Education for Sustainable Development: Connecting the Dots for Sustainability

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Abstract: Critical pedagogy, practitioner experience and a regulatory perspective are employed to scrutinize the notion of Education for Sustainable Development (ESD) as it occurs in the literature. They promote understanding of the challenges impeding the completion of unfinished ESD businesses. In response to practitioner-expressed needs, this paper innovatively proposes a Sustainable Development-compliant National Qualifications and Credit Framework (SD-NQCF) as the instrument to finally connect isolated ESD 'dots' and scaffold their sustainability.

Informed by a systems approach, this framework encourages repositioning educational activities within the UN Agenda 21 to ensure the suffusion of SD principles. ESD becomes the backbone of NQCFs, while critical pedagogy provides the adequate instrument to foster 21st Century sustainability competencies that are embedded into curricula as learning outcomes. The SD-compliant framework resolves tensions between formal, non-formal and informal education. It provides connecting bridges and pathways to sustainably suffusing socio-economic fabrics with SD principles that will shift paradigms.

Keywords: education, sustainable development, accreditation, quality assurance, national qualifications and credit framework, non-formal education

Introduction

Upon appraising the tremendous amount of energy and resources that went into related initiatives during the Decade of Education for Sustainable Development (2004-2014), practitioners worry about their ongoing unsustainability. Education for Sustainable Development (ESD) practitioners are those whose practices are intentionally geared towards the realization of the UNESCO agenda for sustainable development. As the agenda for the post-2015 Sustainable Development Goals (SGDs) was being fashioned, they forcefully expressed their wish for an instrument to enhance the sustainability of these initiatives, (UNESCO, 2014a, b, d & e).

The following extract from the 2014 Declaration on Education for Sustainable Development (ESD) reveals practitioner recognition of:

> … the potential of ESD to empower learners to **transform themselves** and the society they live in by developing **knowledge, skills, attitudes, competences and values** required for addressing **global** citizenship **and local contextual** challenges of the **present** and the **future**, such as **critical and systemic thinking**, analytical problem-solving, creativity, working collaboratively … **making decisions** in the face of **uncertainty**, and understanding of the **interconnectedness of global challenges and responsibilities emanating from such awareness**. (UNESCO, 2014a, section 8).

Simultaneously, the extract also reveals the absence of an instrument that can effectively connect the notions that have been emboldened for "education systems [to] fully embrace sustainable development" (UNESCO, 2016). Each of the above emboldened notions can be construed of as an

isolated 'dot' that fails to connect to another, each being a pointer for action that can become a discipline unto itself. This isolation probably accounts for the sapping of efforts aimed at "integrating economic, social and environmental aspects and recognizing **their interlinkages**, so as to achieve sustainable development in all its dimensions" (UN, 2012, p. 2). This monolithic approach has led to fragmented efforts (Gokool-Ramdoo, Rumjaun & Bholah, 2012) resulting in 'uneven' mainstreaming and debilitating the sustainability of ESD initiatives (UN, 2012, p. 5). After the coming in force of the post-2015 SDGs, the focus is now firmly on SDG 4 which intends to:

> *Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.*

For the above goal to be effectively implemented, the Nagoya Declaration (UNESCO, 2014a) recognizes that a paradigm shift from decade-old practices and special competencies are required. The recent Global Monitoring Report (UNESCO 2016) provides several policy recommendations but no concrete instrument whereby education can embed sustainable development in socio-economic and cultural systems.

In response to practitioner-expressed needs for that instrument to help complete the many 'unfinished [ESD] businesses' (UNESCO, 2013b, p. 1; UNESCO, 2013c, p. 3) and to realize the promise of Goal 4, this paper proposes an innovative framework, where the above ESD dots will effectively connect to scaffold the *sustainable* implementation of the post-2015 SDGs (Sarabhai, 2014). Combining the authors' practitioner experiences, critical pedagogy and a regulatory perspective, it formulates an innovative and solution-oriented framework for practice, which is distilled into a series of protocols.

Methodology

Practitioner research, critical pedagogy and a regulatory perspective provide the lens to examine the reasons for the failure of "educational systems to fully embrace sustainable development" (UNESCO, 2016). Coming from regulatory and teacher-educator backgrounds respectively, the authors view **practitioner experience** as the privileged approach to inquire and reflect upon their own practice in an intentional manner with the aim of devising strategies to recalibrate the said practices in a meaningful way. **Critical pedagogy** helps in questioning the process of knowledge construction and situating the place of the human being in the relationship between education and development. The **regulatory perspective** flags the reasons for the failure of educational systems to embed ESD principles despite innumerable initiatives in lifelong and lifewide settings. This combination helps connect the ESD 'dots' and complete the 'unfinished businesses'.

Practitioner Research

Practitioner research or reflexive praxis involves the questioning of one's practice. It requires problematizing of practice, asking questions, shaking, validating and theorizing assumptions. Research and meetings with fellow practitioners, as well as practical assignments carried out in the area of ESD for UNESCO, have provided insights into desirable directions, challenges and potential solutions.

Critical Pedagogy

Wherever education is associated with work towards issues of justice, equity, and participation, critical pedagogy is, unequivocally, the appropriate approach to understand underlying tensions. As opposed to 'pedagogy' which is simply conceived of as the study of teaching and learning, critical pedagogy critically analyses ways of teaching, learning content and "how one learns (Breunig, 2016, p. 1). It invites reflections on the negotiations that occur during the learning-teaching transaction, how relationships between teacher and learner are transformed, how knowledge is produced as well as how the institutional structures of school and society support and validate this transaction. In this paper, it is also employed to understand the role of education in proselytizing widespread acceptance of present patterns of development and to highlight how these are incompatible with sustainable development. Consistent with the spirit of reflexive praxis, critical pedagogy is adopted in response

to practitioners' felt and expressed need for a different approach to teaching and learning that can be transformative and promote sustainability.

