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ARTICLE

Accommodating environmental controversies in the classroom curriculum: Too hot to handle or opportunities for deep learning?

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Abstract

Studies have shown that young people have a keen interest in environmental issues and the controversies surrounding them, yet environmental controversies often struggle to gain unfettered access to the classroom curriculum. This article discusses the findings of a research project that investigated the beliefs of secondary school teachers about a proposal to build a pulp mill in Tasmania. The study found that teachers were wary of the political context but nonetheless discerned the educational benefits of including subject matter of topical and particular interest to their students in the classroom curriculum. Although environmental controversies can be hot to handle, this paper argues that a student-centred approach to curriculum design, organised around issues of relevance and meaning to young people, offers scope for substantive engagement and deep learning.

Introduction

The environmental movement had its origins in Rachel Carson's *Silent Spring*, published on the cusp of the Sixties social revolution in 1962, which eloquently argued the urgent need to address degradation of the natural environment. In the intervening decades, the study of environmental issues has been widely accepted as legitimate and worthwhile subject matter (Gough, 2002). Yet, in Australian schools and elsewhere, it has rested uneasily in the curricular space contested by the empiricism of the sciences on the one hand and the politicised context of social education on the other. By their nature, environmental controversies are often characterised by political polemics, yet in many cases they are highly complex and therefore provide ample opportunity for students to develop nuanced understandings beyond that of crude debate. As such, local environmental controversies that are genuinely relevant to young people provide rich opportunities for powerful learning.

This article draws its data from a small-scale Bachelor of Education (Honours) research project (McLaine, 2007) that investigated Northern Tasmanian teachers' beliefs about teaching controversial issues in the period following the 2003 announcement of a proposal to build a large-scale pulp mill near Bell Bay in the Tamar Valley region of Tasmania. The proposed pulp mill would enjoy a competitive advantage due to its site in terms of the adjacent seaport and close proximity to timber plantations, and modelling suggests it could significantly benefit the Tasmanian economy (West, 2009). Conversely, it is well documented that pulp mills are notorious sources of environmental toxins (e.g. Colodey & Wells, 1992) and, while wastewater from pulp mills can be effectively treated (Pokhrel & Viraraghavan, 2004), the proposed pulp mill would still need to be monitored in a transparent and trustworthy fashion.

The key parties involved in this environmental controversy were, on the one hand, a coalition of government and business interests wanting to rejuvenate the ailing Tasmanian forestry industry which has lost two-thirds of its workforce, and on the other hand, a well-organised environmental lobby in Tasmania, with a history including the successful Franklin River blockade in 1982 that resulted in the cancellation of a major hydro dam project (Roe, 1997; West, 2009). Prior to and during the period of data collection, feelings in the region ran high. Protagonists were prone to exaggeration and quick to depict their opponents as unpatriotic. For example, a spokesman at a "river rally" protest against the pulp mill involving scores of marine craft sailing down the Tamar River, stated that "(the pulp mill) is the most hideous act of criminality ever perpetrated on the people of this state" (The Wilderness Society, 2006). Prominent Tasmanian novelist and former Rhodes scholar Richard Flanagan reflected at the time:

Anyone questioning the (forestry) industry's actions is attacked by leading government figures as a traitor to Tasmania ... to question, to comment adversely, is to invite the possibility of ostracism

and unemployment ... it is commonplace to meet people who are too frightened to speak publicly of their concerns about forestry practices ... fear has entered Tasmanian public life. (2007, pp. 23-24)

Accordingly, the social context of the research project was clearly charged with a degree of fear and distrust.

The project investigated teachers' perceptions about the following three issues: (1) the extent to which environmental controversies are taught in schools; (2) teachers' beliefs about teaching environmental controversies; and (3) the feasibility of teaching environmental controversies in traditional subject areas such as the sciences.

This article reports on the findings of the project. In the process, it examines the case for teaching environmental controversies, both in the context of the science classroom and the social education classroom. It then links the study of environmental controversies with the interdisciplinary concepts of sustainability and globalisation which are now embedded in the Australian Curriculum (Australian Curriculum, Assessment and Reporting Authority, 2011). The article also discusses integrated curriculum approaches relevant to teaching environmental controversies. It concludes that it is important for schooling in democratic countries to help young people to develop sophisticated perspectives on environmental controversies, but that traditional approaches dominated by stereotypical teaching methods within discrete subject areas may be ill-suited to accomplish this.

