CHAPTER 17

Developing Pedagogic Approaches to Encourage Decision-making, Invention, Innovative Thinking and Problem-solving

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Introduction

In relation to sustainability education, David Orr (1992) famously wrote about 'The Problem of Education' nearly 25 years ago, pointing out that given the worsening state of the Planet, we still educate our students while studiously ignoring a growing social and environmental crisis. Subsequently, we now have significant, extensive and irrefutable evidence warning of the declining human and physical state of the planet (Stern 2006; Intergovernmental Panel on Climate Change 2013; WWF 2014) and the need to foster greater sustainability is an avowed international educational aim. To emphasise this point, the years 2005–2014 were in fact declared the United Nations Decade for Education for Sustainable Development. However, not only do critics of environmental and sustainability education suggest that progress remains too slow (Saylan and Blumstein 2011; Huckle and Sterling 1996), but for many years, even the nature and definition of sustainability has also been under a seemingly constant shift of emphasis, if not meaning (Frova 2011).

One of the great problems, as discussed in Chap. 1, is that 'sustainability' remains a contested concept. The differing interpretations of the term 'sustainability' have led to a confusing paradox whereby sustainable development can be so widely construed that it can become the aspiration of both environmental campaigners and the corporations that they may vehemently oppose. However, in an interesting review of the dis-

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course around Education for Sustainable Development (ESD), Shallcross and Robinson (2007, p.139) point out that most definitions are 'consistent commitments to changing knowledge, values and attitudes and actions'. This functional characterisation implies that ESD does not necessarily involve the transmission of knowledge but that its outcomes are more related to attitudes and the ability to act. Our students accordingly should be freethinking, adaptable and independent learners who are empowered to direct their own learning and practice. Within the field of ESD therefore there have been calls for significant changes in teaching methods and approaches, if we are to produce a generation, capable, hopeful and sufficiently equipped to meet the challenges of the twenty-first century (Huckle and Sterling 1996; Orr 1992; Hicks 2014). The problem here is that, perhaps ironically, education is not being seen systemically. The teaching methods adopted and the opportunities to implement them are often influenced by a range of other parameters beyond professional choice. These may include additional considerations such as the constraints of time, student numbers, available resources and college policy. Furthermore, the enormity of the topic area of ESD often hinders the design of coherent teaching strategies. The temptation is to embed one potentially 'factual' aspect of sustainability in an already crowded curriculum and to give little thought to research-led practice and delivery. However, what seems evident is that the commonly perceived expository approaches in teaching appear to be at odds with the innovative, student-centred methodologies that ESD appears to require.

However, many of the teaching approaches that are seen to promote the outcomes that are called for in ESD are not necessarily new. Indeed, the antecedence of many such approaches may find contemporary resonance in the Progressive Education Movement beginning in the late nineteenth century (Bruce 2013). Certainly, approaches such as problem-based learning (PBL), co-operative learning and student-centred learning alongside the development of critical thinking and independent learning skills have been clearly identified as having their origins in the work of those most associated with American theorist/practitioners such as John Dewey, William Kilpatrick, Carleton Washbourne and Helen Parkurst (Little 2013).

The kinds of educational approach called for by contemporary writers are very closely related to such established methods and as a result, such pedagogical protocols have significant degrees of evaluative research into their effectiveness as learning methodologies. For example, one approach

to teaching, particularly Health Education, has been that of PBL and its range of variants such as contextualised PBL and scenario-based learning. There has been a considerable degree of research into the effectiveness of this approach across a range of subject areas (Walker and Leary 2009; Strobel and van Barneveld 2009). With such approaches, the emphasis is very much on learning through experience. This could be provided by relevant, contextualised problem exploration and solving that would in turn help develop skills in critical thinking, group work and collaborative learning (Tan 2004). Furthermore, such student-centred methodologies encourage what Petty (2004) has described as 'deep learning'; a constructivist approach where learning is achieved by adapting and building on prior knowledge, skills and concepts thereby allowing the learner to seek meaning for themselves and not the meaning as constructed by their teacher; an approach very much in keeping with the characteristics of ESD identified by Shallcross and Robinson (2007).