The Regulatory Perspective

The purpose of the regulatory perspective is to establish the degree of fit between pedagogies and development patterns to verify how education is contributing to contextually-defined goals, (Kopnina, 2014). When it comes to ESD, it provides information on how educational programs are constructed, with what content, the teaching and learning methods adopted, the degree to which the principles of ESD are allowed to permeate the current educational scenario, along with corresponding competencies (Hannum, Irvin, Lei, & Farmer, 2008) and strategies to measure their progress. To make quality assurance interventions sustainable at all levels, sectors and disciplines and through all learning pathways, Gokool-Ramdoo (2009; 2011) and Sherry (2003) have argued that these need to be part of national policy and regulatory frameworks. This perspective helps pose the right questions that then enable the identification of deficits and the required type of remedial interventions. Through the above combined methodological lenses, the notions of ESD will now be critically scrutinized from as far back as they can be traced, to uncover the elements essential for fashioning the scaffolding framework.

Literature Review

The literature reviewed includes ancient texts, scholarly articles, conference and workshop proceedings as well as global conventions and declarations on the education and sustainable development. It critiques the linear relationship between education and development.

The Shifting Notion of Development

Development is a contested notion (Tait, 2014). It implies activities that unfold to fulfill human needs. In simple societies, these needs remain basic, being mostly related to food, water, clothing and shelter requirements. As societies grow complex, the scope of these needs widen infinitely and signposts for achieving them become culturally and contextually determined as *development goals*. These goals are constructed around four interconnected domains: ecology/nature, economics, politics and culture. These four domains are organized according to systems and processes. Activities within these systems and processes draw necessarily from an existing pool of finite resources. Experts agree that the injudicious use of these scarce resources has compromised the sustainability of development (Lockley & Jarrath, 2013) disabling individuals from equitably participating in and benefitting from, the development effort.

Sustainable Development (SD)

Taking the above four inter-connected domains into consideration, the Brundtland Commission (1987), defines SD as that which "meets the needs of the present without compromising the ability of future generations to meet their own needs' within a social and economic infrastructure that determines a society's capacity to maintain itself in a rapidly changing global context (Cappon, 2009).

Interestingly, SD, which is therefore concerned with the endurance of these systems and processes is not a new concern. Already, ancient worldviews as described in some selected ancient texts, ranging from Judaism (Job 12:7-9); Christianity, (Genesis 1:20-22, KJV) through Islam (55:1-12); to Buddhism (Anguttara Nikaya iii. 368); Hinduism (Atharva Veda 12.1), and Confucianism (Mencius 1.A.3), cautioned against depleting the resources that existed in human environments. In most religious texts and in the collective memory, the Environment or Nature is given godly or motherly attributes and center stage in anthropogenic activities like fishing, hunting and farming. This echoes the Rio Outcome Document which recognizes that "planet Earth and its ecosystems are our home and … "Mother Earth" is a common expression in a number of countries and regions [which] recognize the rights of nature in the context of the promotion of sustainable development […, and] to achieve a just balance among the economic, social and environment needs of present and future generations, it is necessary to promote harmony with nature" (UN, 2012, p. 8). Harmony with Nature is a recurrent

notion in all documents reviewed. Education is given center stage in the endeavor to maintain this harmony.

Problematizing Education

The relationship between education and development is often seen as linear and unproblematized. The UNESCO Ahmedabad Declaration, 2007 for instance, illustrates how in a SD context, education is expected to promote lifestyles where each aspect mutually and positively reinforces the other. It takes an all-inclusive perspective, focusing on indigenous education, peace and cultural diversity as transformative elements.

However, it is common knowledge that most forms of education depart from the above t**ransformative** vision. Today, education is a contested notion that is responsible for socialising people into unquestioningly accepting the prevailing patterns of development and to serve the needs of a few. Hailed as an essential promoter of human welfare, its enduring discourse is rather focused on promoting employability: churning out workers or their glamorised version, professionals, to sustain society's inherent consumerism.

This discourse is disguised by the logic of rationality prompting people to believe that they are collectively working towards "ending poverty and oppression so that gradually human beings would enjoy a quality of life hitherto unimagined" (Cunningham, 1993, p. 5). In turn this rationality is responsible for creating false needs and has been accused of being "morally bankrupt", paying little heed to aspects like "nuclear power plants, … toxic wastes" (Cunningham, 1993, p. 6), depletion of fossil fuels, domination by multinationals, institutionalised corruption, conflict, [gender-based] violence, and human distress.

Critical thinkers like Freire (1972), Foucault (1991), Cunningham (1993), Schied (1995), Orwell (1997) and Giroux (2010) agree that education has been vastly responsible for the submissive nature of individuals in contemporary societies with its focus on improving economic efficiency and labour productivity. Institutionalised education has been criticised as an ideological state apparatus (Althusser, 1971) using language, schools and media, to reproduce the values of the dominant and create the conditions to escalate human needs for consumer goods, (Giroux, 1985, p. xi). They argue that a new pedagogy is required to nurture critical thinking and enable people to fully comprehend how their real needs conflict with the artificial needs hyped by the ideological state apparatuses and how, as individuals, they are complicit in making development less sustainable. A paradigm shift is therefore necessary.