Literature review

The case in favour of accommodating controversial issues within the classroom curriculum is relatively strong and is best made using a wide-angle lens; firstly considering disciplinary perspectives in science and social education, then secondly examining the concepts of sustainability and globalisation which cut across the traditional subject areas in the school curriculum.

Concerns about student engagement in science

In their national review of science in Australian schools in 2000, Goodrum, Hackling and Rennie found that students find science "engaging and challenging" when it connects with their interests and life experiences but, too often, "this is not the case" (2001, p. 166). At the grass roots level, some teachers in Australia are eschewing textbooks and making concerted efforts to actively engage students by drawing subject matter for science lessons from local contexts, both in Tasmania (e.g. Kenny, Seen & Purser, 2008), and elsewhere in Australia (e.g. Tytler, Symington, Kirkwood & Malcolm, 2008). In another national review of science education, Tytler (2007) called for a "re-imagining" of the Australian science curriculum with "varied and open pedagogies" known to actively engage young people with learning (p. 67). He added that subject matter should be chosen "with a view to its usefulness in students' current and future lives as citizens" (p. 64). In the same vein, Roth and Calabrese Barton (2004) suggested that it is time to "rethink" scientific literacy so that young people learn how to apply their knowledge of science to meaningfully address personal and community issues. Controversial issues offer a promising way to connect scientific understanding with "real-life" applications that are relevant and meaningful to young people. In the context of citizenship education, for example, Oulton, Day, Dillon and Grace (2004) found that investigating controversial issues helped young people to become scientifically literate by teaching them how arguments are constructed and opinions are swayed.

Controversial issues in the social education classroom

Controversial issues are regarded as an "integral and inescapable" aspect of the curriculum in social education classrooms (Marsh & Hart, 2011, p. 174) but, student-centred investigation of local controversial issues is relatively uncommon in social education because many teachers lack confidence, have insufficient opportunity for professional learning, or are fearful of disapproval from their local community (Barton & McCully, 2007; Johnston, 2007; Kivunja, Reitano & Porter, 2011).

Gilbert (2011) nonetheless builds a compelling case for combining values education and controversial issues and bringing this into the social education classroom in order to prepare young people for active democratic citizens as adults. He argues that investigating controversial issues teaches young people the skills of negotiation, persuasion and logical analysis; and fosters attitudes of tolerance, empathy and caring. Accordingly, Gilbert explains, controversies can be either discussed "in sophisticated, informed and critical ways; or in crude, ignorant and prejudiced ways" (2011, p. 96). This kind of critical approach to education, teaching the skills needed for active citizenship, is befitting of well-educated citizens in a Western democracy (Apple & Beane, 2007; Barton & McCully, 2007).

Another facet to the pedagogy of controversial issues is to develop a strategy for handling personal bias. A contemporary approach, utilised by social educators in Australia, is to flexibly adopt up to four positions according to circumstances: (1) neutral or impartial – where one’s position or bias is withheld, (2) stated commitment – where one’s position is revealed during the course of discussion, (3) balanced approach – where one offers several different points of view, and (4) devil’s advocate – where one adopts an extreme position differing from the position held by the majority of the class (Gilbert, 2011, pp. 94-96; Marsh & Hart, 2011, pp. 173-175).

Globalisation and sustainability

On a global basis, education for sustainable development has gained considerable momentum over the last decade (Cutter-Mackenzie, 2011). For instance, American middle schooling advocates have found that throughout the USA, degradation of the natural environment consistently ranks very highly among the concerns of young people (Beane, 1997, 2005). Similarly, a survey involving over 2,000 children in South Australia found that caring for the environment was their equal top concern alongside fear of a family member or friend dying (Cornish, 2007).

Based on data collected from Tasmanian primary school principals, a case study of a suburban primary school in Hobart, as well as extensive analyses of media publications and public policy documents in Australia, Mulford and Edmunds (2010) concluded that four interrelated forces – (1) globalisation, (2) advances in science and technology, (3) pressure on the environment, and (4) changes in demography and the nature of work – have gathered unstoppable momentum and are in the process of reshaping society and, consequently, are changing the nature of schooling in Australia (pp. 6-11). As such, they argue, it is imperative for school leaders, backed up by communities who know the needs of their children and young people, to be active stakeholders in the process of developing the kind of schooling that students need and deserve.

