Teacher Education for Sustainable Development: Past, Present and Future

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Abstract

Since the earliest formulations of the UN goals for environmental education (EE) at the Belgrade conference (1975), through the reconceptualization of education for sustainable development (ESD) at the World Summit on Sustainable Development in Johannesburg (2002), to *The Future We Want* (2012), teacher education—at pre-service and in-service levels and across primary and secondary education—has been regarded as being essential for achieving sustainable development. In response, the UNESCO-UNEP International Environmental Education Programme (IEEP) published prototypes for teacher education at elementary and middle school levels in the 1980s, and UNESCO published *Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability* (Hopkins and McKeown 2005) and continues to support related programmes. However, despite these many attempts, there is recurring testimony to the almost universal lack of success in introducing coherent or consistent programmes of EE/ESD into teacher education courses. This essay discusses these and other strategies for re-orienting teacher education through pedagogy and whole school system approaches while acknowledging that the teacher education institutions themselves are often the biggest obstacles.

Keywords

Teacher education · Sustainable development · Environmental education · Mainstreaming

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1 Introduction

Teachers have long been identified as a major target audience for environmental education: The Belgrade Charter (1975) and recommendations 17 and 18 from the 1977 Tbilisi Intergovernmental Conference on Environmental Education (UNESCO 1978) specifically refer to pre-service teacher education and in-service teacher education and call for teacher education to include environmental education. These early recommendations were framed around the belief that all teachers need "to understand the importance of environmental emphasis in their teaching" and so "environmental sciences and environmental education [need to] be included in curricula for pre-service teacher education" and that "the necessary steps [are taken] to make in-service training of teachers in environmental education available for all who need it" (UNESCO 1978, pp. 35–36).

There is no doubt that teacher education is essential to achieving ESD. With about 59 million teachers worldwide, and an annual turnover rate of 5–10 %, teachers are an obvious significant target group. The issue is, however, how to reach them and what to teach them as part of the ESD agenda. The UN Decade of Education for Sustainable Development implementation scheme (UNESCO 2005) recognized that educators and trainers needed to be assisted with the relevant knowledge and information to address ESD. However, the *Review of Contexts and Structures for Education for Sustainable Development 2009* (Wals 2009, pp. 50–51) noted that

> The extent to which ESD has been integrated into teacher education programmes is unclear as: 1) limited knowledge of ESD at all levels is still a fundamental challenge and, in many cases, ESD has yet to move beyond a focus on the environment in many training programmes; 2) ESD is still often carried out by a limited number of teacher training institutions at the national level and needs to be further mainstreamed; and 3) more policy support is needed to guide ESD in teacher education and professional development.

The follow-up report on the Decade (Wals and Nolan 2012) did not have teacher education as part of its monitoring and evaluation brief, but it still noted the importance of teacher education to primary and secondary education.

Teacher education, and curriculum, continued to be a focus in the *Future We Want,* the outcomes document from the 2012 Rio+20 United Nations Conference on Sustainable Development: "We therefore resolve to improve the capacity of our education systems to prepare people to pursue sustainable development, including through enhanced teacher training, [and] the development of sustainability curricula" (United Nations 2012, p. 44).

Teacher educators who were conscious of and engaged with the environmental education movement responded to these calls for environmental education in teacher education through a range of individual and group projects for both pre-service and in-service teacher education (see, for example, Fien 1998; McKeown and Hopkins 2002; Kyburz-Graber et al. 2006; Ferreira et al. 2006; McKeown and Nolet 2013). Many of these initiatives had a curriculum focus on increasing teachers' awareness of environmental issues and environmental content knowledge, but a few were concerned with pedagogy and recognizing the need for changing worldviews.

However, teacher education institutions are generally autonomous in what they teach, within the confines of the accreditation requirements of their context, and they often play games with the rules. In Scotland, for example, there are guidelines that teachers are required to be "knowledgeable about sustainable development and competent to contribute to ESD" (Higgins and Kirk 2002, p. 9), but it is an *option* for teacher education institutions to teach ESD and to determine how much emphasis is given to it. If teachers, and ultimately their students, are to understand ESD then there is a need for more stringent policies and guidance to ensure that teacher education programmes everywhere include ESD in their core content.

