Framework Thinking, Subject Thinking and "Taiwan-*ness*" in Environmental Education

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Abstract In the 1998 Taiwanese national curriculum revision, environmental education was one of six new "Important Issues". To some early observers, the generic "framework" sections of this 1998 curriculum (Aims, Goals, Core Competences) resonated well with the integrative and transdisciplinary nature of environmental education. This synergy held out promise for the successful introduction of environmental education to Taiwan, despite it not being one of the seven new Learning Areas (or subjects). However, this study suggests that a pervasive nation-wide exam-driven, subject-dominated educational climate resulted in a somewhat truncated "Taiwan-*ness*" in the environmental education that emerged. In three Junior High Schools preparing for curriculum implementation, there was little early focus on, either the national curriculum's framework aspects or the intended integrative nature of environmental education. Rather, by 2004 curriculum integration had become officially non-compulsory, and environmental education was conceived as a minor priority, to be wedged where possible into spaces within the traditional subjects.

Introduction

Environmental education has increasingly gained emphasis since the late 1960s in school curricula worldwide. Further, it has been widespread in national educational policies, curriculum documents, curriculum development initiatives, and conservation strategies (Rickinson, 2001). In Taiwan, prior to 1998, environmental education largely consisted of voluntary initiatives by individual schools: organic and inorganic recycling within the school community, enhanced energy efficiency in new schools buildings and the through-flow of materials, documenting of the condition of local streams and parks, and so on. If there was a distinctive "Taiwan-*ness*" to environmental education in Taiwan at all, it was characterised by a focus on the need to achieve a cleaner *environment* rather than by the presence of systematic, long-term, theory-grounded *education* programs in schools. However, a national curriculum framework released in 1998 (and which, in 2011, is still current) required for the first time that environmental education be taught in schools. Environmental education was categorised as one of six Important Issues intended to be taught across all seven Learning Areas (or subjects) (Yueh, 2007).

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ISSN:0814-0626 © Australian Association for Environmental Education

https://doi.org/10.1017/S0814062600000136 Published online by Cambridge University Press

In fact, many environmental education specialists (refer Chen, 1999) in Taiwan saw the 1998 curriculum as an even broader opportunity for the advancement of environmental education because, in their views, there were also strong resonances between the generic framework sections of the 1998 curriculum and the fundamentals of environmental education. For example, at a national environmental education conference in Taipei, Chang (1999) suggested that the five Aims and the ten Goals of the curriculum framework could readily be reframed to make them compatible with the fundamentals of environmental education as outlined in the Belgrade Charter of 1975 (UNESCO, 1975) (refer Table 1).

This vision of an extensive overlap between the fundamentals of environmental education and of educational reform at large, and the significance of this overlap as a leverage for the introduction of environmental education (or, more recently, Education for Sustainability), has been commented on worldwide, e.g. in the United Kingdom (Sterling, 2001), Australia (Malone, 2006), the United States (McKeown, 2002) and New Zealand (Barker, 2008). The crucial point for the success of this strategy for environmental education is that what we call "framework thinking" (see below) is in the forefront of teachers' attention. The literature suggests that schools where framework thinking is generating such a synergy are ones which venture well beyond what Orr (1994, p. 41) calls the "tinkering" of current educational reform efforts. They will be schools where the "critical and action orientation of environmental education (is challenging) the dominant practices in schools, which emphasise the passive assimilation and reproduction of knowledge and unproblematic truth" (Hart, 2003, p. 24). Such a synergy, according to Orr (1994, p. 41) will significantly influence "the relationship between an increasingly specialised education process and our ability to ask large questions having to do with the human condition". This relationship, Orr (1994) believes, will engender a deep sense of community, nourished not only by knowledge but by human qualities of humility, connectedness, courtesy, respect, responsibility, caring, wisdom and love.

Despite this optimism, however, surveys of the international literature (for example Bolstad, Baker, Barker & Keown, 2003) suggest that, whatever the proposed strategy, introducing environmental education on a nation-wide basis has often been a difficult and complex process. The present paper describes three case studies designed to probe how successful, or otherwise, this "framework" approach to environmental education in Taiwan was to be. We believe that the lessons learned in Taiwan from this study about how environmental education may be promoted or demoted in the context of national curriculum innovations (for example, those recently in Australia and New Zealand) may be valuable. First, however, Taiwan's environmental education strategy will be cast in a wider context.