ESD: UN Agenda 21

ESD focuses on providing opportunities for each individual to acquire the contextually and culturally relevant knowledge, skills, attitudes and values necessary to shape a sustainable future. ESD as an area of focus can be traced back to 1972 when the UN Conference on the Human Environment highlighted education as a means to address problems of human environment. A special approach was clearly required to devise educational strategies to heighten individual awareness of problems caused by anthropogenic activities as well as stimulate a sense of responsibility to help individuals modify their behaviours accordingly.

In 1977, the Tbilisi Declaration (UNESCO, 1977) expatiated on the desirability of systemic thinking and an **integrated, interdisciplinary approach** to education that takes into consideration the ethical, social, cultural and economic dimensions to strengthen "a closer link between educational processes and real life". This thinking was crystalized in the UN Agenda 21 (1992), which, as the main matrix, synthesizes a roadmap for all sustainable development efforts globally. It details the social and economic dimensions of development and proposes solutions for the conservation and management of resources, the strengthening of major groups and proposes the means for their implementation. ESD is pivotal for this implementation. Hinting at a required paradigm change, Agenda 21 anticipates that the appropriate development rationale is "indispensable to **changing people's attitudes** …. for **effective public participation in decision-making**" (Chapter 36, 36.3). By highlighting the

interconnectedness of all aspects of human life including events in the socio-economic, cultural and political spheres and Nature, it makes provision for contextually relevant development that includes all known types of knowledge. It also provides the basis on which the UNESCO Decade for ESD (DESD) was launched.

With the DESD launch, educational activities were organized into 11 thematic foci entailing a spate of "adjectival educations" that "touch upon SD or SD components" (UNESCO, 2009, p. 28). Subsequently the Bonn Declaration (2009) emphasised focus on three key themes from the DESD list that became penetration points for several education programs: **climate change, biodiversity and disaster risk reduction**. This division possibly accounts for the start of the fracture among ESD initiatives with priorities being incessantly reshuffled. With events like climate change, time has shown that development agendas depart widely from Agenda 21. Moreover, documents have demonstrated that despite much recorded, albeit uneven, progress in terms of global awareness, the availability of a platform for international collaboration, influence in policy and pedagogy alteration (UNESCO, 2014b), improved coordination of stakeholders and a number of ESD projects, the globally agreed paradigm shift failed to happen (UNESCO, 2009; UNESCO, 2014c).

The Inadequacy of Educational Systems

During the Aichi-Nagoya Conference on ESD, participants agreed anew that the current education systems were inadequate and would not sustain the SD Goals. They unanimously expressed the need for an alternative pedagogy (UNESCO, 2014 d & e). They agreed that critical pedagogy promotes the deeper and much required analysis of surface situations (hooks, 1994), thereby, preventing education from being "a device for [ideological], economic and cultural reproduction" (Freire, 1985, p. xi). Aptly, critical pedagogy encourages a counter-hegemonic struggle that starts with the realisation that humanity cannot be interpreted by rationality. Human beings are not machines (Cunningham, 1993) or resources (Schied, 1995). Critical pedagogy supports teaching "as the practice of freedom…in a manner that respects and cares for the souls of…students", (hooks, 1994, p. 13), by providing the instruments for people to unlearn and learn new connections "between their individual experiences and the social contexts in which they are embedded", (Friere, 1985, p. 46). Additionally, it helps "students develop consciousness of freedom, recognize authoritarian tendencies … connect knowledge to power and have the ability to take constructive action" (Giroux, 2010) and responsibility for that action. Critical pedagogy necessarily contributes to a special type of action: reflexive praxis (Schön, 1983; Bronfman, 2005; Wellington, 2006; Daweti, 2005; Schwandt, 1997; Tait & Gaskell, 2005). Critical pedagogy is a necessary ingredient to sustain the paradigm shift.

Critical Pedagogy for a Paradigm Shift

The paradigm shift is characterised by the creation of a new educational order and corresponding sustainability competencies, by the democratization of power relationships, challenged social reality and its constructs (Glasser, 2014). At the Nagoya Conference, Sarabhai (UNESCO, 2014d) reiterated India's 1992 perspective that the challenge of development was to find alternatives to the current paradigm. This has been an ongoing effort for all involved. For instance, recording various shortcomings and non-responsiveness in Africa's formal systems of education and training which have "proven largely unable to produce the necessary skills, in quantity or quality, to raise Africa's development to the level enjoyed by other regions of the world", the Association for the Development of Education in Africa (ADEA, 2012), invited stakeholders to reflect on the development of a strategic framework to promote critical skills acquisition and endorse reflexive praxis.

The ADEA agreed that change in Africa requires an "ideological, **political** and epistemological break with the past [and] a major reorganization that entails a paradigm shift and radical reforms" (ADEA, 2013, p. 16). To transition from a lethargic state to one of awareness requires a recognition that human beings do not operate in neutral spheres of influence, but rather in political spheres of influence that also imply power relationships. These spheres determine how an individual evolves in the various economic, social and cultural arrangements in which s/he finds him/herself. In turn, power

relationships determine how this individual sees him/herself within the different socio-economic and cultural constructs.

In most instances, negative power relationships have led to peace deficits that have impeded progress in literacy, incapacitating people from acceding to [the right kind of] information and knowledge necessary to negotiate themselves out of "deadly spirals" of conflict situations, UNESCO (2011, p. 128). Violent conflicts have reinforced inequalities, grievances and desperation, with individuals lacking the competence and confidence to snap out of violence. Being ill-equipped, these individuals succumb to the supreme effect of negative power relationships by unthinkingly accepting the existing order of things as natural, believing that there can be no alternative (Rowland, 1997; Alcott, 1997).

