

INVESTIGATING CONTRADICTIONS REGARDING EDUCATION FOR SUSTAINABLE DEVELOPMENT INTEGRATION AMONG ACADEMICS: AN INTERDISCIPLINARY PERSPECTIVE

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Abstract

Education for Sustainable Development (ESD) is recognised as a key approach for addressing complex global challenges through higher education, yet its integration remains uneven across disciplines. A significant barrier concerns tensions surrounding roles and responsibilities for ESD integration, often resulting in fragmented practices. This study explores contradictions emerging in interdisciplinary academics' perspectives regarding ESD integration through authentic conversations in a collaborative Community of Practice. Guided by the research question, *what contradictions emerge in interdisciplinary academics' perspectives regarding the integration of Education for Sustainable Development*, the study draws on Cultural-Historical Activity Theory (CHAT). Focusing on primary-level contradictions within the division of labour, the findings reveal competing assumptions about whether ESD is discipline-specific or a shared responsibility. These tensions are intensified by limited policy visibility and institutional support. The study argues that making such contradictions visible through authentic conversations is essential for coherent and intentional ESD integration.

Keywords: ESD, CHAT, division of labour, interdisciplinary collaboration.

1. Introduction

Education for Sustainable Development (ESD) is promoted internationally as a transformative approach aimed at equipping learners with the skills, knowledge, attitudes, values, and competencies required to address challenges such as climate change, inequality, and social injustice (UNESCO, 2017). Within higher education, ESD integration calls for interdisciplinary approaches that transcend traditional subject boundaries. However, research shows that ESD integration within university curricula remains fragmented and inconsistent (Fiselier, Longhurst & Gough, 2018).

In South African teacher education, this challenge is intensified by disciplinary silos, prescriptive curricula, and limited policy guidance on ESD. Academics often engage with sustainability-related ideas, but such engagement is typically implicit, uncoordinated, and reliant on individual initiative rather than institutional coherence (Kazeni & Nyamupangedengu, 2025; Mandikonza & Kawai, 2023).

This paper reports on a study that emerged from concerns raised within an academic Community of Practice regarding who is responsible for integrating ESD, how it should be enacted across disciplines, and whether such integration should be explicit or embedded within existing pedagogical practices. Using authentic conversations as a professional learning strategy (Swain & Spire, 2020), the study investigates how academics from science, mathematics and social sciences teacher education negotiate their understanding of ESD and their roles in its integration.

The study was guided by the research question:

What contradictions emerge in interdisciplinary academics' perspectives regarding the integration of Education for Sustainable Development?

By applying Cultural Historical Activity Theory (CHAT) as an analytical lens, the paper foregrounds contradictions, particularly those related to the division of labour as sources of tension, but also as potential catalysts for expansive learning and pedagogical transformation (Sannino & Engeström, 2018).

2. Methodology

2.1. Research design

This qualitative interpretive study used authentic conversations within an interdisciplinary Community of Practice involving teacher educators from Life Sciences, Physical Sciences, Mathematics and Social Sciences.

2.2. Participants and context

Participants were teacher educators from Life Sciences, Physical Sciences, Mathematics and Social Sciences. Conversations were facilitated in a collegial, non-hierarchical environment. The study was situated in a teacher education context where academics prepare pre-service teachers across multiple subject areas, highlighting the strategic importance of teacher education in advancing ESD integration.

2.3. Data generation

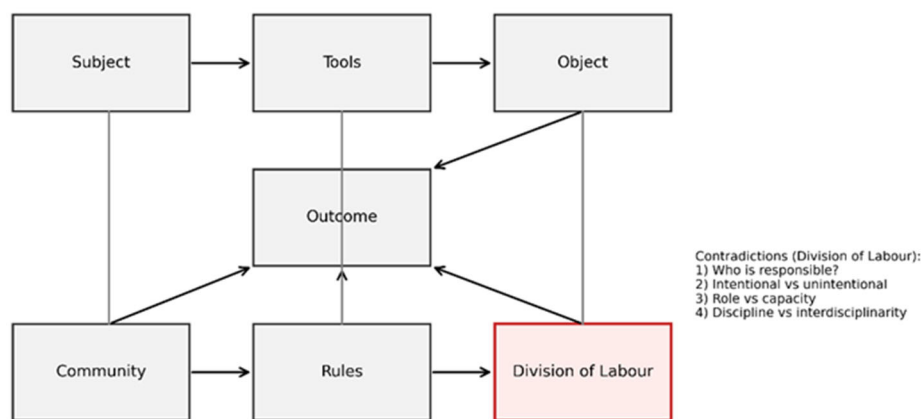
Two two-hour authentic conversation sessions were conducted. Discussions focused on participants' understandings of ESD, roles and responsibilities for integration, current teaching practices, perceived challenges and institutional constraints. Conversations were audio recorded and transcribed verbatim.