Environmental Education: "Subject Thinking" and "Framework Thinking"

Prior to the formal description of environmental education in the Belgrade Charter of 1975, a range of terms and meanings for education related to the environment had been used in local situations but no common definition had been agreed. The Belgrade Charter stated that the goal for environmental education was: "To develop a world population that is aware of, and concerned about environment and its associated problems, and which has knowledge, skills, attitudes, motivation and commitment to work individually and collectively towards solutions of current problems and the prevention of new ones" (UNESCO, 1975, p. 3). Two guiding principles of all environmental education programs were to be that "environmental education should be interdisciplinary in its approach" and it "should emphasise active participation in preventing and solving environmental problems" (UNESCO, 1975, p. 4).

https://doi.org/10.1017/S0814062600000136 Published online by Cambridge University Press

TABLE 1: Chang's (1999) proposals that the aims and goals of the 1998 Taiwan National Curriculum are largely co-extensive with the characteristics of environmental education as in the 1975 Belgrade Charter.

Taiwan National Curriculum (1998): Aims	**The Aims Of Environmental Education**
1. Developing humanitarian attitudes	1. Perceiving education as the relationship between humans and the environment
2. Enhancing integration ability	2. Integrating humanity and technology
3. Cultivating democratic literacy	3. Achieving ecological literacy
4. Fostering both indigenous awareness and a global perspective	4. Thinking globally but acting locally
5. Building up the capacity for lifelong learning	5. Developing environmental consciousness and taking consequent long-term action to achieve lifelong learning
Taiwan National Curriculum (1998): Goals	**Goals For Environmental Education**
1. To enhance self-understanding and explore individual potential	1. To explore the relationship between humans and the environment and to understand an individual's values and responsibilities in order to fulfill individual potential
2. To develop creativity and the ability to appreciate beauty and present one's own talents	2. To experience the environment in order to cultivate environmental sensibility, and then to pursue environmental beauty and quality
3. To promote abilities related to career planning and life-long learning	3. To develop lifelong concern for, learning about and participating in environmental issues
4. To cultivate knowledge and skills related to expression, communication, and sharing	4. To be able to communicate, express, and share information, views, and solutions relevant to environmental issues
5. To learn to respect others, care for the community, and facilitate teamwork	5. To co-operatively solve environmental problems with respectful and concerned attitudes
6. To further cultural learning and international understanding	6. To understand the multicultural aspects of environmental issues
7. To strengthen knowledge and skills related to planning, organising, and their implementation	7. To be able to design, organise and take active action in order to solve environmental problems
8. To acquire the ability to utilise technology and information	8. To be able to explore and study environmental issues actively
9. To encourage the attitude of active learning and studying	9. To be able to diagnose environmental issues, to evaluate their solutions, and to solve problems
10. To develop abilities related to independent thinking and problem solving	10. To be able to use scientific technology and information to solve problems

https://doi.org/10.1017/S0814062600000136 Published online by Cambridge University Press

The "interdisciplinary" nature of environmental education and a focus on problem solving have remained, worldwide, central themes in conceptions of environmental education and its successor, Education for Sustainability, especially in terms of curriculum design, where the notion of curriculum "integration" draws these two original guiding principles together. Curriculum integration is usually considered to be a design that "promotes personal and social integration through the organisation of curriculum around significant problems and issues, collaboratively identified by educators and young people, without regard for subject area lines" (Beane, 1997, p. xi). Viewed this way, environmental education is to be regarded as an approach to education *as a whole* rather than a subject in its own right (Palmer, 1998); and the resulting lack of regard for traditional subject area lines has resulted in environmental education frequently being described as "interdisciplinary" (for example, Fien, Heck & Ferreira, 1997, p. xiv) and "transdisciplinary". Huckle and Sterling (1996) describe the latter as "breaking free of disciplinary perceptions and traditions to create new meanings, understandings, and ways of working. Simply putting disciplines together, by contrast, is often no more than the sum of the parts" (p. 23).

However, "integrated learning" in environmental education invariably has additional special connotations beyond this interdisciplinary perspective. Environmental education "involves the integration of three key dimensions – education in, about and for the environment" (New Zealand Ministry of Education, 1999, p. 14). Fien, Heck & Ferreira (1997, x) express another closely related idea, namely, that "Environmental education considers the environment in its totality, i.e. ecological, political, natural, technological, sociological aesthetic and built environments". More recently, Littledyke, Taylor and Eames (2009), have proposed a model of integrated learner development: by adapting Bronfenbrenner's ecological model, they contend that environmental learning is fruitfully understood if the learner is seen as being at the centre of seamless, ever wider circles of influence (microsystem, mesosystem, etc.).

