



Towards a Theory-Based Framework for Assessing the Mainstreaming of Education for Sustainable Development A Case Study of Teacher Education Institutions in Botswana

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Abstract

This article presents the development of a theory-based framework for exploring the ways in which different teacher education institutions in Botswana have worked towards the infusion of education for sustainable development (ESD) in the curriculum and the practice of pre-service teacher education. The framework combines a theory of change, a theory of education for sustainable human development and a theory of transformative learning. The objective of this paper is to understand how this theoretical framework can help the analysis and understanding of critical features of ESD pedagogy and projects. The research results obtained in the framework's application highlight key elements enabling the successful implementation of ESD in two specific teacher education institutions, namely: the educators' capacity to foster transformational pedagogies in the classroom, their capacity to strategically plan and implement their change projects, and the wider institutional and administrative context.

Introduction

This article focuses on the development of a framework for identifying critical features of innovative pedagogical practice in teacher education institutions wishing to adopt, embed or mainstream education for sustainable development (ESD). It is in response to the need for 'theorising change, and developing praxis-oriented models of change that can be used to fast-track and support ongoing transformation of higher education programmes' (Lotz-Sisitka, Agbedahin & Hlengwa, 2015:17). The theory-based framework attempts to capture ESD's complexity in terms of the underlying pedagogy and change processes. We argue that this framework can provide support and anchor teacher education institutions wishing to mainstream ESD in their local context.

The necessary data were gathered as part of Schrage's study (2015), which developed an earlier version of the framework while conducting an assessment of ESD practice in six teacher education institutions in Botswana. These institutions were participants in a programme of embedding ESD in teacher education in southern Africa; the programme, entitled Education for Strong Sustainability and Agency (ESSA), started in 2011 (SWEDESD, 2016).

This paper, after describing the specificities of the context in which it is implemented and discussing the proposed framework, aims at critically evaluating the utility of the provided framework by looking more closely at its application in two teacher education institutions

selected from the original data set. Through this, the paper identifies the potential strengths and limitations of its use.

Background: ESD in Botswana

Before turning to a discussion of the framework's application in assessing ESD-related change projects in teacher education institutions in Botswana, a brief description of the official ESD context in that country is warranted. Since 1994, the government of Botswana has recognised the importance of environmental and sustainability education. At this time, the National Education Commission stressed the necessity to teach and infuse the curriculum with the concept of environmental education (EE) (Government of Botswana, 1994). The policy required both serving teachers and pre-service teachers to be introduced to EE (Ketlhoilwe, 2007) with the aim of affecting a change in attitudes and increased civic participation of their students (Government of Botswana, 1994).

Today, the implementation of EE at a national level is guided by the National Environmental Education Strategy and Action Plan documents (Government of Botswana, 2007, 2014). Its aim is:

to develop a society that is aware of and concerned about the environment and its associated problems; a society which has the knowledge, skills, attitudes, motivation and commitment to work individually and collectively towards solving current problems and preventing new ones. (Government of Botswana, 2014:1)

The extent to which the implementation of EE in Botswana has been successful has been the subject of much scrutiny. A study by Ketlhoilwe (2003), focusing on education officers and school heads, argues that EE suffered from conceptual vagueness and misconceptions. Mosothwane and Ndwapi (2012) explain that, at the time of their study, EE was still not embedded into the teacher education programme at the national level, so teachers did not feel equipped to explain environmental issues to children. Nkambwe and Essilfie (2012) and Tsayang and Kabita (2013) elaborated and showed that there is still a limited understanding of what EE and ESD mean both in conceptual and practical terms for teachers and teacher trainers in Botswana.

It is against this background of a relatively favourable and conducive policy climate, combined with serious limitations in the way in which policy intentions are operationalised and implemented at the level of teacher education institutions and schools, that in 2011 all teacher education institutions in Botswana were encouraged to participate in the ESSA programme and to undertake ESD-related change projects in their home institution.

The ESSA programme was initiated through a partnership between the Swedish International Centre of Education for Sustainable Development (SWEDES) at Uppsala University, the SADC Regional Environmental Education Programme (SADC-REEP), 42 university-based teacher education departments and stand-alone teacher education institutions in southern Africa, and Jönköping University in Sweden. The programme's aim was to support 'teacher educators and their institutions to introduce innovative methods and relevant content related to education for sustainable development in their syllabuses and working practices'

(SWEDES, 2016:1). The programme wished to encourage institutional change by enabling the creation of structures and policies for embedding sustainable development in the classroom. The programme addressed heads of teacher education institutions as well as teacher educators in order to achieve synchronisation between policy and practice.