Sustainability is a key component of environmental citizenship; in both the global context (e.g., Kusmawan & Reynolds, 2008) and, here on the driest continent, where it is regarded as an essential aspect of Australian education (Department of Environment and Heritage, 2005). The 2008 *Melbourne Declaration on Educational Goals for Young Australians* stated that “a focus on environmental sustainability will be integrated across the curriculum” (Ministerial Council on Education, Employment, Training and Youth Affairs, 2008, p. 14). With specific reference to the *Melbourne Declaration*, the Australian Curriculum recognises “Sustainability” as one of only three cross-curriculum priorities, along with “Aboriginal and Torres Strait Islander histories and cultures” and “Asia and Australia’s engagement with Asia”, which are embedded in the national curriculum’s learning areas (Australian Curriculum, Assessment and Reporting Authority, 2011). As the Australian Curriculum acknowledges, the notion of sustainability is a “big idea” with cross-curricular implications that transcend discrete subject areas such as social education or science. Gough’s (2002) key insight in this regard is that environmental issues such as sustainability need to be studied in an interdisciplinary context mutually drawing subject matter from both social education and science. Indeed, her “mutualism” metaphor, borrowed from biological science, can be logically extended to one of “obligate mutualism” – such as a coral organism and photosynthetic algae living within the coral which both need each other to survive – where both social education and science must have a presence for a given environmental issue to survive within the ecosystem of the curriculum.

Multidisciplinary and integrated curriculum approaches

Given that it has interdisciplinary roots, social education is often recommended as an ideal launching pad for curriculum integration (e.g., Marsh, 2010), yet few writers indicate what an integrated curriculum would look like or how it could be implemented in a crowded school curriculum. In many cases recommendations seem to be founded on subject-centred considerations; that is, they identify overlaps between subject areas which are then organised around a common theme (e.g., McMullen & Fletcher, 2009). Perhaps the most promising approach to curriculum integration in terms of learning outcomes, albeit one that requires whole-hearted commitment, is the student-centred “integrative” model based on democratic principles where teachers and students collaboratively design and implement the classroom curriculum (Beane, 1997, 2005). The integrative approach is ideal for investigating environmental controversies emerging from students’ personal concerns. Similarly, Collins (2009) advocated the use of “guiding ethical questions” to direct student inquiry from social education into a range of other subject areas (p. 5). In this way, she suggested, “the relevant disciplinary doors would be thrown open for students to step through in a meaningful search for answers” (p. 5). As Beane (1995) explained, this allows students to access knowledge within the disciplines on the basis of serving their needs and

purposes, rather than pursuing arid studies of disciplinary knowledge out of context.

Innovations such as an integrated approach to the classroom curriculum invariably seem a good idea at the time but decades of research and practice show that the “grammar of schooling”, representing a bundle of entrenched norms originating as far back as the Industrial Revolution in the mid 19th century, is both highly conservative and remarkably resistant to change (Tyack & Tobin, 1994, p. 453). New subject matter or innovative pedagogies must be widely accepted and practised by subject area stakeholders if they are to be inculcated into this grammar. For instance, despite a long history of promising starts with impressive results, curriculum integration has never entered the mainstream of secondary school practice in New Zealand (Dowden, 2011). Accordingly, teaching an environmental controversy by utilising a student-centred integrated curriculum approach needs to be well conceptualised, fully justified on pedagogical grounds, and must be strongly supported by the school community.

Methodology

The study used a mixed method approach involving the collection of quantitative survey data and qualitative interview data then verifying the data by utilising the “validating quantitative data model” recommended by Creswell and Plano Clark (2007, p. 63). The participants were teachers recruited from eight secondary schools in the Tamar Valley region of Tasmania. The sample sizes were 28 participants for the survey questionnaire and 5 participants for the interviews. The interviewees were selected if, during the survey, they made links between teaching environmental controversies and the possibility of utilising integrated curriculum designs.

The survey included a demographic section, a section rating participants’ degree of agreement with various statements, and a section with open-ended questions. The middle section of the survey consisted of several statements asking teachers to rank their extent of agreement on a five-point Likert scale (Creswell, 2005). In summarised form, some of these statements were: “Students should study local controversies such as the proposed pulp mill”, “I am comfortable teaching environmental issues such as the proposed pulp mill”, “when teaching controversial local environmental issues such as the proposed pulp mill teachers should conceal their opinions and biases”, “it is not safe to teach controversial issues such as the proposed pulp mill”, and “I would like opportunities for professional learning relating to teaching controversial issues”. The open-ended questions in the final section of the survey provided teachers with opportunities to comment on: (1) the extent to which they believed environmental controversies could be taught within traditional subjects such as the sciences, (2) whether or not they had taught students about the pulp mill issues and the subject context and pedagogies they used, and (3) what they considered to be most important about teaching controversial issues.