Nevertheless, however environmental learning is conceptualised, the actual mode of operation of environmental education in schools remains a central issue, and the focus of our investigation here. As a basis for the analysis of school practice that is to follow, we shall refer to *subject thinking* as the traditional way that educators view separately time-tabled disciplines, each with a semi-independent curriculum prescription, and each often taught by subject specialists. *Framework thinking*, by contrast, pays particular attention to the generic and integrating aspects of national curriculum frameworks (overarching Aims, Goals, Vision Statements, Core Competencies, etc.). "Framework thinking" usually manifests as whole-school phenomena (Eames, Barker, Wilson-Hill & Law, 2010); it resists timetable compartmentalisation, and it is intended to be embraced by all teachers in a school, whatever their area of specialisation. Clearly, "framework thinking" resonates strongly with the literature of environmental education.

We now apply this distinction to an analysis of the fate of environmental education - its promotion or demotion - as the 1998 curriculum was implemented in Taiwan. Would environmental education be apprehended and implemented in schools in a transdisciplinary way, by all teachers, and be manifest at a whole-school level? And would the possible resonances perceived by Chang (1999) and others between the framework aspects of the 1998 curriculum (the Aims, Goals, Competences) and the characteristics of environmental education as originally outlined in the Belgrade Charter result in a mutually productive synergy? Or would environmental education be misconceived in more traditional, stand-alone terms as being yet another Learning Area? In short, would teachers' conceptions of environmental education be dominated, respectively, by framework thinking or by subject thinking?

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The Context of this Study

In response to continuous calls for curriculum change in Taiwan since the 1980s, the General Guidelines and the Guidelines for each Learning Area of a new curriculum were first unveiled in September 1998 and March 2000 respectively (Yueh, 2007). Prior to this curriculum change, environmental education was encouraged, but not mandated, in every Taiwanese junior high school, but there had been nothing specifically written for the implementation of environmental education in the former national curriculum. (It should be noted, in passing, that despite a then-emerging international trend, e.g. Tilbury (1995), the notion of "Education for Sustainability" was not part of Taiwan's Ministry of Education discourse over the period of this study.

The 1998 national curriculum apparently heralded a new approach to environmental education. A major feature was the curriculum's generic and overarching Aims, Goals and Core Competences which signaled resonances with 21st century global trends and reforms, the need to improve the quality of citizens' lives, less centralised control, greater teacher choice as evidenced by a more flexible and school-based approach to curriculum planning and the design of materials, and a more integrative approach to learning generally. These generic features were to subsume seven Learning Areas (Language Arts, Health and Physical Education, Social Studies, Arts and Humanities, Science and Technology, Mathematics and Integrative Activities) and it was announced that environmental education, for the first time, was to be mandatorily infused into all the Learning Areas. The curriculum was to be initiated in all primary and junior high school classrooms from August 2001 and 2002 respectively (Yueh, 2007).

In addition to these Learning Areas, there were six Important Issues to be taught via infusion within the seven Learning Areas. The six Issues were: information technology education, environmental education, gender education, career development education, human rights education, and home economics education. A crucial point, however, was that although all six Issues were required to be infused across all Learning Areas in all schools, there was no written requirement that equal attention was to be paid to all six Issues, and there was little specificity about how student learning of the Issues was to be assessed.

School timetables comprised Learning Area Periods and Alternative Learning Periods. Typically, the former were to occupy 80% or more of the school timetable per week or per school year. As regards the time for Alternative Learning Periods, schools could design grade level or school level activities especially relevant to the school's characteristics (school-based curriculum), optional courses for the Learning Areas, remedial teaching programs, group counseling or self-learning. Significantly, schools could make their own decisions regarding time allocations for these choices. The key points were that environmental education, like other Issues, did not occupy specific timetable slots during a school week. Also, if it were to adopt the character of the international literature quoted above, its efficacy rested heavily both on how amenable school staff were to the notion of curriculum integration and, according to Chang (1999), Chen (1999) and many others, how well schools attended to the generic aspects of the 1998 national curriculum.

That teachers quite often fail to attend to national curriculum Aims, Goals, Core Competencies, etc. is well known (Baker, 1999). In fact, high school teachers may perceive them to be "the pages we just turn over" (Loveless & Barker, 2000) en route to locating material on their specialist Learning Area. This appears to be an ongoing problem (Barker, 2009).