The programme relied on the development and implementation of ‘change projects’, initiated by teacher educators in their home institutions, as a way of creating momentum for institutional change with regard to ESD assimilation at the national level. The change projects aimed at mainstreaming ESD in the curriculum and pedagogical practice of teacher educators. The ESD-inspired curriculum and practice were expected to affect the competences of the (pre-service teacher) students, and subsequently affect their actual performance in the schools where they would be posted. The change projects were a way for the participating teacher educators to develop a deeper understanding of ESD as their project was applied to the local needs and contexts of their home institutions.

Theoretical Framework

The framework for this paper was developed through identifying the elements that support or inhibit ESD’s mainstreaming in educational institutions. The framework builds on an understanding of institutional change by combining three theoretical constructs. In this case, the institutional change concerns the introduction of ESD (its content and methods) in teacher training institutions. Connell and Klem (2000) explain that projects in a formal education context, such as the cases presented here, are by their nature complex and dynamic. Therefore, determining their effects and impacts requires a theoretical framework that is sensitive to a variety of elements including, among others: the way ESD is understood by individual instructors or administrators; the nature of the change project itself; the context in which the change project is implemented; the practices that are being targeted for change; and the wider administrative or institutional context. To capture this complexity, a combined set of different lenses is required.

The theoretical framework developed for this paper comprises three conceptual lenses: a theory of change (TOC), a theory of education for sustainable human development (TESHD) and a theory of transformative learning (TTL). The TOC helps with (a) understanding the conditions and processes that lead to the formulation and implementation of a change project, and (b) explaining how certain internal and contextual drivers are likely to affect its outcome. It helps to trace and manage the path taken by an entity in relation to the goal it has set for itself. The second lens, the TESHD, looks at how certain educational practices can lead to greater agency in learners, what Tilbury (2011) called ‘learning to respond’ – one of ESD’s central learning objectives. The TESHD gives insights into the pedagogical practices that support ESD with a special focus on dialogue and deliberation. Finally, the TTL goes one step further and elucidates how certain ESD-related practices can lead towards a new understanding of complex, interconnected and wicked sustainability issues.

Together, the three theories, which are described in greater detail below, combine to form a dynamic evaluation framework. They can be used differentially, depending on the characteristics of the stakeholders involved in the change project/s and their particular circumstances. For

example, when gathering data for the research reported in Schrage's study (2015), the TOC was exclusively used in relation to the change project coordination teams. It brought out the complexity and dynamic nature of the purported change. The TESH and the TTL guided the data collection with both student-teachers and teacher-instructors in order to understand the pedagogical content of the ESD-related change projects from a variety of perspectives. Crucially, these two last theoretical frames provided support for the articulation of ESD in the classroom.

Theory of change

The TOC used in this study is associated with programme and project evaluation, and informed social action. It was devised for the evaluation of complex community initiatives and originated with the work of Fulbright-Anderson, Kubisch and Connell (1998). They propose a guiding framework (a pathway) to discuss the sequence of events that leads to a particular desired outcome. This TOC has been applied in assessing educational reform in a variety of contexts, such as Mathematics and Science (Connolly & Seymour, 2009); early childhood and community school linkages (Geiser, Rollins & Blank, 2013); and district-wide and school reform initiatives (Fullan, 2006; Gambone, Klem, Moore & Summers, 2001). Connell and Klem (2000) argue that the TOC helps in the planning and assessment of education reform initiatives in an urban environment. It helps in making the reform plans more relevant and sensitive to local realities, as well as in building a local knowledge base and enabling evaluation that is more rigorous and timely. It fosters the creation of collective ownership, which is necessary for the project to be driven forward (Fullan, 2006).