Although the sample size was too small to allow generalisation on a statistical basis, and the use of Likert scale data has known limitations (Cohen, Manion & Morrison, 2000), the data were analysed for the presence of substantive trends which could support a case study amenable to “fuzzy generalisation” (Basse, 1999, p. 51) and, accordingly, have relevance to other educational contexts that accommodate environmental controversies within the classroom curriculum.

The project was approved by a full committee of the Human Research Ethics Committee of Tasmania. The controversial nature of the proposed pulp mill and its high profile in the Tasmanian media leading up to and during the period of data collection were assumed to have influenced the participants’ responses.

Results

The project findings demonstrated the presence of some pronounced trends within the participants’ views and beliefs and, taken together, these provide a case study that provides useful insights for other secondary schooling contexts.

Beliefs about teaching environmental controversies

Ninety three percent of the participants agreed that they had a personal interest in controversial issues that affect Tasmania. In addition, 100% of the participants agreed that local environmental controversies such as the proposed pulp mill should be taught in schools. For instance, a male science teacher with over 20 years of teaching experience stated:

If you don’t [teach about local environmental controversies] then you are saying to students it is not the domain or (the place) to discuss it, and that’s wrong. I can always relate it back to science; addressing it through critical scientific literacy.

Seventy nine percent of the participants were comfortable with, and felt safe about teaching local environmental controversies such as the proposed pulp mill, but 21% were uncomfortable and felt unsafe;

with no middle ground on this issue. Notably, 25% of the participants had been specifically instructed by their school administration not to teach about the controversy, which amounts to a remarkable example of censorship of the curriculum within the Australian context. A similar sized group, 28% of the participants, perceived a climate of fear and conflict surrounding the pulp mill debate, meaning that it was safer not to discuss the controversy at school or in class; but, presumably, the size of this response was influenced to some extent by the above censorship that had occurred in at least one school. The majority of the participants (68%) agreed that they would welcome professional learning opportunities to develop strategies for teaching controversial issues, with only one participant disagreeing on this point. Statistical correlation of the data in this section (using Pearson chi-square analysis) showed strong positive relationships between beliefs of the participants concerning their interest in Tasmanian environmental issues, their degree of comfort teaching such issues, and their desire for professional learning opportunities relating to teaching controversial issues.

Neutrality and bias

The participants were strongly divided on the issue of personal bias with few individuals occupying the middle ground. The notion of neutrality was supported by about 50% of the participants in our study; whereas the alternative view, that one should reveal personal opinions or biases, was held by the remaining half of the participants. Statistical correlation of the data using the above methods showed that the two divisions were pronounced.

Accommodating environmental controversies within subject areas

The majority of the participants (68%) believed that teaching about the proposed pulp mill controversy could be introduced into the classroom curriculum within several subject areas; with only small minorities of the participants indicating it should be restricted to either science (10%), social education (7%) or other subject areas (14%). Three participants specifically suggested that an integrated curriculum design would be appropriate. In addition, a large majority of the participants (82%) believed it was preferable to teach the controversy at all levels of schooling. Although small minorities believed it is preferable to limit teaching controversies to Grades 11-12 (7%) or to Grades 9-10 (7%), almost none of the participants believed it was preferable to limit teaching controversies to Grades 7-8 (4% or one person) or to Grades 1-6 (0%). In summary, the participants thought that local environmental controversies are best taught throughout the years of schooling and across a range of subject areas.

According to the participants, the most important reasons for accommodating environmental controversies with the classroom curriculum were: to teach students investigative skills and to evaluate evidence in an objective and balanced manner, to prepare students for citizenship in a democratic society using a values based approach, and to understand the multiple perspectives of the stakeholders within a given controversy.