A paradigm change is more than ever required to jumpstart critical thinking and transformative action to reverse negative power relationships. The new paradigm can be nuanced into first and second order changes where the first order change fosters the acknowledged desire to move away from known unsustainable patterns of living, while the second order change involves "creating the conditions to improve the quality of life for all" (Glasser, 2014). In support of this argument, in a comparative study involving Asian countries, Yamaguchi & Chan (2014) confirmed the need for a new approach to development and education that focuses on three principles: (1) creativity (creation of new values), (2) self-reliance (enhancement of life with diverse abilities) and (3) collaboration (social participation). These are the essential components of critical pedagogy.

Critical pedagogy is therefore naturally pivotal in nurturing sustainability competencies that can empower individuals to break away from hegemonic thought and make people realise interconnections between aspects of SD like agriculture, energy, habitat, economy, education, and democracy. Critical pedagogy has all the potential to make educational systems fully embrace aspects of SD. Consistently, it highlights the transversal nature of education as "linked to virtually all areas in Agenda 21, and even more closely to the ones on meeting basic needs, capacity-building, data and information, science, and the role of major groups" (UN Agenda 21, 1993). It is an apt instrument to provide insights into gaps between desirable conditions and prevailing situations. Such insights reveal the following reasons as having accounted for the failure of the shift in the existing paradigm (UNESCO, 2014e).

Sustainability Competencies and Quality Assurance

Experts agree that special sustainability competencies are required for individuals to critically reflect on their ontologies and epistemologies and as well take action as appropriate. Sustainability competencies also known as 21st Century competencies, carry aspects like systems thinking, wise decision-taking, the ability to anticipate future events, an strategic and inter-personal competencies, among others (Glasser, 2014). Besides Yamagochi & Chan (2014) have extended their initial list to include media and ICT skills. These were added to the ERI-Net Framework of Transversal Competencies, calling upon individuals to also critically evaluate information and media content, and engage in the ethical use of ICT. However, the authors are of the view that many countries have not yet contextually defined or aligned their sustainability competencies with the above list. Therefore, educational systems are not all imparting the competencies that can usher in the paradigm change and revise development patterns.

ESD Leadership and Coordination: Capacity Deficiencies

It is now confirmed that despite the "impressive quantity and quality of knowledge already developed, shared, and applied to policy innovation and implementation", the full integration of ESD remains elusive (UNOSD, 2013, para 3 & 4). For any change to occur, champions and leaders are required. Bokova (UNESCO, 2014c, p. 3) argues that "leadership is essential for moving from policy commitments and demonstration projects to full implementation across the curriculum, teaching and operations, whether in formal systems or in non-formal learning and public awareness raising" but with regard to ESD, she notes that this is "work in progress". Capacity deficit, both at policy and implementation levels, is clearly one of the major culprits.

Usually for administrative convenience, international organisations like UNESCO and governments vest the coordinating role in senior cadres from Ministries, especially Permanent Secretaries. These cadres are reported by fieldworkers to be serious bottlenecks in their fieldwork since many do not have the adequate profile to help implement ESD (Gokool-Ramdoo, Rumjaun & Bholah, 2012; UNESCO, 2013a). With their notorious inter-ministerial mobility, they are anything but permanent and cannot be seen as its devout champions.

Further, in many countries, different ministries or organizations cater for the different themes within the SD framework. Lack of ESD capacity and a centralised strategy, prevents cadres from engaging into efficient inter-ministerial cooperation, coordination and synergies (UNESCO, 2013a, p. 3; UNESCO, 2013b & c). For example, ESD-related themes like Environment and Agriculture may be handled by different ministries that may have widely different foci. Ministry cadres reportedly often fail to connect these two issues within meta-frameworks, like the Agenda 21, thereby slowing harmonization of efforts.

Teachers are important actors that can effectively integrate sustainability competencies. Presently, they reportedly face challenges in making useful connections between theory and context-relevant practice, thus disabling application of ESD principles to new contexts (Taylor, 2014; Pace, 2010). Despite efforts for its mainstreaming, teachers resist by complaining of overload and believing that ESD is an externally imposed constraint (Gokool-Ramdoo, 2012). Moreover, in many countries, the disproportionate focus on formal education skews focus from the non-formal and informal pathways which potentially could have a more positive impact on ESD agendas (Gokool-Ramdoo, Rumjaun & Bholah, 2012).

Dissonances in the Literature Reviewed

The literature has highlighted the following tensions in the effort to mainstream and sustain ESD: (i) an ongoing age-old disconnect with Nature; (ii) development and education agendas widely departing from Agenda 21, (iii) the inadequacy of the current educational system to anchor SD, (iv) the ongoing need for an alternative pedagogy to foster a required paradigm shift and to nurture sustainability competencies and (v) the inadequacy of ESD leadership and coordination. The literature carries solutions for each of these tensions. Responses to each of the above tensions will now be employed as pillars to construct a framework that can connect the isolated ESD 'dots' and scaffold its sustainable implementation thereby completing "unfinished ESD businesses" (UNESCO, 2013b, p. 1; UNESCO, 2013c, p. 3).