Despite its wide application, the TOC approach suffers from conceptual shortcomings: the concept does not prescribe specific evaluative methods, or the way the theories of change are articulated, or indicate who the TOC's 'owners' are (Blamey & Mackenzie, 2007; Sullivan & Stewart, 2006). TOCs have been formulated and implemented in a wide variety of ways (Mason & Barnes, 2007). There are, however, certain points of connection and similarities between the varieties of TOC that have been developed. Vogel (2012b:2), for example, explains that the development of a TOC is based on deliberations among the members of a change project team about, *inter alia*:

- The **context** of the initiative (including social, political and environmental conditions) and the current state of the problem/issue the change project is addressing, as well as the actors able to influence change;
- The **long-term change** that the initiative seeks to support (and for whose ultimate benefit);
- The **sequence of events** (either anticipated or required) expected to lead to the desired long-term outcome/s; and
- The **assumptions** about how these changes might happen, and the contextual conditions that may affect whether the activities and outputs are appropriate for influencing the desired changes in this context.

This approach starts with an analysis of the context (a baseline of the situation), the issue(s) needing to be addressed, and an identification of the drivers (actors, networks, stakeholders)

that are or can become involved in the project. This first step provides the justification for the TOC to be developed, and enables the identification of the landscape which the stakeholders will be navigating (Sullivan & Stewart, 2006). The next step is for the project team to state the desired long-term change to be accomplished by the initiative. This, Vogel (2012b:12) argues, is 'intended to provide conceptual clarity about the realistic long-term impact to guide the project team'. It helps to articulate how the baseline situation will be changed. Thirdly, with the long-term vision in mind, the project team will express the change process as a series of events and identify the different short and medium-term changes needed. This will enable the determination of how shifts in knowledge, attitude and skills will lead to the intended change in practices or policies (2012b:12). In this exercise, it is crucial to identify the outcome indicators that the TOC will be measured against, as well as the target actors and a timeline of how/when the shift is estimated to occur (Judge & Bauld, 2001). The fourth and maybe most important step, requires that the project team explicitly state the assumptions underlying the project. Assumptions are understood as 'the values, beliefs, norms and ideological perspectives, both personal and professional, that inform the interpretations that teams and stakeholders bring to bear on a programme' (Vogel, 2012a:26). Due to their nature, making assumptions explicit is difficult. But doing so should improve the way the TOC is articulated (Gambone *et al.*, 2001).

The capacity for implementing a change project is another crucial aspect. According to Vogel (2012b) the development of a capacity for outlining a TOC for a given initiative within an organisation or group of individuals will allow them to better understand and respond to an issue. In the context of this article, this relates to the capacity of the ESD-related change project teams or coordinators at particular teacher education institutions to successfully put into practice the wider vision set by the ESSA programme. The capacity development of teacher educators should aim at strengthening their professional capacity in terms of: (a) developing and articulating a change project in their institutions, and (b) developing their understanding of the concept of ESD and its practical in-class application.

Theory of education for sustainable human development

In reviewing the concepts of functionings, capabilities and agency, as originally outlined by Sen (1989), Landorf, Doscher and Rocco (2008) offer a framework for assessing ESD-related learning outcomes, teaching practices, curricula, and knowledge and skills acquisition. They re-define ESD as education for sustainable *human* development (ESHHD) in order to emphasise that education should focus on enhancing well-being, based on a practice of democratic dialogue, and forms of learning that include local cultural and social realities. Accordingly, the educator is responsible for evaluating the contextual circumstances that will impact the students' well-being, and for providing a form of teaching that enables their students to understand their own capabilities. It requires that teachers be finely tuned to their students' needs, and create a space for them to understand and become who they are. The 'democratic deliberation' between the teacher and the students allows them 'to identify basic capabilities and culturally valued functionings in the communities in which they practice' (2008:232) – in short, to create agency. The TESHD thus enables a link between expected ESD skills and the formation of capabilities and learning outcomes, through the articulation of improved pedagogy, curriculum and assessment frameworks.

There is a wide body of literature on how ESD is meant to achieve its aims. Hoffman (2006) articulates how the four ‘pillars of learning’, as defined by the International Commission on Education for the Twenty-first Century (Delors *et al.*, 1996), provide connecting points with Sen’s vision to move towards achieved functionings. The four pillars (learning to know, learning to be, learning to live together, and learning to do) provide a parallel to Sen’s concepts of reasonings, agency, potential through social capital and achieved functionings. Landorf *et al.* (2008) articulate this in terms of relevant pedagogy, curriculum and assessment in the context of educational institutions:

- *Pedagogy* for sustainable human development is centered on democratic dialogue. The educator facilitates a democratic dialogue with all learners with the aim of making them understand its significance: ‘that freedom of choice has value in and of itself, regardless of results’ (2008:233).
- *Curriculum* for sustainable human development goes beyond environmental education while focusing on ‘locally determined basic capabilities’ (2008:232). The educator’s role is to guarantee that the curriculum is built through a process of democratic dialogue, where learners and community stakeholders ‘address what students must know and [are] able to do in order to achieve valued functionings’ (2008:232).
- *Assessment* for sustainable human development is closely associated with democratic dialogue. ‘From the beginning of the year,’ explain the authors, ‘the educator and students should together assess the students’ capabilities, and what they must know and learn in order to achieve locally valued functionings.’ Examination ‘is a recursive process, in which continuous monitoring of progress towards mutually agreed upon capabilities becomes an intrinsic element for both the educator and her students’ (2008:233).

Table 1 summarises how ESD, Sen’s capability approach, and education for sustainable human development relate to each other.

Table 1. How the ‘four pillars of learning’ relate to education for sustainable human development through the frame provided by the human capability approach

The ‘four pillars of learning’ and associated requirements:	The capability approach covers:	Education for sustainable human development covers it through:
Learning to know Recognising the challenge	Reasoning	Relevant pedagogy: towards locally determined capabilities
Learning to be Recognising the indivisibility of human dignity	Agency	Pedagogy based on democratic dialogue and self-agency
Learning to live together Recognising collective responsibility and constructive partnership	Potential through social capital	Building consensus on the basis of democratic discussion of values, goals, and priorities
Learning to do Acting with determination	Basic capability or achieved functionings	Learning about oneself and identifying personal preferences

Source: Adapted from Hoffman (2006) and Landorf *et al.* (2008).

During the field research, the TESDH was applied in two ways. First, it offered a guide to observe how different teachers involved with an ESD-related change project bring ESD into their practice. Second, it helped to understand what learning outcomes are to be expected in learners who are exposed to ESD pedagogies. The TESDH's strength lies in its ability to link relevant pedagogy with agency in learners – agency being a core element of ESD in general, and the ESSA programme in particular.

Theory of transformative learning

The field of education, and especially teaching and learning in the context of sustainability, has brought considerable attention to the theory of transformative learning. With its emphasis on learning processes and outcomes, TTL has enabled a re-framing of the role of education in relation to sustainability. As argued by Wals (2010) and Sterling (2005, 2011) the pluralistic society we live in (characterised by a wide range of values, interests and actors, along with the complex nature of sustainability issues) requires a way of learning that addresses divergent interests. Described as a pluralism of thoughts, TTL places emphasis on a critical, problem-based and reflective practice of education (Thomas, 2009). It enables: 'Education that fosters critically reflective thought, imaginative problem solving. The discourse is learner-centered, participatory, and interactive. It involves, group deliberation and group problem solving' (Mezirow, 2000:10).

For the TTL, sustainability is not a vision that education should strive for. Instead, and echoing a notion of critical ESD developed by Vare and Scott (2007), it becomes the state that emerges through transformative learning processes (Wals & Jickling, 2002; Wals & Corcoran, 2006). This transformative learning in the context of sustainability is a form of learning that enables alternative and new kinds of thinking and solutions that are 'co-created [and] co-owned by more reflexive citizens, living in a more reflexive and resilient society' (Wals, 2007: 42).

The TTL focuses on the processes that facilitate a collaborative reflection of the learners involved. It assumes that the reflexive interaction with heterogeneous members of a group allows the learners to mirror their own positions and mind-sets with those of others in the group. Wals (2007) stresses how a carefully balanced collaborative setting enables what he terms the 'deconstruction' (or de-framing) of individual assumptions and ideas which are then further challenged and assimilated with other ideas in a process of co-creation. For the TTL, this process of frame deconstruction is assumed to occur in, but not be limited to, group deliberation and social interactions. Not all participatory learning processes automatically result in a transformed understanding of an issue; but the transformed understanding that on occasion does occur, especially within the context of sustainability and through group processes, has been qualified as 'transformative social learning' (Wals, 2010). Essentially, this refers to the notion that a pluralistic and heterogeneous group will be able to identify new ways of approaching a problem as the group's internal diversity will help with 'switching back and forth' between different mind-sets and understandings of an issue.

Wals and Corcoran (2007) identified eight modalities that, integrated into higher education settings, foster autonomous thinking and an inclination toward systemic change among students

and educators alike (see Table 2). By applying the TTL in teacher education institutions in Botswana, we wished to determine whether and how these modalities manifest themselves in the different ESD-related change projects.

