learning and sustainability across all cases. In Malawi, the Change Project nurtured a sense of collective responsibility. Participants emphasised the importance of inclusion in teamwork, as A12 put it, “Everyone must be involved, because if everyone is involved, then they will also put some effort to make the project work.” This participant added, “I have learnt that no one can work in isolation, and you will still require human resources to support you.” Collaborative engagement extended into teaching practice schools where, for AW9, “Student teachers initiate it with their learners and reach the community.”

In Tanzania, experiential learning was central. Participants discovered the power of doing rather than telling. BW1 said, “Through this programme, we can get interested in ourselves, you are doing yourself, and then you find yourself getting the passion.” BW2 affirmed this: “Learning is happening in the natural setting, and then when it is acquired, it remains.” These experiences promoted reflection and long-term learning. Furthermore, collaboration extended beyond the classroom. B14 explained, “We need to work with the indigenous community and everybody else who is around us, and we need to remember the old knowledge.”

In Eswatini, collaboration was promoted through workshops and sensitisation sessions that encouraged community-wide engagement with inclusivity goals. The Change Project also involved mobilising different stakeholders, including administration and academic staff, to buy into the inclusive education advocacy. The involvement of administrative and teaching staff in implementing infrastructure renovations demonstrated the power of collective effort. Thus, experiential and collaborative learning not only enhanced engagement but also built a sense of ownership and sustainability in ESD implementation.

### Mainstreaming sustainability and inclusivity in teacher education curricula

Mainstreaming sustainability and inclusivity principles in teacher education emerged as a key transformative aspect of the Change Projects. In Malawi, participants recognised how their projects connected to the curriculum and encouraged interdisciplinary learning. AW7 stated,

The project speaks to the curriculum. I can see even the linkage of subjects through this project. Some subjects from the arts are linked with subjects from science and come with solutions to our problems, like cutting down trees for cooking.

A14 reflected on the project’s alignment with national goals in saying, “It is really important to consider inclusiveness everywhere in Malawi. . . because through inclusiveness, nobody is going to be left behind.”

Similarly, in Tanzania, participants reported learning how to integrate ESD concepts in their disciplines, for B12, “Like the illustrations, the examples and the materials I am using for teaching, they should be based on sustainable development issues.” B13 further noted that “ESD is not something which may be contained in a certain container. . . it must be included in every sphere of life.” This comment demonstrates the holistic view of sustainability that goes beyond defined subject boundaries.

In Eswatini, participants drew connections between inclusivity, development, and global sustainability agendas. Participant CW2 highlighted the institution’s alignment with “the UN’s SDG 2030 agenda.” This emphasises education’s role in addressing climate change and disability inclusion. Participant CI3 further reflected that “the world is a system of systems.” Again, this highlights how teacher education must embrace interconnections between social, environmental, and political issues.

### **Institutional transformation and infrastructure for inclusive development**

Institutional change and physical transformation were notable indicators of the Change Projects’ long-term impact, particularly in Eswatini and Malawi. In Eswatini, the Change Project spurred infrastructure renovations that improved accessibility. As Participant CW1 noted, “Ramps, pathways, and accessible bathrooms had been incorporated into hostel renovations.” Although Participant CW4 acknowledged that inclusivity measures were “not fully fleshed out”, participants agreed that these developments demonstrated ongoing commitment. The concept of inclusive development was further reinforced by CW4, who said, “Development must encompass all human beings, physically challenged or otherwise.”

In Malawi, the institutional transformation manifested in the diffusion of inclusive and sustainable practices across teaching practice schools. Participants described how their students were applying the knowledge gained in their communities. As AW9 said, “In teaching practice schools, students initiate it with their learners and reach the community. The project done at the college is a powerful tool for promoting education that is reflective of the needs of society.”

In Tanzania, institutional transformation took a pedagogical form, as teacher educators adopted new frameworks for project-based learning and inclusion through ICT. The Change Project empowered participants to take the initiative. For B12, “When I started the project, it was like a trial. . . my passion was to try the idea.” The central issue in this Change Project was that student teachers with disabilities and teacher educators should become technologically proficient to reduce paper and equipment waste associated with learning support for special educational needs. Such changes reflected a shift in institutional culture toward innovation, inclusivity, and sustainability. These transformations, whether infrastructural, pedagogical or cultural, demonstrate the potential of the ESD Change Projects to create inclusive, sustainable, and forward-looking teacher education institutions across different contexts.

## Discussion

This study demonstrated that integrating the ESD framework with the Change Project model enabled teacher educators to create new learning opportunities for inclusive practice by forming communities of practice, engaging in co-learning, collaborating across diverse abilities, and interacting across many levels of the education system. Importantly, the findings reveal that these opportunities cannot be understood only within national contexts but are best explained thematically through the tenets of bioecological systems theory, particularly the Process–Person–Context–Time (PPCT) model (Bronfenbrenner, 2005; Bronfenbrenner & Morris, 2006). The themes that emerged across the three cases: resource innovation; ICT-enabled inclusion; institutional transformation; and systemic interconnections demonstrate how *proximal processes* operate as the “primary engines of development” (Bronfenbrenner, 2005, p. 6). These proximal processes shape both individual teacher educators’ practices and broader institutional cultures.