This essay reviews a range of international and local initiatives and strategies for re-orienting teacher education to address ESD, through curriculum, pedagogy and whole school system approaches, from the 1980s through to future directions; it is not an empirical study.

2 Early Initiatives

At an international level, in the 1980s the UNESCO-UNEP International Environmental Education Programme (IEEP) commissioned and published the thirty volumes of its Environmental Education Series (the "Green Books") to support various aspects of teacher education. These include pre-service or in-service teacher training modules and programmes (11 of the 30 volumes), education modules for classroom use (7), guides and approaches to various aspects of environmental education (9), and trend paper or surveys (3). These volumes were intended to support the implementation of environmental education in member countries.

The Environment and Schools Initiative (ENSI) Project started in 1986, initially funded by the Organisation for Economic Co-operation and Development (OECD), was an in-service-like teacher education project. However, this project was different from the usual series of workshops for classroom teachers that comprise in-service teacher education in that it was action research based where teachers and schools worked with researchers in developing their practice. The initial ENSI Project has gone on to be a decentralized international network that brings together school initiatives, educators and other stakeholders in several countries to promote and understand activities promoting sustainable development in schools and their communities. It has sponsored a number of projects, including *Quality Criteria for ESD-Schools: Guidelines to enhance the quality of Education for Sustainable Development* (Breiting et al. 2005), which are useful in both pre-service and in-service teacher education settings. For example, the Breiting et al. (2005) document presents a non-exhaustive list of 'quality criteria' to be used as a starting point for reflections, debates and further development regarding future work on ESD among educational officials, teachers, headmasters, parents, and students, and it has been translated into numerous European languages. The on-going ENSI activities, which generally draw on experiences from across a range of countries,

are mentioned here as they provide resources for both pre-service teacher education and in-service teacher education (see, for example, Kyburz-Graber et al. 2006).

National projects for incorporating environmental education into teacher education have been developed and implemented in a number of countries at both pre-service and in-service education levels over many years. The Australian *Teaching for a Sustainable World*, subtitled "A New Agenda in Teacher Education" (Fien 1995, subsequently disseminated internationally by UNESCO 2002 as *Teaching and Learning for a Sustainable Future*) was designed as a pre-service teacher education project, but the modules could also be used in in-service teacher education contexts. Interestingly, this project was funded by the Australian development assistance agency, AIDAB, and the modules attempted to integrate environment and development issues, which makes them an early example of materials consistent with an Education for Sustainable Development agenda. Also in the early 1990s, there was a European Union initiative on environmental education within pre-service teacher education programmes which addressed pedagogical, assessment, implementation, curriculum and school aspects of what makes an "environmentally educated teacher" (Brinkman and Scott 1996). There was no national approach in the United States and a survey conducted by McKeown-Ice (2000) found that the environmental education component of preservice teacher education programmes varied, where they existed at all.

Indeed, across many countries, at individual teachers' college or university level there were numerous initiatives to incorporate environmental education into teacher education programmes. However, these usually took the form of an elective programme rather than being part of the core teacher education programme (Gough 1998; Ferreira et al. 2006).

Although the possible breadth of re-orienting teacher education for ESD could (and should) include both pre-service and in-service teacher education, for the remainder of this essay I am only focusing on pre-service teacher education because in-service teacher education is so diverse and ephemeral, and it is generally provided outside higher education contexts. Pre-service teacher education programmes have parameters and controls generally associated with the accreditation requirements for these programmes, however this does not mean that re-orienting them for ESD is simple, and the remainder of this essay focuses on strategies and barriers for re-orienting teacher education programmes for ESD.

3 Effectiveness of Early Initiatives to Incorporate Environmental Education into Teacher Education

The environmental education research literature of the 1990s provides a recurring testimony to the lack of success in introducing coherent or consistent programmes of environmental education into teacher education courses, despite many efforts (Gough 1998). Reviews of environmental education in teacher education from around this time tended to find that

- All universities offered some form of EE at some stage in their pre-service teacher education programmes
- Not all programmes are implemented in a manner consistent with the EE literature
- EE is often offered as an elective and is frequently only included in a course because of a lecturer's individual efforts
- EE is sometimes not offered until the final year of a teacher education programme
- There are substantial number of teachers who enter the teaching profession without any formal training in EE
- Where EE is taught as an integrated subject it is most likely associated with science or social studies subjects.