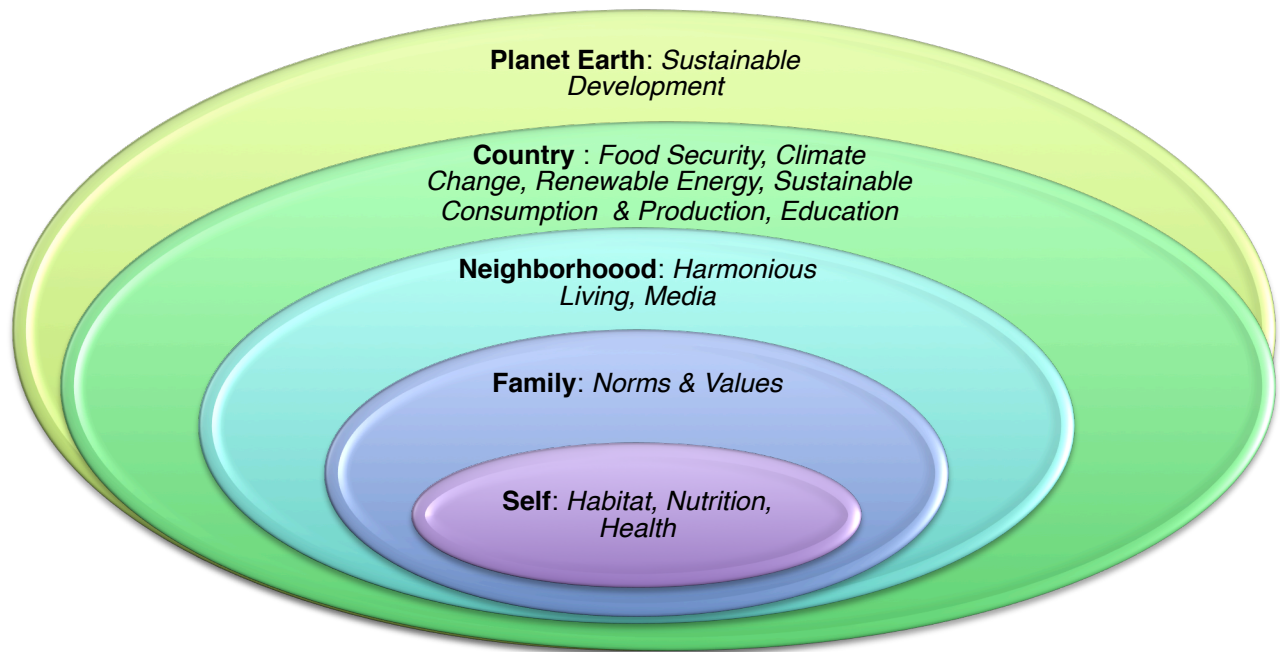## Towards a Scaffolding Framework: Unfolding the Protocols for Practice

In response to each of the above identified tensions, elements that will act as counterpoints have been culled from the literature. These will be the pillars of the framework where the ESD dots will connect and that will scaffold the sustainability of ESD programs, which now unfold as a series of protocols.

Protocol 1: The Systems Approach to Reconnect with Nature

The first protocol involves the adoption of the systems approach to reconnect with Nature. This will promote the recognition that human beings operate in systemic arrangements characterised by the economy, society, culture and environment. It also stands to harmonize the notions of development and education and generate SD-appropriate learning content that belongs to each and every sphere.

The use of the systems approach is reiterated in the Aichi-Nagoya declaration on ESD (UNESCO, 2014a) inviting governments to pay "special attention … to system-wide … holistic approaches and multi-stakeholder cooperation and partnerships" in a spirit of participative democracy and amidst consultations. To promote harmony with Nature and to reinforce the notion of *system-wide* focus, the systems approach highlights visibility regarding how the different spheres of influence and corresponding anthropogenic activities, interact to affect an individual's market opportunities and life chances amidst the power relationships that compose the entirety of a socio-economic system, as

schematized in Figure 1. The critical perspective underscores the political nature of these spheres that may be characterized by power struggles (Freire, 1985). Thus, each power relationship can be questioned and re-adjusted to ensure that the individual is at the center of development efforts.

Planet Earth: *Sustainable Development*

Country : *Food Security, Climate Change, Renewable Energy, Sustainable Consumption & Production, Education*

Neighborhoood: *Harmonious Living, Media*

Family: *Norms & Values*

Self: *Habitat, Nutrition, Health*

Figure 1: Systems approach to heighten understanding of interconnectedness of contextualized spheres of influence with the human being at the centre (Gokool-Ramdoo, Rumjaun & Bholah, 2012).

Learning content that emanates from the systems approach will foster transversal competencies that enable individuals confidently to navigate each of the spheres. At a global level, synchronization and coordination of education *systems* (Hoosen, Butcher & Njenga, 2009) are required to strategically develop and strengthen the capacity of educational institutions to respond simultaneously to educational, employability and SD needs of populations. This justifies the repositioning of development and education rationales within Agenda 21.

Protocol 2: Repositioning Education and Development Rationales within UN Agenda 21

Harmonious co-habitation of the above spheres is the crux of Agenda 21. It requires repositioning development rationales within the UN Agenda 21 so that education and development goals are aligned with qualifications systems consisting of "all aspects of a country's activity that result in the recognition of learning" (Tuck, 2007, p. 4). This effort will ensure that all learning content carry SD-related competencies that "are indispensable to **changing people's attitudes** … for **effective public participation in decision-making**." (Agenda 21, Chapter 36, 36.3). It will also ensure that the SD learning content will articulate with a qualifications framework and employability concerns across a continuum of the education system, involving lifelong and life-wide learning opportunities. It naturally follows that the resulting curriculum should belong to ESD, which would then be the backbone of all curriculum development, across educational sectors, levels and pathways.