Of course one issue related to problem-based or scenario-based approaches is that they are often either centred on previous casework, where the actual outcome (or solution) is known, or is placed in a fictional narrative. Therefore, often the problem is illusionary; it has either been solved in the past, or does not actually exist beyond its function of promoting learning. However, in ESD, we have the potential for students to engage in real-life problems and issues that provide the sorts of experiential transferable skills and proficiencies that are required for the promotion of a more sustainable world (Jones et al. 2010).

Box 17.1: Pause for Reflection.

In Plato's Allegory of the Cave, he imagined a group of people that have lived their entire lives chained to a wall in a cave. The cave entrance, and therefore the light, is behind them and throws shadows of passing animals onto the only wall that they can see. Over time these people give these shadows names, think that echoes are the sounds they make and see them as living creatures. This becomes their reality. One day, one of the people managed to free themselves from the chains and turns to see the cave entrance. The bright light of course hurts their eyes and they are almost blinded by it. As a result they turn and return to the comfort of the dark and the safety of their established reality.

(*continued*)

Box 17.1: (continued)

How far is this allegorical perhaps of our slowness to respond to the environmental crisis? We know that things need to change and that a sustainable future has profound implications for our lifestyle, so we turn away. Is there a sense of safety in the dark? How far can education promote a sense of the possible? To what degree do we as educationalists engage our students with issues relating to sustainable futures?

Yet, as complex as the issues of sustainability are, the need to address them and the ways that we explore, explain and respond to them should interest anyone involved in teaching. For many, when we examine the suggested pedagogical strategies called for it is in fact difficult to see why they should be uniquely associated with ESD. The new methods and outcomes called for in good and effective sustainability education are perhaps simply those required for good and effective teaching and learning (Cutting and Cook 2009; Cook et al. 2010) and have already been adopted by many practitioners. In other words, we are closer than we might recognise to implementing these called for changes in education in the UK.

Given this, the approaches that we may have already adopted in our praxis may have much to offer in terms of an expertise and extant proficiency to the wider international transition to a more sustainable world. Sometimes it is easy to forget the international nature of sustainability education and our responsibilities towards global issues of health and social equity.

Box 17.2: Pause for Reflection.

- What do you think are the peculiar skills that students need to face future issues of sustainability?
- Having identified some at least, how does your teaching at present address these needs?
- Do you think that teaching approaches and teaching styles need to change? If so, in which ways and how would your teaching style change?
- Can you identify any obstacles that may present themselves relative to those changes? How may it be possible to overcome these?

From Millennium Development Goals to Sustainable Development Goals

A key international initiative that has been an important focus for international partnerships in key aspects of sustainability has been the Millennium Development Goals (MDGs) (UNESCO 2005). In 2000, the MDGs were first published, and the eight goals, each with stated targets, were to directly address the issues of poverty, hunger, disease and inequality by 2015. The eight goals and the targets for each are given in Table 17.1.

After 15 years, while millions of people have undoubtedly moved out of extreme poverty, the relative success in moving towards achieving the MDGs remains contentious (Fehling et al. 2013) and the challenges of fighting extreme poverty in all countries and of achieving the other MDGs

Table 17.1 The MDGs

1. Eradicate extreme poverty and hunger
   a. Halve, between 1990 and 2015, the proportion of people living on less than $1.25 a day
   b. Achieve decent employment for women, men and young people
   c. Halve, between 1990 and 2015, the proportion of people who suffer from hunger
2. Achieve universal primary education
   a. By 2015, all children can complete a full course of primary schooling, girls and boys
3. Promote gender equality and empower women
   a. Eliminate gender disparity in primary and secondary education preferably by 2005, and at all levels by 2015
4. Reduce child mortality
   a. Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate
5. Improve maternal health
   a. Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio
   b. Achieve, by 2015, universal access to reproductive health
6. Combat HIV/AIDS, malaria and other diseases
   a. Have halted by 2015 and begun to reverse the spread of HIV/AIDS
   b. Achieve, by 2010, universal access to treatment for HIV/AIDS for all those who need it
   c. Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases
7. Ensure environmental sustainability
   a. Integrate the principles of sustainable development into country policies and programmes; reverse loss of environmental resources
   b. Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss
   c. Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation
   d. By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers
8. Develop a global partnership for development