With respect to interventions such as the UNESCO-UNEP International Environmental Education Programme (IEEP), while produced with the very best of intentions, the exact audience for these volumes was not always clear. The volumes raised particular concerns because of the universalized nature of the statements made in them which do not recognize the diversity of cultures, environments, languages, religions, stages of 'development', and politics within the world, as well as differing stages of colonization and post-colonization. In addition, the volumes also overlooked or negated the social context and expertise of the teacher educator through statements such as, "When implemented as intended, these guidelines will, in fact, result in teachers who are sufficiently competent and skilled to offer instruction in environmental education that will clearly contribute to the development of environmentally literate students" (Marcinkowski et al. 1990, p. 1). Statements like this raise questions about what makes such prototype programmes for an environmental education curriculum appropriate for places other than where they have been developed and whether the major components and guidelines they have identified are also appropriate. This could well explain the low level of usage of these volumes by teacher educators, as more recent research in non-Western countries such as Malawi (Glasson et al. 2006) and the Pacific region (Thaman 2010) indicates. The findings from these studies suggest that teacher education programmes that are grounded in local culture and environment are more relevant and effective.

However, there are other aspects of teacher educators and teacher education institutions that require elaboration at this point to better clarify their responses to the calls for the incorporation of environmental education into teacher education.

4 Understanding the Response of Teacher Educators and Teacher Education Institutions

The calls for teacher education to include environmental education were heeded by those who were engaged with the area, but for others, the calls fell on deaf ears because environmental education was seen as a political priority rather than an educational one. The calls for its inclusion came from government level meetings

and from activists outside of education—often environment groups and government environmental agencies—rather than from within education bureaucracies. As such, it was seen as yet another pressure for inclusion of an area into an already overcrowded curriculum—along with such things as driver education, sex education, multicultural education, and so on.

With a few exceptions—such as Oman (Mulà and Tilbury 2011), South Africa (Lotz-Sisitka 2012) and Vietnam (UNESCO 2013)—within governments, the policy pushes and statements in favour of environmental education were forthcoming from environment agencies and were thus distanced from the education authorities—and as such did not carry any requirement to comply.

Another significant issue in some countries is, exactly what constitutes pre-service teacher education. This can vary from being 1 year of training after a high school certificate for primary teachers in Bangladesh to a 2 year Master of Education programme following an undergraduate degree for secondary teachers in Finland and Australia—and in some countries there are many unqualified teachers.

Apart from different lengths in qualifying courses there are also differences between primary teacher education and secondary teacher education in terms of the content and focus of the programmes. Primary teachers are educated to be generalists, and are often expected to be experts in everything. Their programmes often specifically focus on literacy and numeracy as the basics of education because, in some countries, many students do not even reach these basic levels before they stop coming to school. Secondary teachers are trained to be specialized subject teachers rather than generalists and this too can militate against them being able to take on board environmental education because of their own preferences and the pressures of content for their specializations.

Thus the range of options for the inclusion of ESD in teacher education programmes that can be found in practice include:

- Struggling to be recognized as core curriculum alongside literacy and numeracy in early childhood and primary teacher education programmes,
- Being offered as an elective, which results in a few teachers specializing in ESD,
- Being mainstreamed across the teacher education programme so that a genuine 'whole-of-system' approach to ESD can be developed, or
- A combination of the above (adapted from Ferreira et al. 2006, p. 13).

The extent to which any teacher education institution takes up one or all of these options is usually within the control of the institution. As Higgins and Kirk (2002, p. 9) note with respect to Scotland,

> While the structure of programmes is determined by regulatory bodies, teacher education institutions can be as innovative and flexible as they wish, so long as their programmes are fully compatible with the national guidelines… it is left to individual teacher education institutions to determine how much emphasis is to be given to ESD.