Discussion

Teachers' beliefs

All the participants in the study believed that environmental controversies should be accommodated within the classroom curriculum, and it seems reasonable to assume that many teachers in other contexts would think the same. Indeed, we suggest that investigating environmental controversies and, in the process, developing a sophisticated literacy relating to the art of negotiation, debate and compromise is a democratic right for all young people and, in the long run, is fundamental to nation building and ensuring that citizens are well educated and informed.

Some of the participants in the study felt uncomfortable or unsafe at the prospect of teaching an environmental controversy. This finding echoed other Tasmanian research during the period of the Tamar Valley pulp mill controversy that found that Bachelor of Education students were keen to avoid environmental controversy; even to the extent of pursuing an "agenda of censorship", controlling what children may learn, by situating social education lessons within non-controversial contexts (Johnston, 2007, p. 358). This problem could be addressed by opening up discussion and providing professional learning opportunities for teachers as well as other key curriculum stakeholders in school communities such as the principals. In addition, the study indicated that some secondary teachers may be unaware that an effective pedagogy for dealing with neutrality and bias is to flexibly adopt a range of positions according to circumstances (Gilbert, 2011; Marsh & Hart, 2011). Again, professional learning pertaining to teaching controversial issues should include consideration of this and other similar pedagogical approaches.

Curriculum integration

We suggest that environmental controversies can and should be taught across the curriculum throughout the years of schooling. Curriculum integration offers a promising vehicle for investigating environmental controversies because it allows a given issue to be considered holistically without ignoring important aspects, which is often necessarily the case during single-subject lessons. For example, a student-centred integrated curriculum design might investigate the environmental impacts of a controversial development such as the proposed Tamar Valley pulp mill. Utilising the key principles of sustainability, a student-led investigation could also include analyses of the social and economic impacts of the pulp mill, both positive and negative; and provide a balance to conclusions students might draw on the merits or otherwise of the project going ahead.

While subject-centred or "multidisciplinary" approaches to curriculum integration could be utilised to investigate environmental controversies, these are typically designed by teams of teachers; thus student-centred approaches, such as Beane's integrative model (1997) which involves intensive teacher-student collaboration, are preferable for ethical reasons (Dowden, 2007). Indeed, in the case of investigating environmental controversies, there is an ethical and moral imperative to allow students to develop their own lines of inquiry; by constructing their own knowledge by drawing from the disciplines, then developing their own nuanced conclusions and personal standpoints.

The integrative model has another feature which especially lends itself to the investigation of environmental controversies. In collaboration with their teachers, young people frequently formulate micro- and macro- applications of the same theme (Beane, 1997). For instance, they might choose their own personal health and the problem of national obesity; or, taking the example already discussed, the local environmental controversy of a proposed pulp mill and instances of multinational companies exporting pollution by establishing poorly regulated industrial complexes in third-world countries.

Pedagogies might include using digital technology to connect with other classes investigating local environmental controversies in other parts of the world. For instance, a class in Louisiana, USA, might be gauging the impact of an oil spill on their local coastal ecology and the regional shrimp industry; or a class in Churchill, in the Canadian province of Manitoba, could be investigating the impact of polar bear eco-tourism on the local First Nations community and the Hudson Bay economy; or a class in the locality of Simandou, in the interior of the West African country of Guinea, might be investigating the impact of a new iron ore mine on the biodiversity of the Upper Guinean rainforest and as a major employer in the local economy. Young people become truly global citizens: by collaboratively sharing their findings then comparing respective ways of knowing, by gaining deeper insights into each other's cultures, and by making meaningful personal connections. Rich exchanges between young people would result in a rapid and "deparochialised" kind of globalisation (Lingard, 2006, p. 289), rather than the imperialistic kind of globalisation often associated with brands of soft drink or fast food, and strongly promote the global development of what Apple (2001, p. 18) referred to as "thick" democratic understandings.

Conclusion

The participants in the research study believed that it is generally desirable to accommodate environmental controversies in the classroom curriculum. However, in the case of the proposed Tamar Valley pulp mill, some were not convinced it would be safe and others were denied the right to do so. The participants believed that environmental controversies can be taught across the curriculum. We have argued that a student-centred design for curriculum integration opens the door to rich learning experiences. The study of environmental controversies prepares future generations who – as active and responsible citizens – are then better equipped to understand and apply disciplinary knowledge from the specialist subject areas that inform their careers. Thus, the primary purpose of accommodating environmental controversies in the classroom curriculum should not, as Apple (2000) explained, be merely to promote "functional literacy", but to create a critical, powerful and political literacy.

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