remain (Stijns et al. 2012). However, many countries have made some advancement towards most of the goals and it is widely accepted that the MDGs did provide a focus for discussions and policy planning at national and international levels. In education, they became the basis of educational programmes, both formal and informal, with the recognition that 'the increased inequality caused by differences in educational attainment adds to longstanding inequalities in other dimensions'. (Sachs 2012, p.2211). This framework and focus is now set to continue with the new Sustainable Development Goals (SDGs) (UN General Assembly 2015) (Table 17.2).

Table 17.2 The SDGs

1. End poverty in all its forms everywhere
2. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture
3. Ensure healthy lives and promote well-being for all at all ages
4. Ensure inclusive and equitable quality education and promote life-long learning opportunities for all
5. Achieve gender equality and empower all women and girls
6. Ensure availability and sustainable management of water and sanitation for all
7. Ensure access to affordable, reliable, sustainable, and modern energy for all
8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
10. Reduce inequality within and among countries
11. Make cities and human settlements inclusive, safe, resilient and sustainable
12. Ensure sustainable consumption and production patterns
13. Take urgent action to combat climate change and its impacts
14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

Box 17.3: Pause for Reflection.

- Read through the MDGs listed in Table 17.1. How far, if at all, did your teaching, or your role, help achieve any of these goals?
- How could you have contributed more?
- Which goals do you feel you did/could have contributed most effectively to?
- Now read through the SDGs
- What do you see as the primary difference between the MDGs and the SDGs?
- Identify which, if any, you could feasibly professionally contribute to.
- What form would/could those contributions take?

International Collaboration in Education and the Sustainable Development Goals

In the Pause for Reflection box, you were asked to consider the potential contribution that you could make to the implementation of the SDGs. This section looks at ways in which international collaboration, particularly in terms of the pedagogical approaches discussed in the first section, may be one way that such an objective may be achieved.

Perhaps one of the most important and poignant issues relating to the present state of the planet is that of health, particularly the provision of and equitable access to healthcare. If ESD has one key priority, perhaps the health of this and the next generation perhaps should be it. Reflecting this, both the MDGs had and the SDGs have priorities relating to health outcomes. Urgent improvements in healthcare formed the basis of MDGs 4, 5 and 6 and this is retained in goals 2, 3 and 4 of the SDGs. Improvements in the quality and inclusivity of education forms the basis of SDG 4, and although there is no explicit statement about the importance of education, it is clearly integral to a number of the other goals relating to social equity. The one goal that also remains is the commitment to international collaboration and perhaps in such partnerships in teaching and learning, the greatest potential opportunity for direct involvement resides.

In many African countries, University Health faculties will be a major, if not the sole, training providers in poor, rural areas. In 2013, there was a worldwide shortfall of 7.2 million health workers, and that this figure was predicted to rise to 13 million by 2035 (Campbell et al. 2013). One of the identified key causes for this worsening shortfall was that not enough young people were being adequately trained and that increasing demands are also being put on the sector from a growing world population exacerbating regional imbalances. In relation to education and training in the 47 countries of sub-Saharan Africa, only 168 medical schools exist. Of those countries, 11 have no medical schools, and 24 countries have only one. The report concluded that:

> One of the challenges for achieving universal health coverage is ensuring that everyone—especially people in vulnerable communities and remote areas—has access to well-trained, culturally-sensitive and competent health staff.

High-quality teaching and learning is therefore vital in production of effective practitioners who work in environments of extreme poverty and isolation.