Hopkins and McKeown (2005, pp. 30–32) identified a number of challenges to re-orienting teacher education for ESD which build on this comment from Higgins and Kirk. Within the teacher education institutions these include:

- Official national and provincial curriculum rarely mandates sustainability.
- Teacher certification guidelines do not mention sustainability.
- Lack of or inadequately trained professionals who are knowledgeable about ESD.
- Lack of or inadequate funding and material resources.
- Lack of or inadequate national, provincial and local policy to support ESD.
- Lack of or inadequate institutional climate that supports the creativity, innovation, and risk-taking necessary to support transformative efforts to re-orient education to address sustainability.
- Lack of, or inadequate, reward for institutions or faculty members who undertake ESD programmes.

I discuss the addressing of these challenges in the following sections.

5 Implications of the Shift from EE to ESD for Teacher Education

While the focus in this essay is on teacher education and education for sustainable development rather than environmental education, it is important to acknowledge the similarities and differences between the two areas. Education for sustainable development is seen by some as having grown out of environmental education, given that the characteristics of environmental education described in the Tbilisi recommendations (UNESCO 1978) are almost identical with those describing ESD (United Nations 1993, 2012; UNESCO 2005). However, there is a major difference in that the Tbilisi recommendations were generally interpreted as a drive to change the nature of the knowledge conveyed (for example, by introducing environmentally related topics into the school curriculum) whereas ESD is concerned with changing the way education is conceived. There are therefore significant differences as a result of the linking of education for sustainable development with other international initiatives in the international implementation scheme for the United Nations Decade of Education for Sustainable Development (UNESCO 2005). These initiatives—the Millennium Development Goal (MDG) process, the Education for All (EFA) movement and the United Nations Literacy Decade (UNLD)—are much more obviously linked to Education for Sustainable Development than environmental education, which did not, for example, overtly acknowledge the importance of gender equality (Gough 1999).

According to the implementation scheme, all of these initiatives

> aim to achieve comparable impacts: an improvement in the quality of life, particularly for the most deprived and marginalised, fulfilment of human rights including gender equality, poverty reduction, democracy and active citizenship. There is also a common consensus around the central importance of basic education and the need to extend it and enhance its quality (UNESCO 2004, p. 9).

This aim shares with the earlier description of environmental education a focus on quality of life and active citizenship, however, protecting the environment is no longer mentioned even though environmental stewardship is one of the underlying ideals of sustainable development (along with social equity, justice and tolerance and quality of life) (UNESCO 2005).

It has long been recognised that women's illiteracy is a major obstacle to them achieving full participation in sustainable development (see, for example, *Agenda 21* from the United Nations Conference on Environment and Development (UNCED) (United Nations 1993) so it is not surprising to see gender, literacy and sustainable development linked in the international implementation scheme for the United Nations Decade of Education for Sustainable Development. The Education for All report, for example, notes that "Progress towards the EFA goals is being undermined by a failure of governments to tackle persistent inequalities based on income, gender, location, ethnicity, language, disability and other markers for disadvantage" with an estimated 776 million adults lacking basic literacy skills in 2006, and two thirds of these are women (UNESCO 2008, pp. 4–5). However, the inclusion of Education for All into the agenda for the United Nations Decade of Education for Sustainable Development makes the re-orientation of teacher education for Education for Sustainable Development much more complicated than just re-orienting it to incorporate environmental education. Can the call to "re-orient teacher education for ESD" be interpreted as simply increasing the emphasis on educating teachers to address basic literacy, has the emphasis shifted to one of improving quality of life for all, or is there still an environmental agenda?

The remainder of this essay will discuss these new visions and some initiatives to support them, together with possible strategies for achieving a re-orientation of teacher education.