2.4. Data analysis

Data were analysed thematically using CHAT. The analysis focused on identifying primary-level contradictions, particularly those clustered around the division of labour within the ESD integration activity system.

2.4.1. Explanation of how CHAT was used to analyse data. Figure 1 below based on Engeström's model of an activity system, which consists of seven interconnected components: **subject**, **tools**, **object**, **rules**, **community**, **division of Labour**, and **outcome** represent the CHAT activity system for ESD integration, with the Division of Labour highlighted in red and annotated with the principal contradictions identified in the authentic conversations.

Figure 1. Adapted from Engeström's model of an activity system.



At the top of the diagram, the subject refers to the lecturers involved in teaching across different disciplines namely Life Sciences, Physical Sciences, Mathematics, Geography, History and Methodology. These lecturers attempt to integrate ESD into their practice by acting upon the object, which in this study is the collective goal of achieving intentional, effective and interdisciplinary ESD integration across teacher education programmes. The transformation of the object is mediated by tools, which include pedagogical strategies (e.g., case studies, scenarios, simulations), curriculum documents (e.g., CAPS), conceptual resources (e.g., SDGs, sustainability competencies), and subject-specific examples used in teaching.

Beneath the components subject, object and tools, the community encompasses all individuals and groups with a shared stake in the object of the activity. This includes lecturers across all disciplinary divisions, students, departmental structures, the wider School of Education, and policy-setting bodies that influence ESD expectations. The rules component refers to both formal and informal regulations, norms, expectations and constraints that guide lecturer behaviour. These include institutional policies, curriculum prescriptions, disciplinary norms, and broader global agendas like SDG 4.7.

The division of labour, highlighted in red in the diagram, was the central focus of our analysis. This component describes how roles, responsibilities, tasks and authority are distributed among lecturers and programmes. Finally, in the middle of the diagram, the outcome represents the intended result of the activity system namely, coherent, intentional and interdisciplinary ESD integration that enhances the quality of teacher education.

3. Results

In this paper, we foreground tensions clustered in the division of labour, leading to fragmented, inconsistent integration across disciplines. These tensions/contradictions were about: Whose responsibility ESD is, what counts as ESD in practice, whether lecturers are integrating it intentionally or unintentionally, what constitutes “adequate” integration, different understandings of ESD across disciplines and lack of alignment between policy, institutional expectations, and practice.

The contradictions show that there is a complex set of relationships that shape how lecturers at the teacher education institution engage in the activity of integrating ESD into their teaching. In addition, the division of labour is where primary contradictions emerged from most during authentic conversations. Table 1 below shows a summary of these contradictions as well as CHAT elements, evidence and implications.

Table 1.

Summary Table 1. Contradiction → CHAT Element(s) → Evidence → Implication.

