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Educating for the marine environment: Challenges for schools and scientists

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ABSTRACT

Environmental education has long been recognized as critical for achieving environmental awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective participation in environmental decision-making. Since the Declaration of the 1972 United Nations Conference on the Human Environment concerns about marine pollution and ecotoxicology, among other environmental challenges, should be included in environmental education. However, in the more than forty years since this significant environmental Declaration, marine education has struggled to find a place in the school curriculum of most countries, even though issues such as climate change, chemical contamination of marine environments, coastal eutrophication, and seafood safety continue to threaten human and other species' well-being. This viewpoint discusses how marine education is marginalized in school education, and how marine specialists need to embed school education in their action plans. Particular questions include: who should be educated, about what, where and with what goals in mind?

1. Introduction

Major marine environmental disasters such as the Torrey Canyon oil spill off the English coast in March 1967 were part of the 'growing evidence of man-made harm in many regions of the earth; dangerous levels of pollution in water, air, earth and living things; major and undesirable disturbances to the ecological balance of the biosphere' that were acknowledged in the wording of the Declaration of the 1972 United Nations Conference on the Human Environment (United Nations, 1972, p.1). Outcomes from this conference include the establishment of both the United Nations Environment Programme (UNEP) and UNESCO's international environmental education programme. Both of these organizations continue today, although the nature of the UNESCO programme has changed considerably in the intervening decades.

The origins of the environmental education, and the education for sustainable development (ESD), movements are closely linked to the 1972 United Nations Conference on the Human Environment and its Declaration which proclaims: 'to defend and improve the environment for present and future generations has become an imperative goal for mankind [sic]' (UNESCO, 1978, p. 24).

What was significant at this time was that governments and curriculum developers were listening to scientists and enacting legislation and developing education programs to inform and education people about environmental issues.

Various United Nations sustainable development documents over the decades have recognized the importance of the marine environment

and the need for action to conserve and manage these environments as resources for development. For example, Chapter 17 of *Agenda 21* (United Nations, 1993, para 17.1–17.136) is concerned with 'Protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas, and coastal areas and the protection, rational use and development of their living resources', paragraphs 30–36 of the *Report of the World Summit on Sustainable Development, Johannesburg, South Africa, 26 August–4 September 2002* (United Nations, 2002, pp.22–27) focus on the marine environment, and paragraphs 158–177 of *The Future We Want* (United Nations, 2012, pp.41–46), focus on oceans, seas and coastal areas.

In each of these documents, education is seen as a means of implementation for achieving environmental protection and sustainable development.

The goals from the 1977 UNESCO-UNEP Intergovernmental Conference on Environmental Education Tbilisi (UNESCO, 1978, p.26), which are seen as framing the field, are:

- to foster clear awareness of, and concern about, economic, social, political and ecological interdependence in urban and rural areas;
- to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment;
- to create new patterns of behaviour of individuals, groups and society as a whole towards the environment.

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The focus here is on education related to the total environment – ‘natural and built, technological and social’ (UNESCO, 1978, p.27) – and its improvement and protection. This focus is widely known as ‘Education for the environment’, recognizing that it also involves education *in and about* the environment (Gough, 1997).

There was a transition in terminology between the Tbilisi Declaration (UNESCO, 1978) and later reports in that ‘environmental education’ was increasingly being replaced by ‘education for sustainable development’ in both *Agenda 21*, the report of the 1992 Earth Summit held in Rio de Janeiro (United Nations, 1993) and the report of the 2002 United Nations World Summit on Sustainable Development held in Johannesburg (United Nations, 2002). This transition in terminology related to education reflected the change in emphasis from environmental improvement and protection to a focus on balancing this with development – as reflected in the new terminology of ‘sustainable development’ that has now become part of our everyday language. The emphasis is also now on issues related to improving the lives of people everywhere. For example, in *The Future We Want*, the outcomes document from the 2012 Rio + 20 United Nations Conference on Sustainable Development (United Nations, 2012), the thematic areas and cross-sectoral issues are summarized as: poverty eradication, food security and nutrition and sustainable agriculture, energy, sustainable transport, sustainable cities, health and populations, and promoting full and productive employment, decent work for all, and social protections.