Given this context, the present study sought to document the uptake of environmental education before, during and after the 1998 curriculum (which was launched in August

https://doi.org/10.1017/S0814062600000136 Published online by Cambridge University Press

2002) was implemented in three Taiwanese junior high schools. How would teachers (unused to accommodating environmental education in the visible life of schools before the 1998 curriculum), respond during their exploration of the novel demands of this national curriculum? After implementation, would environmental education have established a place as an integrative multidisciplinary Issue across all school programs? And as Chang (1999) and others had anticipated, would environmental education and the Framework aspects of the 1998 curriculum have established a productive synergy?

Methods

The virtues of case studies in environmental education research such as the present investigation, have been recognised at least since the late 1990s (Hart & Nolan, 1999). Case studies, "rich descriptions of bounded cases" (Mutch, 2005), can provide details to help others' decision-making in similar situations (Bassey, 1981), and they are the preferred strategy when "how" and "why" questions emerge from "what" questions (Yin, 1994). Case studies are a "step in action", beginning in a world of action and contributing to it (Cohen & Manion, 1994). In this study, three case study schools were selected in order to monitor the extent to which environmental education was promoted or demoted in the context of a national curriculum change.

Data-gathering monitored both the *inputs* to the overall longitudinal process of curriculum change, especially the professional development that occurred, and also the *staff responses* to the professional development, namely the staff's personal stances, and the curriculum implementation that occurred in each school. The purposes of the data-gathering were to document:

1) teachers' attention paid to, and perceptions of, the *"framework" aspects* (Aims, Goals and Core Competences) relative to the *"subject" aspects* (the seven Learning Areas), particularly how the balance might change over the whole implementation process.
2) how the six *Important Issues* were approached in each school, and how certain Issue(s) were selected for attention within each school.
3) how environmental education was perceived by staff and to what extent it was implemented.

The research strategies needed to accommodate the timeframe for facilitation of the new curriculum in the three case study Junior High Schools. After the Guidelines for each Learning Area were released in March 2000, school staff had until July 2002 to explore what the new curriculum would require. In August 2002 the old curriculum was relinquished and the new curriculum then directed teaching and learning in Junior High School classrooms. From August 2002 teachers and students adjusted to the new curriculum and the period of transition to the new curriculum was completed in July 2005. The research strategies comprised:

1) *Documentation* of Ministry materials sent to schools and the documents consequently produced in schools (i.e. the school calendar, the teaching plans for the seven Learning Areas and the topic teaching, agendas and minutes of professional development meetings, senior administrative meetings, and Learning Area meetings). City administrative orders were also collected as supplementary information. Nearly all documents were written in Chinese.
2) *Interviews* with school administrators, and with teaching staff from a wide variety of Learning Areas. To study the process of environmental education development before, during and after the first year of curriculum implementation, three rounds of semi-structured interviews were conducted: in 2001 (i.e. when staff were exploring what the new curriculum would require), late 2002/03 (i.e. during the first school year of classroom implementation) and 2003/04 (i.e. approaching full

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implementation). The interviewees in each school comprised three administrators (the principal, instructional director, and environment officer) and at least seven teachers, one from each of the seven major Learning Areas. Due to staffing changes, 38, 35 and 32 faculty participated in the three rounds of interviews, which took approximately 30, 60 and 90 minutes each respectively. All interviews were conducted in Chinese.

The three public Junior High Schools (pseudonyms Redbrick, Parkway and Riverside), in a city of population one million, had 1000 - 1400 students. As well as carrying out the standard environmental education activities seen in all Taiwanese schools (namely garbage classification and recycling), each school possessed a feature that seemed promising for the successful implementation of environmental education. Redbrick had an effective principal who majored in biology and showed a special interest in environmental education, Parkway had gained numerous awards in energy education, and Riverside had published booklets about the local environment and was conducting an active outdoor community education program.

Findings and Discussion

As signaled above, we shall present responses to three parameters, namely, attending to "framework" aspects and "subject" aspects; implementing the six Important Issues; and perceiving and implementing environmental education. In what follows, there were no significantly different patterns of responses between the administrators and Learning Area teachers.