Contradiction	CHAT Element(s)	Evidence (Transcript)	Implication for ESD Integration
1) Who is responsible for ESD?	Division of Labour (+ interactions with Tools/Rules/Community)	“To me... it’s more of a science topic than a mathematics topic.” (Prof. Marks) “ESD is for everyone... every subject should develop critical thinking.” (Prof. Yuna)	Ambiguity in role allocation generates fragmentation and abdication (not my subject), directly mirroring the abstract’s claim that responsibility tensions slow integration.
2) Intentional vs unintentional integration	Division of Labour (+ interactions with Tools/Rules/Community)	“We incorporate some principles..but unintentionally.” (Dr Naomi) “People may have been integrating ESD and not know it.” (Dr Uje)	Confusion over whether implicit practices “count” produces inconsistent standards of adequate integration and unclear expectations of labour.
3) Role expectations vs capacity/knowledge	Division of Labour (+ interactions with Tools/Rules/Community)	“Only one really understood what ESD was... nobody ever mentioned it.” (Dr Naomi) “Policy does not mention ESD... we don’t have liberty to incorporate it.” (Dr Naomi; Dr P)	When role expectations outstrip tools and rules (knowledge, policy), contradictions intensify, producing hesitation and uneven practice.
4) Discipline identity vs interdisciplinary expectations	Division of Labour (+ interactions with Tools/Rules/Community)	“We look in cells—we do not know what the next person is doing.” (Dr Naomi) “Maths is the language of science... modelling, numbers.” (Prof Marks;	Tension between strong disciplinary identities and interdisciplinary labour fuels uncertainty about who does what, where, and when.
5) Teaching tasks vs ESD outcomes	Division of Labour (+ interactions with Tools/Rules/Community)	“If I teach this concept, how do I teach sustainable development?” (Dr Uje) “We cannot claim behavioural outcomes we have not seen.” (Naomi)	Unclear mapping between tasks and ESD competencies causes role confusion in planning, enactment and assessment.
6) Prescribed curriculum vs ESD flexibility	Division of Labour (+ interactions with Tools/Rules/Community)	“We have a prescription... we don’t have the liberty to incorporate it.” (Dr Naomi) Desire for field trips but lack of resources (Dr Noah).	Responsibility without authority/resources is a classic division-of-labour contradiction, producing workarounds and inconsistency.
7) Collaboration expected vs structures absent	Division of Labour (+ interactions with Tools/Rules/Community)	“We need to sit together... so that we actually do something.” (Dr Casper) “We do not know what the next person is doing.” (Dr Naomi)	Authentic conversations temporarily substitute for missing structures, but sustained collaboration needs formalised roles and routines.
8) Definitions contested → labour contested	Division of Labour (+ interactions with Tools/Rules/Community)	“ESD is education... focus on quality education.” (Dr C) “Sustainable development is subject-specific” vs “for everyone.” (agreed on)	When meaning is unsettled, the division of labour is unsettled; shared definitions are a precondition for coherent role allocation.

4. Discussion of findings

Using CHAT, the findings show that contradictions across activity system components shape academics' engagement with ESD integration. The division of labour emerged as the primary site of contradiction, closely interacting with rules, tools and community expectations. These contradictions and the misalignments which resulted in uneven and inconsistent integration across disciplines are discussed below.

4.1. Who is responsible for ESD?

Participants expressed divergent views regarding responsibility for ESD integration. Some positioned ESD within science-related disciplines, while others asserted that all disciplines share responsibility. This lack of consensus resulted in uncertainty and fragmented role allocation. This contradiction confirms what Abrahams and Van Wyk (2024) observed in their study, that ESD implementation is sporadic, with many 'mainstream' disciplines (engineering, mathematics) shifting responsibility to "development studies" or education departments. These responsibility tensions are likely to slow integration.

4.2. Intentional vs unintentional integration

Lecturers reported integrating ESD implicitly through examples and discussions without explicitly naming it, while others argued for intentional and planned integration. Munasi (2024), in their study of grade 11 learners, found out that unintentional and unplanned ESD integration, though it may raise awareness, the inconsistency often leaves gaps in student understanding of ESD.

4.3. Role expectations vs capacity/knowledge

Participants highlighted limited conceptual understanding of ESD and minimal professional development opportunities. Expectations to integrate ESD without adequate conceptual or policy support intensified contradictions within academic roles. This showed that contradictions are likely to intensify when role expectations outstrip tools and rules (knowledge, policy), producing hesitation, lack of confidence and uneven practice.

4.4. Discipline identity vs interdisciplinary expectations

Strong disciplinary identities influenced how academics perceived their responsibilities. These identities often conflicted with expectations for interdisciplinary collaboration, contributing to uncertainty about shared responsibility. Tension between strong disciplinary identities and interdisciplinary labour which can fuel uncertainty about who does what, where, and when, Abrahams & Van Wyk (2024).

4.5. Teaching tasks vs ESD outcomes

Participants questioned how routine teaching tasks align with ESD outcomes. For example:

Unclear links between disciplinary content and ESD competencies complicated planning, enactment and assessment. This implies that while ESD competencies are well-defined, their integration into disciplinary content remains unclear and inconsistent. Hence the need for stronger conceptual models, assessment tools, and cross-disciplinary accountability to bridge this gap.

4.6. Prescribed curriculum vs ESD flexibility

Rigid curriculum prescriptions and limited resources constrained lecturers' ability to integrate ESD meaningfully. This contradiction also intensifies the tension of expected striving to fulfil roles and responsibilities but without authority and/or resources to do so, making it unattainable to adequately integrate ESD.