While the health problems that countries and regions face are often uniquely contextualised (Maila 2010), in the last decade there has been something of a pedagogic divergence, in regard to the delivery of health-based courses, between teaching institutions in the higher-income countries (HICs) and those in the lower-income Countries (LICs). Delivery of health courses in HICs has moved increasingly to a PBL model (Tan 2004) and yet the pedagogical approaches adopted on programmes in LICs are often more didactic models (Weber 2011).

The call for new approaches in sustainability education is predicated upon a research literature that suggests that didacticism often fails to promote critical engagement, as well as critical reflection upon and the contextualisation of practice. Such approaches in the area of health would clearly not produce practitioners who are effective decision makers. Curricula based on more active learning approaches such as PBL however are recognised as bridging the gap between theory and practice, enabling the development of real-world competencies (Tan 2004; Cutting and Kelly 2015).

In a recent paper, Kiguli et al. (2011) have identified critical gaps in core competencies in nursing and medical programmes in Uganda and concluded graduate practice would be improved if teaching were better

contextualised and relevant to work settings. The development and implementation of elements of PBL in programmes in such African universities could eventually provide a significant improvement in the professional practice and subsequently the health of regional communities. It would help build the capacity of students specifically working in the areas such as paediatrics, infectious diseases and pre- and postnatal health to evaluate situations, make informed decisions and critically reflect on practice.

A Case Example of the Nature of Potential Collaboration

Mekelle University (MU) is situated in Tigray regional state, one of the largest regions in Ethiopia with a population of nearly five million, of which 18 % are under five years of age. The College of Health Sciences is the sole regional provider for child healthcare workers and is therefore a vital resource in building the capacity of health professionals. In many African countries, other University Health faculties will be the major (if not the sole) training providers in poor, rural areas. Such provision is then at the forefront of training and professional development of health workers in some of the poorest areas.

The recent and rapid expansion of higher education (HE) in Ethiopia has resulted in a significant shortage of HE staff (Jobson 2010). At MU, the shortfall is addressed by the employment of recent master's graduates as instructors. With little or no training, pedagogic approaches are predominantly didactic and foster an approach to teaching that often fails to promote critical engagement, as well as critical reflection on and contextualisation of practice. It is not producing graduates who are effective decision makers, who can operate in isolated environments with partial information and limited resources. At postgraduate level, MU offers a UNICEF-funded MSc in Child Health and Paediatrics that has undoubtedly made a significant contribution to the health of children in Tigray. The course is unique to MU and as such is identified as a priority provision. However, here again, the pedagogical approaches adopted on the programme are predominantly didactic, an approach that often fails to promote critical engagement, as well as critical reflection on and the contextualisation of practice. The recognised need here is to build the capacity of students specifically working in the areas of paediatrics,

infectious diseases and pre- and postnatal health to evaluate situations, make informed decisions and critically reflect on practice.

The key to realising the SDGs in this area is not only to develop the capacity of students to advance critical practices, a recognised priority, but also to increase the capacity of teaching staff. In the UK in the FE sector, we already adopt a wide range of research-led active learning approaches and the transfer of such experience is one way in which collaboration may be developed.

MU recently sought to develop student-centred PBL resources as this is well established as pedagogy in medical education. Yet, evidence suggests that the introduction of PBL is diminished without staff development and support; therefore, staff training is regarded as essential (Massaro et al. 2006). Staff development and assistance in the design of resources was the recognised need. The expertise of teaching staff in the UK provides a real opportunity across a range of subject areas to assist in the development of teaching and learning resources around professional practice.