Attending to "Framework" Aspects and "Subject" Aspects

The claims made for environmental education in the literature cited above are unanimous about the breadth of its scope - that it is "integrative", "transdisciplinary", and so on. If environmental education were to flourish in Taiwan's schools, propelled by Chang's (1999) hoped-for synergy with the framework aspects of the 1998 curriculum (Aims, Goals, Competences), then teachers would need to be initially well disposed towards the notion of curriculum integration, and would need to remain so.

During the first year of implementation and the second round of the interviews in 2002/03, the interviewees were invited to share their perceptions of the characteristics, merits and shortcomings of the new national curriculum. In terms of characteristics, there was at that stage generally a broad, if imprecise, perception of the curriculum's Aims and Goals (see Table 1). For example, more than two-thirds (71%; 25/35) of the interviewees (8/12 in Redbrick, 9/11 in Parkway, and 8/12 in Riverside) cited curriculum integration as the most striking characteristic (refer the second Aim: Enhancing integration ability). The eighth Goal ("to acquire the ability to utilise technology and information") was frequently cited as a case where integration was demanded. Nearly one-half (46%; 16/35) of the interviewees considered that cultivating students' abilities (creativity, critical thinking, problem solving, and expression) was both a characteristic and a merit that resonated with the fifth Aim (the capacity for lifelong learning) and at least three curriculum Goals (second: developing creativity, fourth: cultivating expression, tenth: developing independent thinking and problem solving). This suggests that at the point of implementation, many of the teachers in this study did apprehend and applaud many of the Aims and Goals (i.e. the framework thinking) of the 1998 curriculum and therefore, according to Chang (1999) and many others, were potentially well placed to develop environmental education.

However, Ministry of Education professional development - a compulsory week-long workshop on the 1998 curriculum at large, offered in the winter vacation of

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2001 and again in the summer vacation - was apparently doing little to enhance teachers' perceptions of the importance of framework aspects and integration in the 1998 curriculum. In the second round of interviews, curriculum integration was also seen, by two-thirds (66%; 23/35) of the interviewees, as the biggest *shortcoming* of the 1998 curriculum. By the last round of the interviews, this view was re-enforced: integration was seen as the biggest obstacle impeding the successful curriculum implementation in Taiwan. This view suggests that, in contrast with their professed philosophies, teachers' subject thinking was readily surfacing in practice because they still preferred to teach their own subjects rather than the new integrated Learning Areas (framework thinking). Except for Language Arts and Mathematics, the other five Learning Areas were all integrated from several previously independent subjects in the old curriculum. Teachers who taught these integrated Learning Areas all said that the urgent need for them was to prepare unfamiliar subjects within the new Learning Area that they were responsible for. Teachers of Science and Technology and of Social Studies complained the most stridently because these two Learning Areas would be tested in external assessments. "Subject thinking", it seems, was emerging strongly amongst these teachers. In the last round of interviews, in 2003, the Redbrick biology teacher commented that … integration in the Learning Area of science is not occurring comfortably … biology should not be integrated into chemistry/physics … In fact, one year after August 2002 in the schools studied, Science and Technology was still being taught by separate subject specialists, although Social Studies was taught by one teacher in the lower grades. This can be viewed as a commentary on how the "framework thinking" which teachers' initially professed was being undermined in the face of the practical demands of "subject thinking".

Many teachers commented that the success or failure of the curriculum implementation would depend on what would be examined in the external assessment after curriculum change. In fact, a few months after implementation there were mountainous waves of criticism from society and schools towards the whole notion of curriculum integration: the more specialised knowledge required at Junior High School (compared with Primary Schools) was held to demand clearly defined subjects areas. The Redbrick mathematics teacher said in the last round of interviews, in 2003 … teaching math should pay attention to traditional requirements … I think it's okay to cultivate students' creativity in the arts but we should not do it in basic subjects like math … This subverted the radical change that the Ministry of Education had intended in the curriculum document, and the Ministry announced in late 2002 that the external assessment would test the same subjects as in the old curriculum. Further, in early 2003 the Ministry announced that curriculum integration would no longer be compulsory (Yueh, 2007).

The upshot was that no satisfactory balance between framework thinking and subject thinking was achieved. Rather, we could say that, somewhat to the relief of the teachers, framework thinking was surrendered to subject thinking at the government level, and the implied legitimisation of the traditional approaches to school subjects became strongly reflected in school practices. This shift in teacher orientation had the unintended (but very real) effect of disestablishing the kind of curriculum climate necessary for the promotion of environmental education.