4.7. Collaboration expected but structures absent

While interdisciplinary collaboration was widely valued, participants reported a lack of institutional structures, time and policy support. Authentic conversations provided an initial platform but could not substitute for sustained structural support which is encouraged by Berg and Vester (2023).

4.8. Definitions and labour are contested

Competing conceptualisations of ESD resulted in contested interpretations of who should integrate it and how. Without shared meaning, coherent division of labour remained difficult to achieve. For example Dr Casper insisted that *ESD is education... focus on quality education*, yet four of the participants (Prof Marks, Drs Hillary, Muponi, Naomi and Noah) thought sustainable development is subject-specific vs the

other three (Prof Yuna, Drs Casper and Uje) who were of the idea that ESD is for everyone. Without a common understanding of ESD conceptualisations, the tension remains unresolved.

5. Conclusion

Through our authentic conversations, we were enlightened that ESD integration is not a simple matter of changing teaching techniques but rather, a systemic activity influenced by interacting elements. The contradictions that we highlighted in the division of labour reveal why lecturers experience uncertainty, uneven practice, and disciplinary tensions. The authentic conversations made the tensions visible and enabled us to provide a theoretical explanation that supports our argument that structured, cross-disciplinary dialogue is essential for resolving contradictions and moving toward a shared ESD framework.

6. Recommendations

Taking into consideration the findings, the following recommendations should be considered: Develop a shared ESD Framework: Institutions should co-develop a flexible, interdisciplinary framework that clarifies what counts as ESD integration across disciplines. Institutionalise Authentic Conversations: Regular, structured dialogic spaces should be embedded within professional development to support collective sense making and learning. Enhance Policy Visibility: ESD should be explicitly articulated in institutional policies, curriculum guidelines, and quality assurance processes. Support Intentional Pedagogy: Academics should be supported to make ESD integration intentional, including assessment strategies that acknowledge cognitive, socio emotional, and behavioural domains.

References

- Abrahams, A., & Van Wyk, T. (2024). Mainstreaming Education for Sustainable Development (ESD) in Higher Education. In *Imagining the Futures of Higher Education in Southern Africa: An Exploration from Multiple Perspectives* (pp. 91-110). Singapore: Springer Nature Singapore.
- Berg, C. V. D., & Verster, B. (2023). Integrating education for sustainable development into a sustainable-smart transdisciplinary learning framework. *The Independent Journal of Teaching and Learning*, 18(2), 8-28.
- Fiselier, E. S., Longhurst, J. W., & Gough, G. K. (2018). Exploring the current position of ESD in UK higher education institutions. *International Journal of Sustainability in Higher Education*, 19(2), 393–412. <https://doi.org/10.1108/IJSHE-06-2017-0084>
- Kazeni, M & Nyamupangedengu, E. (2025). Exploring the integration of Education for Sustainable Development into Science, Technology, Engineering and Mathematics teacher education curricula: A case study from a South African university. *Proceedings of ICERI2025 Conference 10th–12th November 2025, Seville, Spain. pp. 7698-7707. ISBN: 978-84-09-78706-7 ISSN: 2340-1095. DoI: 10.21125/iceri.2025.2131*
- Mandikonza, C & Kawai, P. (2023). Education for Sustainable Development (ESD) Classroom Practices: A South African Perspective. In Hoffmann, E., Mavhunga, E., Bohl, T., Maringe, F., & Diekmann, D. (Eds). *Teacher Education in South Africa and Germany: Shared Perspectives on National and Global Questions.* (pp. 235-250). Tubingen University Press. <http://dx.doi.org/10.15496/publikation-76378>
- Munasi, K. R. (2024). Evaluating the Integration of Education for Sustainable Development in the Life Sciences Curriculum: A Case Study of Grade 11 Teachers in Vhembe East District. *Sustainability*, 16(24), 10918.
- Sannino, A. & Engeström, Y. (2018). Cultural-historical activity theory: founding insights and New challenges. *Cultural-Historical Psychology*, 14(3), 43-56. <https://doi.org/10.17759/chp.2018140305>
- Swain, J. M., & Spire, Z. D. (2020). The Role of Informal Conversations in Generating Data, and the Ethical and Methodological Issues. *Forum Qualitative Sozialforschung Forum: Qualitative Social Research*, 21(1). <https://doi.org/10.17169/fqs-21.1.3344>
- United Nations Educational, Scientific and Cultural Organization (2017). *Education for Sustainable Development Goals: Learning objectives*. Paris: UNESCO:62.