6 Recent Initiatives to Overcome Obstacles

In 2005, after much international consultation, UNESCO published *Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability* (Hopkins and McKeown 2005). Unlike the earlier UNESCO-UNEP International Environmental Education Programme (IEEP) series, these *Guidelines* recognized the importance of teacher education institutions developing "their own thematic guidelines based on descriptions and ideals of sustainability" (Hopkins and McKeown 2005, p. 15). To provide some guidance, nine criteria (seven positive and two negative) for creating and evaluating new ESD projects are proposed (Hopkins and McKeown 2005, p. 16):

- ESD is locally relevant and culturally appropriate.
- ESD is based on local needs, perceptions, and conditions, but recognizes fulfilling local needs often has global effects and consequences.
- ESD engages formal, non-formal, and informal education.
- ESD is a life-long endeavor.

- ESD accommodates the evolving nature of the concept of sustainability.
- ESD addresses content, context, pedagogy, global issues, and local priorities.
- ESD deals with the well being of all three realms of sustainability—environment, society, and economy.
- ESD is not imported from another cultural, economic or geographic region.
- ESD is not "one size fits all", but must be created to account for regional differences.

The *Guidelines* document also recognizes that "addressing ESD will require student teachers to think about their profession differently and learn skills that perhaps, teachers in previous eras did not learn or use" as well as understanding the interrelatedness of the environment, society, and economy and having this interrelatedness "evident in their teaching and their lives as community members" (UNESCO 2005, p. 43). However, by having the guidelines so broad there is the risk that teacher educators, and those who determine the content of teacher education programmes, could well continue to overlook ESD because the agenda has become much more complicated and they do not know what to do, so they continue to operate in ignorance until required to act.

Nevertheless, several initiatives took up the challenge posed by the UNESCO *Guidelines*—including, in Australia (Ferreira et al. 2009; Gooch et al. 2008), Canada (Beckford 2008; Dippo 2013), Jamaica (Down 2006), South Africa (Lotz-Sisitka 2012), the United States of America (Nolet 2013) and Vietnam (UNESCO 2013).

The Australian Government, through its Department of the Environment, Water, Heritage and the Arts, funded the "Mainstreaming Education for Sustainability within Teacher Education in Australia" research project (Ferreira et al. 2009). This project piloted a model for whole-of-system change as recommended in Ferreira et al. (2006), which adopted a participatory action research approach to mainstream Education for Sustainability (EfS) within and across a whole pre-service teacher education system. Findings from the pilot study indicate that ESD can be mainstreamed within teacher education by:

- capacity building within the teacher education community by
  - developing competencies in education for sustainability;
  - establishing more effective interactions between decision-makers and other stakeholders;
  - establishing a community of inquiry for participants; and
  - developing an appreciation of whole-school approaches to sustainability
- engaging with policy developers to:
  - enable a realignment of current policies; and
  - make changes to accreditation processes within education departments, teacher registration authorities and curriculum bodies;
- thinking broadly about the teacher education, so that all stakeholders are engaged in the change process; and

- improving networks across the teacher educator systems by: identifying and supporting key agents of change within the sector and by developing new, and utilizing existing, partnerships between schools, teacher education institutions and government agencies in the area of education for sustainability and whole-school approaches.

Similar conclusions emerge from the other studies across six different countries, thus providing some guidance on how to address obstacles to the successful implementation of ESD teacher education.

In the Jamaican study, Down (2006) describes how issues of sustainability were integrated into two different subjects (a basic computer course in the primary programme and a specialist course on Caribbean literature in the secondary programme) teacher education programmes. Down concluded that challenges to the mainstreaming of ESD in teacher education programmes are related to staff, students, syllabuses, policy and support. She noted the need for capacity building of stakeholders, for institutional policy to support such initiatives, for the development of local, regional and international networks to support teacher educators in re-orienting their practices for ESD, and the need for ESD to be conceptualized as locally relevant.

Achieving the goals of education for sustainability requires a very different approach to learning and teaching from that currently practiced in most schools and teacher education institutions. This is not a new observation—it has been signalled since the UNESCO meetings on environmental education of the 1970s. However, after the United Nations Decade of Education for Sustainable Development (2005–2014) brought together the Millennium Development Goal (MDG) process, the Education for All (EFA) movement and the United Nations Literacy Decade (UNLD)—there was a stronger connection with socially transformative education and the importance of universal literacy and social equity. Changing the content of and pedagogical approaches in teacher education is a challenge, but it is one that teacher education institutions can no longer ignore, as several researchers have described through case studies (including Dippo 2013; Ferreira et al. 2009; Lotz-Sisitka 2012; McKeown and Hopkins 2002; McKeown 2014; Stephens 2012). Nolet (2013, p. 4), for example, suggests four strategies for re-orienting teacher education programs in the United States:

- Focus on improving outcomes for all students
- Embed ESD in the process of learning to be a teacher
- Use existing structure, processes, and local resources
- Provide professional development for faculty and administrators.