Such collaborations need not necessarily involve the costs incurred by travel and physical meetings, for the last decade has also witnessed Web 2.0 technologies assisting in the generation of online learning (Dunlop and Lowenthal 2009) promoting appropriate interactions that help students learn through discussion and discourse (Wheeler 2009). PBL is well suited to online environments (Savin-Baden 2007) and the co-operative development of online PBL resources not only may play a significant role in the promotion of learning but also can promote highly effective international learning communities (Cutting and Garrett 2012a). The development of such communities between colleges would establish what Elton (1996) best described as the New Collegiality where learning transcends hierarchy and nationality, as students and staff from different institutions together become knowledge producers. Such international collaboration would provide pedagogic and professional approaches that would promote a model of learning that focuses not only on cognitive perspectives but also on the ontological. It would allow an international discourse that promotes criticality and reflective practice. In short, it would help facilitate the development of professionals better equipped to improve the health and well-being of children in some of the poorest areas.

Having established contact with Mekelle University, it was proposed that online workshops were run, for and with, MU staff in the College of Health Sciences, using the considerable experience of staff from the UK in the development, implementation and evaluation of student-centred

learning (Kelly and Finlayson 2007: Kelly and Cutting 2008) and in running staff development workshops and seminars. This programme would be essentially online, and on completion, participants would be recognised by MU as PBL advocates and would go on to implement an agreed staff development programme, supported again online, by pre-recorded video and live links by the Plymouth University team.

Online workshops would also be run by the team with MSc students focusing on the development of their research skills, delivered in a PBL format with MU advocates in attendance as co-facilitators.

Partnership Approaches to Learning and Sustainability

Promoting external partnership and internationalisation are often major strategic objectives of tertiary colleges and today international partnerships are not difficult to develop. Increasingly, the use of non-proprietary freely available software such as Skype or FaceTime may be utilised for collaborative online meetings and discussions with both staff and students. Social media may be utilised to form international co-operative and collaborative study groups (Cutting and Garrett 2012a). The development of online international partnerships provides a two-way learning environment. Members of staff from both institutions are able to develop effective and appropriately contextualised teaching and learning resources, in this case based around issues of health, and the students begin to genuinely recognise the complexity of both the issues and the constraints relative to possible responses. This in turn provides a different level of engagement in subsequent discussions about sustainability. Working at an international level also promotes sensitivity to, and a much greater appreciation of, the issues relating to health and development in Low-Income Countries (Cutting and Garrett 2012b). This also has particular benefit in Low-Income Countries, as an 'open source' approach requires minimal investment form the participants. Web 2.0 applications may help to promote a more global curriculum, support learning and improve student engagement, and particularly target contextualised real-life problems. Students have also informally reported that the international dimension of the project added a dynamic to the discussions. One based on an enhanced appreciation of cultural perspectives (Cutting and Garrett 2012b).

This approach may be seen as 'learning as participation' (Vare 2007) where students are involved in a method that promotes the development of deeper understanding to the extent that we may feel we can influence outcomes. (Scott and Vare 2007) These characteristics are exactly those of approaches that we require to adopt in ESD.

Conclusions

Of course calling for international collaboration on line or otherwise is one thing, carrying it out is another. Within FE Colleges, there is a constant tension between social and community purposes and contemporary economic pressures and staff often need to carefully negotiate and arbitrate these conflicting factors. However, undoubtedly, FE colleges need to be flexible multi-agencies if they are to meet the needs of their local communities and those of a global community (Hyland and Merrill 2001).

We have the technology in place and through social media and information technology, we have an unprecedented opportunity for inclusive, global-scale problem solving around the main sustainable development challenges.

The international collaborative development of contextualised active learning approaches presents a very real opportunity for staff in the FE sector across a range of professional disciplines to enhance the experience of their own students and that of students in other countries. It is also a mechanism by which the teachers in FE colleges can bring their professional skills to the forefront and actively promote and help in the implementation of strategies to help achieve the new SDGs. Sachs (2012) suggests that pathways to sustainability 'will not be identified through a top-down approach, but through a highly energised era of networked problem solving' (p.2211). Such networks may well be a way in which FE colleges could look beyond local provision and participate more fully in the future well-being of people in the wider global community.

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Further Reading

It is difficult to recommend specific reading around this area, but you could try a general search for international collaboration. The British Council website is often a good place to start to view some of the projects taking place and can be accessed at https://www.britishcouncil.org/education.