Protocol 3: Adopting ESD as a Backbone of Educational Systems

The **third** protocol involves making ESD "the backbone of all educational systems, inclusively holding together all its sectors, sub-sectors, approaches, and stakeholders together …" (Gokool-Ramdoo, Rumjaun & Bholah, 2012, p. 12). This move will attract the necessary resources, support capacity development for a range of stakeholders, as well as the mainstreaming of ESD through

curriculum development. Mainstreaming involves the widespread acceptance that **all learning content or curricula, and objects should transversally carry SD principles as seen in t**he following extract from UN Agenda 21:

> Environment and development education … **(which may include spiritual)** …should be integrated in all disciplines, and should employ formal and non-formal methods and effective means of communication. (UN Agenda 21, 36.3)

SD principles will resonate in all learning content that will be developed and systemically linked to the above different spheres (Figure 1). Stakeholders can better diagnose deficiencies and recalibrate practice to ensure that by 2030 "people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature" (UN 2015, Goal 12.8), through ICTs, formal, non-formal and informal educational channels. When all educational channels carry ESD learning content, the transformative vision of education can best be realised.

Protocol 4: Transformative Critical Pedagogy to Sustain the Paradigm Shift

The **fourth** protocol is concerned with the adoption of critical pedagogy as the main teaching and learning approach that can boost transformative change (Freire, 1972; 1985) and sustain the paradigm shift (UNESCO, 2014d & e).   The need for transformative pedagogy to "make a powerful contribution to the renovation of the educational process" has long been recognized (Tbilisi Declaration, UNESCO, 1980, p. 12). Pace (2010) insists that teaching and learning approaches for ESD require rethinking and simply re-labelling traditional practices will not bring about fundamental changes necessary for transformative change to occur, for retaining students' interest (Lotz-Sisitka, 2010) and for the required paradigm shift to happen (Gokool-Ramdoo, Rumjaun & Bholah, 2012).

When development is repositioned within Agenda 21, with the human being at the center of development efforts, critical pedagogy is useful to rethink the indices for development. These should go beyond Gross National Product or Per Capita Income to include psychological well-being. Thus, what Yamagochi & Chan (2014) state can be seen in Japan as *zest for living*, or in Australia, China and Malaysia as *a sense of belongingness*, and in India, as *competencies to deal with stress*, is crystallized in Bhutan as the Gross National Happiness (GNH) index for development. Anchored in spiritual Buddhist values that are nonetheless transversal, the GNH is flanked by four pillars: SD, cultural values, natural environment and good governance. These are nuanced into eight contributors to happiness—physical, mental and spiritual health; time-balance; social and community vitality; cultural vitality; education; living standards; good governance; and ecological vitality. While this approach is not widespread, its increasing desirability appears to be attracting attention. For instance in Singapore, it is proposed that in addition to financial reserves, social reserves should also be computed during assessments of a country's development. As with the principles of Global Citizenship Education, social reserves "are the goodwill that makes us look out for one another during difficult times, … the resilience to help us overcome challenges and constraints, and … the tenacity to progress both as individuals and as a nation" (Tan, 2013). The competencies that promote human welfare should thus be clearly described in educational systems and their acquisition measured through quality assurance, assessments, awards, and skills/prior learning recognition arrangements. Critical pedagogy can supplant the mainstream pedagogy, since it promises the holistic development of sustainability competencies like autonomy, responsibility and the critical thinking required to modify our frames of reference, and heighten informed decision-taking. The corresponding sustainability competencies should not only lead to a change in mind-set, but the ability to act on ourselves, that is reflexive praxis.

Protocol 5: Attuning Sustainability Competencies

So far, the framework under construction is one that invites a systemic reconnection with Nature, operates within the unified development framework of Agenda 21, adopts ESD as the backbone for educational systems and employs critical pedagogy. Competencies are generally contextually and culturally determined. Sustainability or 21st Century competencies follow suit (Glasser, 2014). These competencies articulate the different "abilities, attitudes, knowledge, understanding, skills and mind-

sets that are functionally linked to support both problem-posing and solving as well as evoke purposeful behaviour toward particular end goals, in relation to the sustainability challenges and opportunities that are before humanity" (Glasser, 2014).

Sustainability competencies are required to promote "democracy, good governance and the rule of law… for …sustained and inclusive economic growth, social development, environmental protection and the eradication of poverty and hunger" (UN 2012- Rio+20). Already adjectival educations are suffused with such competencies as their learning outcomes. Peace Education is, for instance, concerned with "the process of acquiring the *values*, the *knowledge* and developing the *attitudes, skills, and behaviours* to live in harmony with oneself, … others, and …the natural environment (Bajaj & Chiu, 2009, p. 441). In the light of growing insurgence and conflicts in the Middle East and Africa especially and the impending doom of terrorist attacks in the rest of the world, it is becoming a necessity to inculcate social reserves as those favored by Singapore.

Debates held in different contexts like an African workshop on ESD in 2012 (ADEA, 2012), a survey in the USA as well as one in the Asian-Pacific region demonstrate the different types of competencies that are seen as appropriate. Given the consistency emanating from the different thinking above, in Table 1, Gokool-Ramdoo (2011) and Gokool-Ramdoo, Rumjaun & Bholah (2012) clustered the different competencies under more pedagogically-appropriate labels: the cognitive, affective and metacognitive (Deschênes & Maltais, 2006). C*ognitive* (C) pertains to the processing of information through instructional strategies to increase or broaden knowledge; *Affective* (A) relates to strategies that engage the feelings of the student with a view to enhancing the meaningfulness of the learning experience; and *Metacognitive* (M) refers to the student's ability to organize and take responsibility for the learning experience in current situations, anticipate future situations and to exercise reflexive praxis.

Interestingly, Table 2 takes the discussions of Table 1 a step further. It shows how different competencies can be woven into the educational systems of selected countries as through the use of National Qualifications Frameworks (NQFs). They are integrated as learning outcomes in educational programmes.