Table 2. Eight modalities of transformative learning in higher education

Modalities	Description	Example
1. Total immersion	Fostering a direct experience with a real-world phenomenon.	Observing and monitoring sustainability impacts. Managing a specific issue.
2. Diversity in learning styles	Being sensitive to the variety of learning styles, and preferences that can be found in a single group.	Offering a variety of didactic approaches. Reflecting on the learning processes with learners.
3. Active participation	Developing discourse and ownership by utilising learners' knowledge and ideas.	Soliciting the learners' own ideas, conceptions and feelings.
4. The value of valuing	Exposing the learners to alternative ways of knowing and valuing through self-confrontation.	Giving learners opportunities to express their own values. Creating a safe and open learning environment.
5. Balancing the far and near	Developing empowerment by showing that remote issues have local expressions which one can influence.	Relating issues of biodiversity or sustainability to last night's dinner.
6. A case study approach	Digging for meaning by studying an issue in-depth and looking for transferability to other areas.	Assigning different people to explore different angles of a particular theme and bringing the different angles together.
7. Social dimension of learning	Mirroring learners' ideas, experiences and feelings with those of others, through social interaction.	Taking time for discussions and exchange. Addressing controversy. Stimulating flexibility and open-mindedness.
8. Learning for action	Making the development of action and action competences an integral part of the learning process.	Allowing learners to develop their own course of action and to follow through with it. Studying examples of action-taking elsewhere.

Source: Wals and Corcoran (2007)

Discussion of the framework

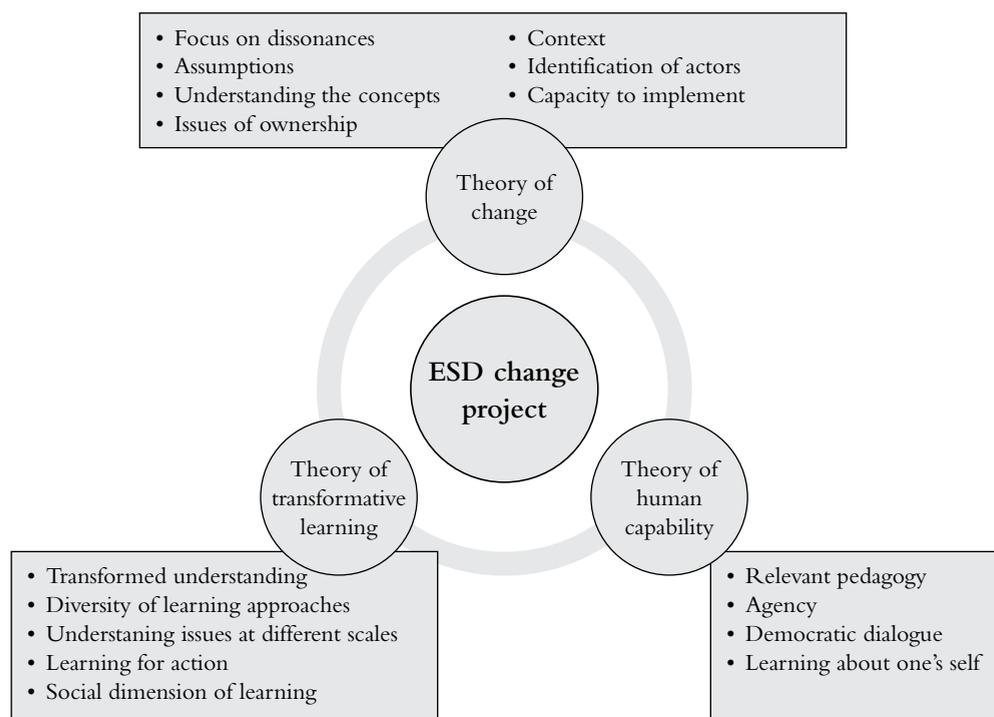
In the above discussion, we have shown how each of the three theories have their own explanatory power. However, each of them remains partial in its ability to grasp the whole, especially when evaluating such a complex endeavor as an ESD-related change project in a teacher education institution. One of the characterising principles of ESD is that it is holistic in that there is an intricate dynamic between educational content and pedagogical method, as exemplified by the TESDH and the TTL. It also pertains to the close association between ESD's

substance and the manner in which ESD is being implemented through change projects, which is the major objective of the TOC. Concentrating on one theory while excluding one or two others violates this characteristic.