Some guidance for teacher education institutions is forthcoming from the example of Teacher Education given in the document *Asia-Pacific Guidelines for the Development of National ESD Indicators* for monitoring and assessing progress during the United Nations Decade of ESD in the Asia-Pacific Region (UNESCO Bangkok 2007, p. 4). In particular, the guidelines recommend that each country has national education policy that requires pre-service teacher education courses to

provide training in ESD and that all pre-service teacher education courses provide training on ESD-related content and pedagogy.

According to Gooch et al. (2008, p. 185), more guidance needs to be given to the pre-service teachers about "how to teach critical thinking skills and how to formulate plans to address issues such as comparing alternatives, rating suggestions for costs and effectiveness, and anticipating long and short-term consequences of each alternative". They also note the need for the development of networks between pre-service teachers and local communities, for developing exemplars of unit plans as models to guide the pre-service teachers, and for re-orienting "the ways in which teachers think about, and actively plan to teach for sustainability" (Gooch et al. 2008, p. 184).

In addition, teacher education institutions, as higher education institutions, need to be a catalyst for sustainability progress in academic and practical innovation because "The strategic implications of sustainability reach far beyond individual curriculum changes, isolated environmental practices and signatures on international declarations, and require adjustments to academic priorities, organizational structures, financial and audit systems" as well as requiring "considerable innovation for HE institutions to evolve as 'learning organizations'; advancing strategic integration, staff development, collaborative partnerships, and effective stakeholder dialogue" (Ryan et al. 2010, p. 113).

This convergence around strategies for overcoming obstacles provides useful directions for the future implementation of ESD in teacher education.

7 Conclusion

This review of the past thirty or so years of incorporating environmental education into teacher education reveals that there have been many efforts at many levels—so the fact that there are still no consistent or coherent programmes in many institutions is not for want of trying. The approach being taken in recent times is a more comprehensive one, attempting whole system (institution) approaches, and the results from the recent initiatives are encouraging. However, it is likely that these efforts will still struggle to be implemented in many places until ESD becomes an educational priority rather than a political one and it is wholehearted embraced by ministries of education and teacher education institutions.

According to McKeown (2014), the situation is improving and ESD is being woven into teacher education programmes in many ways. For example,

- ESD is being infused into existing coursework—also called embedding or mainstreaming ESD—is a common strategy for beginning to reorient teacher education to address sustainability.
- New courses, and certificate and degree programmes are being created.
- Teacher educators are weaving themes of sustainability and ESD pedagogies into the existing courses.

However, many of these initiatives rely on single enthusiastic individuals and teacher education institutions still need to work with their ministries of education and accept ESD as an educational priority within their teacher education programmes and thereby increasing the percentage of new teachers who understand and can implement ESD-related content and pedagogy. This content needs to be a mandatory component of teacher accreditation, not an option, as teachers have a pivotal role in the education of future generations.

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Annette Gough has been working in the field of environmental education since she conducted Australia's first needs for environmental education survey in 1974. She received her doctorate in education from Deakin University in 1995 where she researched the foundations of environmental education. She first taught at Deakin University but has been Professor of Science and Environmental Education the School of Education at RMIT University in Melbourne, Australia since 2005. She has been an adjunct or visiting professor at universities in Canada, South Africa and the Hong Kong Institute of Education, and has worked with UNESCO, UNEP and UNESCO-UNEVOC on research and development projects. She is a life fellowship of the Australian Association for Environmental Education. Her research interests include curriculum policy and development in science and environmental education, feminist, posthuman, critical and poststructuralist research, and research methodologies. She has written over 120 books, reports, essays, articles and curriculum materials in science and environmental education and related areas.