Implementing the Six Important Issues

The six Important Issues required to be infused into all the seven Learning Areas in schools were information technology education, environmental education, gender education, career development education, human rights education, and home economics education. During the third round of interviews in 2003/04, teachers were asked how

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they perceived their school had prioritised the six Important Issues (see Table 2, in which scores were calculated by summing each teacher's perception of the priority - allocating 6 points for top priority, 5 points for second priority, etc. - and averaging over the cohort).

Table 2 suggests that information technology education was given top priority in all three schools, in contrast with environmental education, which was perceived as medium priority. From the interviews and document analysis (city administrative orders), we concluded that central government support was the main reason why information technology education was more strongly prioritised than environmental education. Information technology education, according to the Redbrick Chemistry/ Physics teacher in 2003 had been supported by … experts to edit textbooks, required teaching hours in the school timetable, and professional teachers to teach it. No such support was provided for environmental education.

Similarly, gender education and career development education, which ranked second and third, were also well-funded Issues and would be evaluated at the end of each funded project. For example, the Riverside Instructional Director said in 2003: … gender education has already been allocated with a budget for many years … Now the new Issue valued more is career development education and lots of money from the Ministry of Education was distributed to schools for its implementation rather than environmental education.

All of this suggests that targeted allocations of government funding to some selected Important Issues was powerfully subverting the Aims and Goals in the curriculum framework; teachers were tending to treat these funded Issues as stand-alone subjects.

The funding of particular Important Issues made it unlikely that all six Issues would be implemented equally, as intended. In fact, the paucity of funding for environmental education created the suspicion that it was less valued by the Taiwanese government during this curriculum change. As a consequence, what actually constituted environmental education, and its resonances with the Aims and Goals, remained unidentified and unexplored. The Parkway math teacher said in 2003: I don't feel that

TABLE 2: Scores generated from pooled teacher perceptions of how their schools had prioritised the six Important Issues offered in classrooms at three case study Junior High Schools as required in the new Taiwanese curriculum.

Important Issue	**Redbrick (N=11)**	**Parkway (N=11)**	**Riverside (N=10)**
Information technology education	5.9 (1st)	4.8 (1st)	5.9 (1st)
Environmental education	3.5 (4th)	4.1 (3rd)	3.6 (4th)
Gender education	4.6 (2nd)	3.7 (4th)	5.1 (2nd)
Career development education	3.7 (3rd)	4.2 (2nd)	4.2 (3rd)
Human rights education	3.0 (5th)	2.8 (5th)	2.1 (6th)
Home economics education	1.4 (6th)	2.6 (6th)	2.2 (5th)

https://doi.org/10.1017/S0814062600000136 Published online by Cambridge University Press

our government valued environmental education a lot … it might have, but it didn't specifically raise the term "environmental education" … My school did do many things relevant to the environment but the problem is that we can't connect what we've done with environmental education.

The "framework" potential of human rights education and home economics education was even less realised than for environmental education. Far from being infused across all Learning Areas, in the context of a crowded curriculum they were perceived as tiny subject content subsets of either the Social Studies (human rights education) Learning Area or the Integrative Activities (home economics education) Learning Area.

In summary, although environmental education (like the other five Issues) was perceived having "framework" potential, by contrast it was treated in reality rather more as a subset of other subjects, that is, one with lesser status than, say, math or geography, and not dignified by clear assessment procedures. The allocation of especially dedicated funding to certain Issues (and environmental education received relatively little) was taken by teachers as further encouragement to treat each Issue in isolation. In-service workshops appeared to contain little specific advice about the teaching of environmental education, an area that has subsequently seen considerable international pedagogical development, e.g. Saunders (2010). How environmental education actually *was* taught in the schools studied will be described further in the next section.

Finally, we would note that the discourse around Issues that was occurring, as reflected in the teacher interviews, was one in which the Issues were to be selected and engaged with *separately*, i.e. with little pedagogical interaction *between* Issues. This meant that environmental education was very infrequently viewed through the lens of the other five Issues, i.e. its technological, gender, career, human rights and domestic aspects. Such a climate militated strongly against a wide-ranging exploration of the "ecological, political, natural …" (Fien et al., 1997) aspects of environmental education.

Perceiving and Implementing Environmental Education

Having described the broad fate of environmental education within the three case study schools, we now document individual teachers' views about environmental education especially as they were voiced in 2003, i.e. when curriculum implementation was well under way. We shall note especially what happened when these views, which often initially encompassed wide "framework thinking", were confronted by a growing climate of traditional, pervasive "subject thinking".