The three theoretical constructs provide a strong and dynamic frame to review what goes on in institutions that have decided to adopt ESD in their curriculum and teaching practices. Firstly, the TOC enables the identification of the different elements to facilitate the implementation of an initiative or project. It helps to identify the limiting or helping factors that accompany the change projects in their current state, such as the assumptions of the stakeholders involved, the dissonance in understanding different concepts, and the wider institutional context in which the change project is being developed. ESD implies a type of learning that equips learners to be able to navigate increasingly uncertain situations, to connect with real life challenges – a type of learning that is empowering, reflexive and critical (Lupele & Lotz-Sistka, 2012). To reflect this, the TESHHD and the TTL together allow for the articulation of learning processes that enable the development of relevant knowledge, skills and competences to connect and deal with life's challenges. With the help of the TESHHD, one can identify how student-teachers' and teacher-educators' values are formulated and reflected in the context of the classroom. It also provides a frame for understanding how dialogue among learners can make learning and teaching more culturally relevant and democratic. Individually, the two lenses identify the features of innovative pedagogies and, when combined, help focus on agency or action-oriented learning, which is associated with a more reflexive and value-based approach to teaching and learning.

Through the assembly of its different elements, the framework is sensitive to the context in which it is being used. It is wide enough in its approach to deal with the complexity of the situations under study. At the same time, its individual components provide enough specificity to identify unique conditions or characteristics within teacher education institutions and compare ESD-related change project implementation in different contexts. Importantly, the framework allows this through its ability to cover two critical sets of ESD project implementation variable: (a) its sensitivity to individual and group key capacities (through the TOC, TESHHD and the TTL); and (b) key contextual factors (through the TOC) supporting or hindering the implementation and support of ESD. Figure 1 illustrates how the conceptual framework – and the different themes it addresses – guided the gathering and structuring of data among teacher-educators, administrators and student-teachers in Botswana.

This framework and its two emergent dimensions were used as framing for the development of the methodology, the generation of the data, and the subsequent analysis of the two teacher education institutions considered in this article.

Figure 1. Assessing curriculum change projects with an ‘evaluative’ framework

The Research

With an earlier version of the framework developed above, Schrage (2015) undertook a qualitative study to determine whether and how teacher education institutions in Botswana were implementing, or had implemented, the change projects they had decided to undertake as a consequence of their having participated in the ESSA training workshops during 2013 and 2014. Data were generated in six teacher education institutions through individual and focus group interviews with teacher-educators, student-teachers and heads of institutions. These were complemented with document analysis and field observations. The different research techniques allowed for triangulation of the data. They assisted in probing the same phenomenon from different angles, and helped to obtain an understanding of its complexity.

This article focuses on the results in two out of the six teacher training institutions. They are identified as institution A and institution B. At the time of study (March 2015), each institution had articulated its own change project. The two change project coordinators in institution A aimed at infusing ESD through the design and development of the curriculum, educational materials and learning assessment tools. The change project in institution B was specifically targeting curriculum innovation and development of instructional materials related to in-class teaching practice.

Table 3 lists the different methods used to generate data in the two selected institutions.

Table 3. Summary of the data gathering and analysis process

Institution	Data gathering & capturing tool	Data source	Data familiarisation	Data analysis
Institution A	Interviews	Two change project coordinators	Verbatim transcription and typing of notes	Thematisation of data
	Focus groups	Third year students Second year students	Typing of notes and extraction of quotes and segments of text from different sources	Data reduction Interpretation
	Documents	Change project reports Institutional policy documents Student assessments	Verbatim transcription and typing of notes	Triangulation with other sources
	Field notes	About change project coordination team and project	Typing of notes	
Institution B	Focus groups	Second year students Change project coordination team	Typing of notes and extraction of quotes and segments of text from different sources	
	Documents	Change project reports Institutional policy documents Student assessments	Verbatim transcription and typing of notes	
	Field notes	About change project coordination team and project in both institutions	Typing of notes	

Application of the Framework: Results

For the two teacher education institutions considered for this article, the findings are summarised in Table 4.

The combination of the three theoretical lenses made it possible to comprehend the extent to which the change projects contributed to embedding or infusing ESD in the training of student-teachers. The framework helped to identify a wide array of change project team factors supporting or hindering ESD infusion. Such factors included the teams' use of teaching methods, learning support materials, assessment, curriculum and understanding of ESD. The framework also helped to identify a group of factors external to the change project team that have been shown to impact how ESD teaching and learning practices were being mainstreamed in teacher education institutions in Botswana.