One central theme was the emergence of resource innovation through collaborative and experiential approaches. Teacher educators developed inclusive teaching aids from locally available or recycled materials and integrated sustainability practices into pedagogy. These innovations highlight the proximal processes that arise when educators and pre-service teachers co-engage in problem-solving. The emphasis on resourcefulness reflects how Person characteristics (knowledge, creativity, beliefs) interacted dynamically with Context (curriculum, material constraints, peer support) to generate transformative processes (Bronfenbrenner, 2005). In practice, this finding vindicates the theoretical claim that inclusivity in education requires not only policy but also pedagogical ingenuity (Florian & Camedda, 2020; Walton, 2025). For educational theory, this supports a shift towards recognising ESD-informed resource innovation as a critical dimension of inclusive pedagogy (de Souza, 2024, 2025b).

Another prominent theme was the use of ICT as an enabler of inclusivity. Teacher educators, especially in Tanzania, integrated assistive technologies into curricula and demonstrated how ICT could shift perceptions of disability from deficit-based to potential-oriented. From a PPCT perspective (Bronfenbrenner, 2005), ICT served as a mediating tool in proximal processes, altering the quality and direction of interactions between teacher educators, pre-service teachers, and learners with disabilities, situating them within Bronfenbrenner’s multilevel systems. Also, this shows how contextual innovations (such as institutional ICT policies) influence the micro-level learning encounters. Practically, this finding highlights that inclusivity cannot remain a rhetorical goal; it requires embracing digital and assistive technologies in teacher training programmes. Theoretically, it positions ICT not just as a technical resource but as a cultural and systemic mediator of inclusive education.

A further theme across the cases was institutional transformation, especially in relation to infrastructure, admissions policies, and curriculum revision. The Eswatini case illuminated how inclusivity materialises when institutions reconfigure physical and systemic barriers, such as inaccessible facilities. These changes reflect proximal processes not only at the

individual level but also at the structural-process level, where institutions themselves become agents of change (Bronfenbrenner & Morris, 2006). In the PPCT model, such processes illustrate that the Person–Context nexus is not limited to interpersonal interactions but extends to institutional practices and policies as interactive actors that shape developmental trajectories. For educational theory, this strengthens the systems perspective, aligning with arguments for whole-institution approaches to educational issues such as sustainability (and of course, inclusivity) (Lotz-Sisitka et al., 2017). For practice, it suggests that policy and infrastructure reform are indispensable precursors to sustainable and inclusive pedagogy.

A final theme concerned the recognition of systemic interconnections, particularly how inclusivity aligns with broader SDGs. Teacher educators perceived disability inclusion as inseparable from goals related to quality education (SDG 4), infrastructure (SDG 9), and reduced inequalities (SDG 10). This theme demonstrates Bronfenbrenner’s emphasis on the nested, interrelated nature of systems, in which changes in one domain cascade into others to form a network (see Neal & Neal, 2013). Theoretically, this reinforces the notion that inclusive education should not be conceptualised in isolation but as part of a holistic ESD agenda within the new social contract for education (United Nations Educational, Scientific and Cultural Organisation, 2021). Practically, it calls for teacher education to foreground the cross-sectoral implications of inclusivity in preparing future teachers to see education as part of an interdependent societal transformation project.

The thematic findings demonstrate that inclusive education, when framed within ESD and the PPCT model, operates as a dynamic and relational process rather than a fixed set of strategies. For educational theory, this study extends Bronfenbrenner’s model by highlighting the importance of pedagogical innovation and institutional agency as proximal processes in teacher education. It also demonstrates how inclusivity benefits from being conceptualised within the broader sustainability discourse, thereby connecting inclusive pedagogy to the systemic global agendas (de Souza, 2024). For educational practice, the study entails three key implications. First, teacher education for inclusive education should prioritise resource innovation. This entails capacitating teacher leaders, teacher educators, and teachers to mobilise local and sustainable resources creatively for inclusive pedagogy through the ESD framework. Second, ICT, and the emerging Artificial Intelligence focus, should be positioned as a structural enabler. This will ensure that pre-service teachers are prepared to integrate assistive and digital technologies into everyday teaching practice. Third, institutional and policy reforms are essential because inclusivity requires whole-institution approaches, infrastructural redesign, and systemic policy commitments.

Overall, the findings affirm that ESD provides a fertile framework for cultivating inclusive pedagogical proficiencies, not by treating inclusivity as an add-on, but by mainstreaming it into transformative processes that connect people, institutions, and systems. This has the potential to shift teacher education from a descriptive, resource-limited practice to a critical, systemic, and sustainability-oriented praxis that prepares educators to engage with diversity as a resource for collective development. Therefore, adopting the ESD framework and the Change Project model as part of the teacher training mechanism for inclusivity can enable

teachers to find the applicability of ESD to inclusive education. In the same vein, teacher educators could frame assessment designs that evaluate teachers' learning capabilities and empower them to exercise their agency for transformation. This model from teacher education praxis could potentially influence practice in schools, where teachers could work with learners with diverse abilities.

## Conclusion

This study demonstrates that mainstreaming inclusive education through the ESD framework can transform teacher education in Southern Africa by linking pedagogy, institutions, and systems through the Change Project model. Teacher educators engaged in resource innovation, digital inclusion, institutional change, and systemic integration of sustainability goals. The study shows how Bronfenbrenner's PPCT model actualises inclusion as a nested, multi-level, process, extending beyond proximal processes to encompass pedagogical innovation and institutional agency, framing inclusivity as a core sustainability challenge rather than a marginal concern. Three priorities emerge: capacitating educators to creatively mobilise local resources; utilising digital and assistive technologies as structural enablers; and pursuing policy and institutional reforms to sustain inclusive practices. While resource and policy constraints remain, ESD offers a viable platform for reorienting teacher education towards inclusivity.

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