It follows that with the possibility of embedding sustainability competencies in educational systems through the use of NQFs, the latter is a fitting instrument to connect the related 'dots', maintain the sustainability of ESD and complete the unfinished [ESD] businesses (UNESCO, 2013b, p. 1; UNESCO, 2013c, p. 3). It is a more comprehensive version, a sustainable development-compliant National Qualifications & Credit Framework [NQCF] that will be used to that effect.

The NQCF is an outcome-based instrument for the development and classification of qualifications according to a set of criteria for specified levels of learning achieved, linked to any given country's centrally agreed development goals (Dzelalija & Balkovic, 2014; Tuck, 2007, p. v).

The use of the NQCF is driven by the global interest in this mechanism (ILO, 2004; Allais, 2010) and practitioner experience in the educational regulatory world. Given its ability to carry competencies and because of the information it sends out to the public, the NQCF can easily carry sustainability core competencies across the different educational sectors, levels and learning pathways in terms of corresponding credits on a contextually-responsive. It is therefore the appropriate instrument that can connect the dots and promote the sustainability of ESD initiatives.

Table 1. Agreed-upon 21st Century Competencies (Aichi-Nagoya World Conference on ESD 2014)

American perspective[1]	*	Asia-pacific perspective[2]	African perspective[c]				
			*	Competencies for Learners[3]	*	Competencies for Teachers[3]	*
Systems thinking	M	Specialised (subject-specific skills)	C	Critical thinking	C	Organizing and facilitating effective learning and situations	C
Anticipatory	M	Foundation	A	Scientific expertise	C	Managing learning progression and assessment	M
Normative	M	Transversal	M	Cognitive skills	C	Ability to monitor individual student progress	M
Strategic	M	ICT	C+M	Social skills	A+M	Participatory approach	A+M
Interpersonal	A			Life skills	M	Collaborative work	M
Affinity for life	A			Decision making	M	Participate in the management of the educational institution (formal & informal)	M
State of the planet knowledge	C			Ability to implement human rights	C+M	Application of new technologies	C
Wise decision-making	M			Respect for differences	A	Ability to define student-appropriate success criteria	M
Modeling sustainable behaviour	M					Ability to contextualize learning including through extracurricular activities	M
Transformative social change	M			Change management	M	Espouse ethical practice	M
						Taking responsibility for individual training	M

Note. The above have been identified as the 21st Century competencies as agreed after discussions held during a dedicated workshop at the Aichi-Nagoya World Conference on Education for Sustainable Development
[1]Glasser, H. (2014). Presentation on American Perspective of 21st Century Competencies
[2]ERI-Net study on Asia-Pacific Study on 21st Century competencies (UNESCO, 2013)
[3]African perspective as discussed with stakeholders of the Association for Development of Education in Africa(adapted from ADEA, 2012)
*Pedagogically appropriate labels for clustering 21st Century competencies (Gokool-Ramdoo, 2011; Gokool-Ramdoo *et al*, 2012)

Table 2: Sample of Competencies Integrated in NQFs as Learning Outcomes and Perceived Pedagogically Appropriate Labelling

NQF United Arab Emirates	Scottish NQF	Australia NQF
Information skills	Knowledge and understanding	Cognitive and creative skills involving the use of intuitive logical and critical thinking
Communication skills	Practice: applied knowledge and understanding	Technical skills involving dexterity and the use of methods, materials, tools and instruments
Organizing skills	Generic: cognitive skills	Communications skills involving written, oral, literacy and numeracy skills
Working with others	Autonomy, accountability and working with others	Interpersonal and generic skills
Numeracy skills	Communication, ICT and numeracy skills	
Technology literacy		
Societal skills		

Protocol 6: The NQCF as an ESD Instrument

The sixth protocol involves the use of the NQCF as that space where the above-identified isolated dots can connect with most efficiency and effectiveness. Through quality assurance exercises, the regulatory perspective continuously monitors the degree of fit between education and SD. Table 3 explicates the potential uses of an NQCF.

**Table 3: What a National Qualifications and Credit Framework can do**

#	Aspects
1	Carry culturally and contextually-determined sustainability competencies
2	Contribute significantly to the agenda for sustainable development: UN Agenda 21, post – 2015 SDGs and African Union Agenda 2063
3	Promote understanding and visibility concerning possibilities for individual progress through life chances and market opportunities
4	Promote understanding on how to accede to higher and different levels of education and training over a lifetime as well as plan for children's educational progress
5	Address social equity
6	Foster competitiveness of educational systems and structures
7	Contribute to capacity development
8	Promote the comparability and transferability of qualifications and skills
9	Enhance employer confidence in staff recruitment and training
10	Facilitate educational and labour market mobility
11	Facilitate curriculum design and development with the aid of credit descriptors as they exist within NQCFs
12	Respond to the requirements for sustainable development by enabling the recognition of [formal, non-formal and informal] learning in lifelong and life-wide settings and providing possibilities for "people of all ages and circumstances to access appropriate education and training over their lifetime to fulfill their personal, social and economic potential"(Scottish Qualifications Framework).
13	Inspire confidence among local, regional and international stakeholders

Note: Adapted from Gokool-Ramdoo (2015)