Table 4. Summary of research findings

Institution/ Framework	Theory of change	Theory of education for sustainable human development	Theory of transformative learning
Institution A (university) change project: 'Infusing ESD in the curriculum of teacher trainers'	<p>Context: Favourable but limited for project implementation.</p> <p>Capacity to implement: Strong understanding of concept of ESD in theory and practice. Strong ownership of project at individual level.</p> <p>Ability to adapt project to institutional reality.</p> <p>Assumptions: Assumptions about project articulation explored and some addressed.</p> <p>Long-term change: Articulation of intended long-term changes and identification of actors to implement that goal.</p>	<p>Pedagogy: Integrated notion of 'relevant pedagogy' and focus on pedagogy for 'agency'.</p> <p>Curriculum: Infusion through changed learning outcomes, evaluation & content.</p> <p>Assessment: Change in assessment, reflecting notion of democratic debate and agency between student and teacher.</p>	<p>Detected modalities: Through diversity of learning approaches, exploration of issues at multiple scales, case studies, and exploration of the social dimension of learning.</p>
Institution B (teacher education college) change project: 'Curriculum innovation and material development'	<p>Context: Administrative and institutional context is supportive to change project implementation.</p> <p>Multiple stakeholders involved in project.</p> <p>Capacity to implement: Low. Limited understanding of concept of ESD in theory and practice. Some dissonances between members. Low ownership on behalf of project team.</p> <p>Assumptions: Several assumptions pertaining to ability to effect change with regards to set goal.</p> <p>Long-term change: Weak articulation of intended long-term change.</p>	<p>Pedagogy: Little or no change observed.</p> <p>Curriculum: Creation of booklet compiling in-class activities; limited focus on developing 'agency'.</p> <p>Assessment: No change in assessment.</p>	<p>Detected modalities: Focus on diversity of learning approaches.</p>

In the following section, we discuss the findings related to the teams' and individuals' capacities to introduce change in their home institutions and to the context in which this implementation took place. In both cases, significant differences showed up between the two teacher education institutions.

Analysis and Discussion

The data and following analysis has been organised following the two sets of critical variables emerging from the combination of the framework's theoretical lenses, namely, the variables relating to individual and group capacity, and those associated with context.

Set 1: Individual and group capacity variables

Firstly, the extent of the 'consonance' or 'dissonance' between the team members seemed to have a strong impact on the team's capacity to infuse ESD. At institution B, there were clear differences of opinion among the change project team members. Two respondents explained that ESD learning should enable the creation of 'engaged citizens' with a sense of agency. Other respondents expressed the idea that ESD should include the notion of life-long learning, or should aim towards a 'cleaner environment'. In the absence of consensus, it is difficult to see how the project team could effectively proceed with the change process. Institution A's change project did not show such dissonance. Unlike institution B, where a variety of stakeholders were brought together around the change project, the project coordinators in institution A did not establish a wider project committee. Instead, they themselves initiated and led the project implementation. Thus they reduced the possibility for dissonance or misunderstanding.

Secondly, the TOC explains that having a long-term goal, developing a plan of implementation and assigning different tasks to the team members develops ownership of the project while building agency among the different members. In this regard, the level of ownership differed between the two teams. At institution B, it appeared that the change project group had not articulated a long-term vision. This had a negative influence on the members' perception of the purpose of the change project, in terms of ESD pedagogy and content development. The data showed that, due to the absence of an internally developed common vision, the group was working towards meeting the perceived expectations of external actors; such as those of the Ministry of Education or ESSA workshop facilitators. In contrast, in interviews with the change project coordinators at institution A, they expressed a long-term vision for their change project and identified several actors and strategies to produce their desired outcomes, thus showing a clear sense of agency and ownership.

Thirdly, and perhaps most importantly, according to Vogel (2012a) the ability of the change project team to implement change relates to their ability to adapt to and adopt new forms of knowledge for their project, in other words, their 'capacity to learn'. With respect to our research, it is the capacity of the change project coordinators to comprehend the concept of ESD and to translate this understanding into learning outcomes, skills, pedagogy, curriculum change, assessment and content development. The TTL and TESHD provide a framework to understand ESD in this regard. The change project coordinators at institution A expressed a wider set of themes (ten) related to the two theoretical frames (see Figure 1) than those at institution B (three).