Over the three years studied, every interviewee said more than once that environmental education was important, should be taught in schools, and was a broad enterprise encompassing everything relevant to the environment. Even in the third round of interviews in 2003/04, all 32 interviewees continued to affirm that environmental education could enhance their school's general educational goals in some way, directly or indirectly. However, by 2004 this ongoing "framework thinking" was often being supplanted by "subject thinking". For example, the Parkway mathematics teacher in 2001 said … (Environmental education) is very broad and is involved in every subject. It's better for subject teachers to teach environmental education while teaching their own subject … In 2002 his attitude had changed: It is probably difficult, possibly difficult, for every Learning Area to infuse the teaching of environmental education ... it looks constrained if doing so in math teaching. By 2003, he was anxious about appearing to forego his existing subject base: At present, I don't feel that I need to stress environmental education a lot because the real goal of my teaching is to achieve the understanding of mathematics. (Environmental education) will become a burden if students and parents think we are encouraging something not

https://doi.org/10.1017/S0814062600000136 Published online by Cambridge University Press

relevant to mathematics. In 2004, the Riverside health education teacher worried that she might not afford to teach environmental education in her subject teaching. She said: Who is going to teach it? Which Learning Area should environmental education belong to? Everyone is overloaded and it is hard to get someone interested in teaching environmental education. Similarly, the Riverside English teacher commented: Environmental education is not a school subject but just a kind of living habit, style, or thinking ... Yes, we might do it if there is still have time after school subjects and other Important Issues. These comments suggest why environmental education was not the first priority to be implemented among the six Issues, despite every teacher saying that it should be taught in schools. In fact, some teachers admitted that they did not understand environmental education well and therefore could not teach it well. Early in 2002, the Parkway mathematics teacher admitted: Honestly, I don't really understand environmental education in-depth. The Redbrick scout training teacher said in 2003: It'd be better to let people more professional than me explain environmental education to students … My understanding about environmental education is not good enough. The Redbrick math teacher also said in 2003 … I'm seriously lacking in knowledge if I have to teach environmental education professionally.

This emergent lack of confidence about teaching environmental education might have been predicted from data gathered in the first round of interviews in 2001 that revealed considerable confusion about environmental education pedagogy. Two-thirds (66%; 25/38) of teachers cited action-orientated behavioral change as their expected student learning outcome. However, when asked what should be taught in environmental education, four-fifths (79%; 30/38) of the school staff in 2001 suggested that teaching knowledge about a wide variety of environmental education topics was paramount. This obvious disjunction between knowledge-based teacher input and behavioral-based student output was bound to create a lack of confidence about what would be achieved.

This confusion was not addressed by the government-sponsored teacher professional development workshops, which offered little specific introduction to environmental education. In 2001 the Redbrick Art teacher commented: Before implementing the new curriculum, there was no workshop specifically for environmental education ... Those early workshops mainly introduced the new curriculum in general such as curriculum integration, aims, curriculum goals, and so on … with only a little introduction of the six Important Issues. In fact, our final interviews also showed that no specific environmental education workshops were ever conducted in the schools studied, although there were workshops for some other Issues such as information technology education, gender education, human rights education, and career development education. This resonates with the fact that no interviewee had ever checked the National Environmental Education Guidelines to identify to which extent the environmental education teaching was required in either teachers' own subject teaching or in school practices overall.

In summary, a broad pattern emerged when teachers talked about their experiences with environmental education in the curriculum change process. Initially, they had generally held positive perceptions of environmental education as an Important Issue, with potential to contribute to achieving the Aims and Goals of the 1998 curriculum framework. However, these perceptions were later overtaken by confusion about practicalities - how to actually go about implementing environmental education in order to achieve these curriculum Aims and Goals. This was never a clash of pedagogies between those teachers who advocated a practicable "framework" approach to the introduction of environmental education (as an integrative transdisciplinary whole-school enterprise) and those who conceived it, in practice, as a traditional "subject". The "framework" approach never took shape in the teachers' minds because of their

https://doi.org/10.1017/S0814062600000136 Published online by Cambridge University Press

previous lack of experience teaching environmental education and, now, the lack of supportive in-service offerings in environmental education. A "framework" approach to environmental education therefore never materialised in practice. However, neither was environmental education even accorded the "subject" status of a Learning Area, that is, a separately timetabled entity with a semi-independent prescription and taught by specialists.