Discussion: Connecting the ESD Dots across an NQCF

In this section we demonstrate how after the foregoing protocols are adopted, the NQCF can be an innovative framework where the 'isolated' dots that constitute the various aspects of ESD can be connected to complete the 'unfinished businesses'. An NQCF carries "all activities that result in the recognition of learning, such as the means of developing and operationalizing policy on qualifications, along with institutional arrangements, quality assurance processes, assessment and awarding processes" (Tuck, 2007, p. v) within given socio-economic arrangements. It promotes transparency, governance and management of the qualifications framework as well as quality assurance by keeping the general public informed about the opportunities that given educational systems can offer (Tuck, 2007). To effectively contribute to SD, the NQCF should be responsive to a given country's occupational structure. It informs the public about areas where skills and competencies would be required. The NQCF articulates competencies acquired across progressive levels of responsibility spanning across different levels and pathways of learning. At each level there is a description of corresponding *qualifications, credits attributed, competencies achievable known as level descriptors and learning outcomes.* The associated credit system carries cross-cutting competencies clustered into notional learning hours and **credit loads,** acquired at progressive levels of difficulty. Importantly, the NQCF informs whether learning in formal, non-formal and informal pathways is equally recognized and transferable and **whether alternative pedagogies like literacies**, are acceptable. Literacies are a strategy that connects experiences and understanding to provide directions for informed action. Thus the **health literate** or **environmental literate** citizen has the

competencies to navigate in given situations and make informed or wise decisions about related solutions. As shown in Figure 2 below, there should be a free flow from one pathway to another and across all levels of learning.
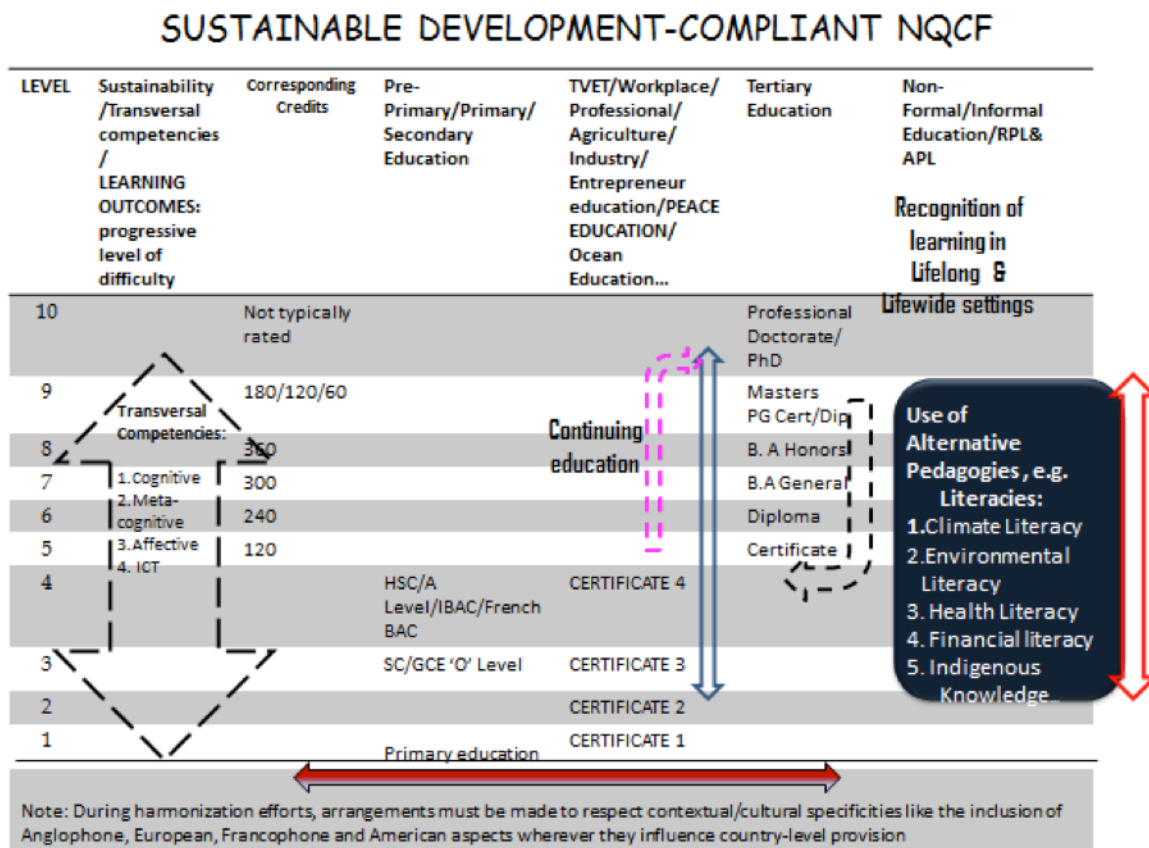
Figure 2: The Innovative SD-compliant NQCF (adapted from Gokool-Ramdoo, 2015).

The SD-compliant NQCF (Figure 2) should be contextually and culturally appropriate. It (i) is inspired from the systems approach (ii) carries the learning activities positioned within the UN Agenda 21 (iii) rests on ESD is its backbone, (iv) inherently adopts critical pedagogy, (v) fosters sustainability competencies as learning outcomes acquired progressively across levels of learning (1-10) and **sectors** (including general education [pre-primary-tertiary], vocational, professional, agriculture, maritime, etc.), (vi) enables articulations and pathways between lifelong and lifewide learning opportunities, including arrangements for recognition of prior learning in formal, non-formal and informal settings without losing transparency at the national level (vii) is inclusive of all adjectival educations and pedagogies including literacies (viii) is culturally and contextually adaptable, (ix) supports employability as well as personal and national development and (x) measures progress in SD.

With tensions being resolved between formal, non-formal and informal education, any individual should be able to move across and along the SD-NQCF. By adopting the SD-NQCF, stakeholders can aim at making ESD a part of every breath taken.

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