These themes are also reflected in the Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development (United Nations, 2015) and in the UNESCO (2014) *Roadmap for Implementing the Global Action Programme on Education for Sustainable Development* (GAP). The two objectives of this new programme, which is the successor to the 2005–2014 United Nations Decade of Education for Sustainable development (UNESCO, 2005), are:

- to reorient education and learning so that everyone has the opportunity to acquire the knowledge, skills, values and attitudes that empower them to contribute to sustainable development
- to strengthen education and learning in all agendas, programmes and activities that promote sustainable development (UNESCO, 2014, 14).

Each of the various United Nations sustainable development reports acknowledge the importance of education at all levels in achieving a sustainable future. For example, *Agenda 21*, the strategy plan from UNCED, (United Nations, 1993, para. 36.3) states:

Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues It is also critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development, and for effective public participation in decision-making.

In this instrumentalist view, education for sustainable development (ESD) is seen as the means by which schools and communities can (and should) work towards creating a sustainable future.

The 2002 World Summit on Sustainable Development (United Nations, 2002) declared education as critical for promoting sustainable development. However, the vision from *Agenda 21* had broadened from a focus on ‘the role of education in pursuing the kind of development that would respect and nurture the natural environment’ to encompass ‘social justice and the fight against poverty as key principles of development that is sustainable’ (UNESCO, 2004, p. 7). Similar sentiments are reflected in the outcomes report of the Rio + 20 United Nations Conference on Sustainable Development (United Nations, 2012, para 229) where it states,

full access to quality education at all levels is an essential condition for achieving sustainable development, poverty eradication, gender equality and women’s empowerment, as well as human

development, for the attainment of the internationally agreed development goals, including the Millennium Development Goals.

The Millennium Development Goals (MDGs) have recently been replaced by the Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development (United Nations, 2015). These goals are applicable to all countries (rather than just developing countries as with the MDGs), and they include goals related to education (Goal 4) and oceans (Goal 14) as well as climate change, biodiversity, poverty, water, economic development, food security, water and sanitation, among others. Education continues to be an overarching requirement for achieving sustainable development, as the preamble to Goal 4 states: ‘Obtaining a quality education is the foundation to improving people’s lives and sustainable development’ (United Nations, 2016).

The focus of this viewpoint is to explain how various aspects of ocean sustainability, marine pollution and ecotoxicology (as reflected in the scientific themes of this conference), could be incorporated into environmental or sustainability education as part of a top down approach through the science and geography curriculum statements for schools.

I do this by firstly outlining the relationship between environmental education and marine environment, and how this is interpreted in United Nations’ and others’ documents, and then providing examples of how discussions of the marine environment are marginalized in school curriculum. Finally I will focus on how marine pollution and ecotoxicology specialists need to – and can – embed school education in their action plans. In particular, I discuss who should be educated, about what, where and with what goals in mind?

2. Marine education – UN and other international perspectives

A number of United Nations agencies, particularly those associated with UNESCO and UNEP, include a focus on the marine environment and marine education. For example, according to the UNEP ‘Kids Against Marine Litter’ webpage (2016):

Several agencies and organizations working with the issue of marine litter (marine debris) offer educational material and special activities for children. The overall purpose of these efforts is to make children familiar with the marine environment, make them care about it and understand the consequences of abusing it. The educational programmes are about waste management in general and/or about marine litter in particular.

Recognizing that 80% of the pollution entering the marine environment is coming from land-based sources, the UNEP Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA), founded in 1995, closely relates freshwater and seawater in its focus:

The GPA was designed to address the accelerating degradation of the world’s oceans and coastal areas by encouraging governments and regional organizations to prepare and implement comprehensive, continuing and adaptive action plans to protect the marine environment, recognizing the effects on food security, poverty alleviation, and ecosystem health, as well as the resulting economic and social benefits (UNEP/GPA, 2016).

This focus, which encompasses the interconnectedness of social, economic and environmental issues, is consistent with notions of ocean sustainability as included in ocean and coastal sustainability strategy documents such as *A Blueprint for Ocean and Coastal Sustainability* (IOC/UNESCO et al., 2011) and in the Oceans and Seas section of *The Future We Want* (United Nations, 2012).

Some ocean and coastal strategies recognize the importance of developing public awareness and education such as the national (UNEP/GPA, 2006b, p.76) and regional seas (UNEP/GPA, 2006a, p.22) action

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