So how might the environmental education that *was* implemented in these three schools be characterised? In the absence of direct classroom observations, this study can only surmise a scenario from the teachers' interview comments. In the name of an elusive "infusion" pedagogy, it seems that what actually transpired in the classrooms was usually rather unstructured opportunistic environmental education content teaching, loosely derived from whatever happened to be taught in the given Learning Area. No assessment of student learning outputs in environmental education, behaviorally orientated or otherwise, was required of teachers.

Implications

As we have pointed out, Chang's (1999) observation - that the overarching Aims and Goals of the new Taiwanese national curriculum were largely co-extensive with the aims and goals of environmental education - was not unexpected. It has been paralleled in many other countries, and its strategic potential often noted. McKeown (2002, p. 29) warned what could happen if the challenge is not taken up: "If (environmental education) can be linked to the current global educational reform movement, (environmental education) will be swept along with the energy of the reform movement. If, however, the wave is missed, proponents of (environmental education) will be looking for a foothold in the curriculum and trying to convince teachers to wedge sustainability principles, knowledge, issues, skills, values, and perspectives wherever possible".

In Taiwan, an analysis of these three case study schools suggests that, as the 1998 curriculum was facilitated, there was an early de-emphasis on the relationship between environmental education and the generic Aims and Goals. This was later followed by a further deterrent to "framework thinking", namely, the active discouragement of the allied notion of curriculum integration. As concerns environmental education, there was little existing teacher knowledge of its generally accepted characteristics - that it addresses the environment in its totality, be life-long, interdisciplinary, future-focussed, issues-based, and so on (Fensham, 1976) - nor about how environmental education might actually be manifest in schools. Instead, these teachers perceived other signals demoting environmental education: the lack of government support for environmental education (especially in professional development), and its relegation to the 20% of "Alternative Learning Periods", which were to be school-designed, not-specifically time-tabled, and without assessment directives. (Except for information technology education, the four other Important Issues to be addressed in the Alternative Learning Periods met with more or less similar responses from teachers.) It is not surprising, given all this, that Chang's (1999) hopeful synergy of broad frameworks – the Aims, Goals and Competences of the national curriculum, and those of environmental education - was apparently never perceived in the three study schools. In contrast, in these schools, a host of pragmatic "subject thinking" issues, especially related to student performance in traditional subjects in prestigious examinations, rapidly surfaced and these appeared to be actively government-supported. All of this meant that environmental education became prone to a "wedging" mentality (to use McKeown's evocative term) and this resulted in its relatively low impact in these schools.

The issue addressed here was perceived twenty years ago, namely, that environmental education "cannot be claimed as a subject in itself, rather it must be

https://doi.org/10.1017/S0814062600000136 Published online by Cambridge University Press

treated as a "whole" concept that requires inputs from all parts of the curriculum" (Worldwide Fund for Nature [WWF], 1990, p. 1). As Yueh (2007, p. 89) put it: "The problems which environmental education encounters are not merely self-generated; rather, they are also a basic problem of education itself".

In conclusion, we suggest that the 1998 curriculum *has* influenced the "Taiwan-*ness"* of the nation's environmental education. Now no longer a purely voluntary aspect of schooling, made visible only by the commitment of some enlightened school leaders and dedicated teachers, environmental education currently has a defined and secure - if low-profile - place in all school programs. However, internationally, not just in Taiwan (Huang, 2010), schooling continues to wrestle with implementing environmental education in "framework" aspects of curricula. In New Zealand, early results (Cowie et al., 2009) relating to "framework" implementation of the "New Zealand Curriculum" of 2007, are not encouraging; and the implementation of "sustainability" (the discourse which earlier environmental education has generated), conceived as a future focussed theme and a value, is also tentative. Australia faces similar challenges as it currently explores the inclusion of sustainability as a cross-curriculum dimension in the first Australian Curriculum (Australian Government Department of the Environment, 2010). Achieving this alignment will be vital. As Hart (2003, p. 20), paraphrasing Orr (1994), claimed: "If we re-examine what education is for, measured against an agenda of human survival, … then all education is ultimately environmental education".

Acknowledgements

We are grateful for comments from Chris Eames on an earlier draft of this paper, and to the two AJEE reviewers who encouraged us to clarify and augment aspects of this paper.

Keywords: curriculum; subject; learning area; subject thinking; framework thinking.

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https://doi.org/10.1017/S0814062600000136 Published online by Cambridge University Press