The extent to which ESD was infused in the two institutions seemed to depend on the ability of the project coordinators to articulate a comprehensive understanding of the ESD concept

– what the TOC describes as ‘conceptual clarity’. The project coordinators at institution A had engaged with the concept of ESD in higher education for many years and were therefore well-versed in its articulation and implementation. The project coordination team at institution B had been exposed to ESD and its many facets during the ESSA workshops (in the previous months) for the very first time; at the time of research they had not engaged much with using the ESD concepts in their daily practice.

The capacity of change project coordinators to implement the desired change in their institution does not only depend on their inherent or acquired capacity to learn; as is presented below, it is also facilitated or inhibited by the context in which they and their change projects are situated.

Set 2: Contextual variables

The TOC explains that the wider context in which the change is occurring will inherently affect project articulation. Our framework enabled identification of the contextual elements affecting the way the change projects were articulated, developed and implemented, namely: the organisational set-up of the teacher education institutions; the institutional environment provided by the Ministry of Education and Skills Development; and the wider policy environment in which the projects were situated.

The data highlighted how the institutional and administrative structure in which the different change projects took place affected their development. At Institution B, the change project was situated under the principal’s office. It involved heads of department as well as administrative staff. The involvement of such a variety of staff could be thought to encourage and facilitate the introduction of changes in the curriculum. However, this was not the case. The organisational structure of the institution seems to confer much authority and control to the principal; this places limits on the space that teacher educators have or perceive to have in taking initiatives and making their own decisions about their work practices. The change project coordinators expressed the opinion that their environment was constricting them in the development of their change projects.

By comparison, the administrative context of institution A was quite different. According to formal university rules, a proposal for changing teaching and learning processes is required to receive approval from a wide list of different actors: the department board, the faculty board, the advisory board, the school of graduate studies board, the academic planning committee and the senate. Despite (and perhaps because of) this complexity, such an administrative structure might provide for greater autonomy and agency among the teacher educators. Interviews with change project coordinators at institution A highlighted how they developed their projects in such a way to avoid what one of the change project coordinators called ‘administrative red tape’. This institutional environment and the capacity of the change project coordinator to adapt accordingly likely affected the way in which the project itself was articulated.

The framework developed for this paper also revealed that the ministry’s perceptions of ESD affected the formulation and development of the change project. At institution B, for example, various project coordinators noted that an official of the Ministry of Education had influenced the articulation of their change project. Moreover, field notes and interviews showed how

funding opportunities for teacher education institutions were dependent on the way in which they framed their institutional change project.

Another contextual element that emerged from the interviews is the 1994 document developed by the National Education Commission. This commission introduced, for the first time, the necessity to teach and infuse school curricula with the concept of environmental education (Government of Botswana, 1994). Both change project coordinators at institution A referred to this document to justify their own approach in their change project. No other or more recent policy or document was mentioned.

Conclusion: Towards a Framework to Support ESD Infusion

We conclude that the theoretical framework presented and ‘tested’ in this article matches the multidimensional nature of ESD. The TESHED together with the TTL helped develop an understanding of the ways in which ESD content and methods are being articulated in different teacher education institutions in Botswana, and how they translate in terms of transformative content, pedagogy and assessment. In addition, the framework (including the TOC) proved to be flexible and sensitive enough to discern the different administrative and institutional conditions in which the change projects were situated. At the same time, the framework’s complexity proved to be both a strength and a weakness. Combining the three theoretical concepts is a way to cast a large net for understanding how ESD infusion can be fostered; however, this very combination brings together such a variety of themes and elements that the framework is cumbersome in its use. Enhancing the framework’s analytical precision and power for identifying and assessing ESD practice and infusion would necessitate its further specification and operationalisation, as well as the actual testing thereof. It would also require more pertinent data collection methods, as well as a more detailed and standardised protocol for analysing and characterising the data. Such refinements are likely to provide a more profound analysis and more meaningful results. This would be a step towards addressing a lack of support currently plaguing the wider implementation of ESD in formal educational settings.

This framework (with its potential future refinements) provides insight into critical aspects, factors and conditions that impact ESD infusion. It is anticipated that it can be used for guidance and planning by educational administrators and other decision-makers involved in ESD-related/inspired change projects, programmes and policies.

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