PART D – REVISIONING ENVIRONMENTAL EDUCATION THROUGH WHOLE SYSTEMS THINKING

Purpose: to explore the implications of whole systems thinking for the revisioning of environmental education within the context of wider systemic change in education and management.

Introduction

In this final main Part, the implications of whole systems thinking for environmental education and sustainability education are explored. In subsection 1, the influence of and tensions between paradigms operative in the environmental and sustainability education field is discussed (behaviourism, constructivism and critical pedagogy). The strengths and weaknesses of each paradigm are discussed. Then problems common to the discourse as a whole are outlined and positive recent developments that indicate a more integrative and systemic model are briefly presented. In subsection 2, I outline a whole systems participatory framework for environmental and sustainability education that seeks to address some of the existing paradigmatic problems in the field. In subsection 3, I look at design and strategy and argue that we need to think more in terms of design for emergence than planning for predetermined goals. In section 2, which concerns the practical implications of the Thesis, I discuss how the arguments and ideas reflected in the Thesis have been received and used by others.

1 ENVIRONMENTAL AND SUSTAINABILITY EDUCATION PARADIGMS

1.1 Reviewing the paradigm debate in environmental and sustainability education

> The challenge is to find the basis of an education capable of promoting integral human development, to which environmental education offers an essential contribution….from a reconstructive perspective, it is a search for meaning, for significance in a worthwhile human journey.
> (Sauve 1998, 53, writing for the ‘Colloquium on the future of environmental education in a postmodern world’)

In little more than three decades, environmental and sustainability education has emerged and evolved from marginal beginnings to claim the necessity, and indicate the possibility, of fundamental change in our collective view of the purposes and nature of education and learning - a change which, if made effective, might be critical to the quality of life of future generations. Yet it is clear that such deep change is by no means assured. Whilst the progress of environmental and sustainability education over the last three decades has been impressive, it also has been slowed by a degree of incoherence in the field and constrained by a largely uncomprehending and resistant mainstream. To help analyse this picture and indicate the 'basis for an education capable of promoting integral human devlopment' (to use Lucie Sauve's words), this subsection reviews the paradigm bases of the field and both problems and promising signs in the debate.

The term 'sustainability education' is widely thought to be a more inclusive conception than environmental education (EE), and covers 'education for sustainable development' (ESD), 'education for sustainability' (EfS) and 'education for a sustainable future' (see Box A.1: Clarifying sustainability education terms, in Part A.1.1). These terms have emerged particularly since the first Earth Summit of 1992, alongside and sometimes replacing 'environmental education'. There is a whole debate surrounding the difference and non-difference between the meaning of these terms which I have addressed elswhere (Sterling in Blewitt and Cullingford, in press) but here I will look at the discourse as a whole. Since around the time of the first Earth Summit in 1992, this discourse has become far more extensive and detailed than was the case previously. Drawing on my experience as a participant in this debate (see for example Hesselink, van Kampen and Wals 2000), and using a whole systems perspective as outlined above, I will review some of the main paradigmatic issues and tensions that result from environmental and sustainability education being a product of "both older *and* emerging worldviews" (Robottom and Hart 1993, 44, my italics). Such worldviews need to be seen at the contextual levels of both educational paradigms and cultural paradigms, of course. "How we ultimately shape the future of environmental education depends… on how we think of education itself", say the editors of the 1998 international colloquium on the future of environmental education (Jarnet, Jickling, Sauve, Wals and Clarkin 1998). As I have argued, this shaping also depends on how we think of the wider world and our view of reality.

For many years, the dominant position in the field has been to a greater or lesser extent, essentially *behaviourist.* When I began working in environmental education

some thirty years ago, first as a teacher, then as deputy director of the Council for Environmental Education (CEE), I shared a fairly simplistic notion of environmental education with most of the environmental education community as it then was (although I always had an holistic outlook). It was based on the assumption that people were insufficiently aware of the environment and understood little about it. Therefore we needed to raise awareness and increase understanding, and then, we believed, environmental issues were more likely to be resolved.

In all that has happened since in the environmental education debate, including the emergence of 'education for sustainability' (EfS) and 'education for sustainable development' (ESD), the idea of remedying environmental ignorance through education has remained strong, even though the argument has been presented in a more sophisticated way than it was decades ago. This view is essentially a realist position, resting on a materialist ontology, an instrumental and universalist view of education, and often implying an instructive, transmissive methodology. The guiding questions are behavioural and may be summarised as: 'how can education change people's attitude and behaviour towards the environment'? There is a linear and rationalist view of change: an idea that 'education *about* the environment' is sufficient to encourage personal change, and "a belief that if you can just find the 'right' thing to do, then change will happen" (Dillon 2002, 86) - and this is reflected in educational strategy. There is, therefore, an emphasis on communication, summed up in the phrase 'getting the message across' beloved of campaigners and government. (This relates to the linear view of the education-society relationship outlined in Part C.1.1.)

With mounting evidence over recent decades of environmental destruction, human misery and short-sightedness, catalogued by such regular reports as those from the Worldwatch Institute (*State of the World*), the World Resources Institute (*World Resources*), UNEP (*Global Outlook* series), and WWF (*Living Planet Report*), a driving urgency informs a good deal of the work of environmental educators and sustainability educators, many of whom consequently subscribe to an instrumental 'environmental responsibility' view of environmental education to some degree. As noted in B.4.1, this position has been reflected strongly in international 'high-level' endorsements for environmental education (which have been taken up as mandates particularly by NGOs), and resonates with the notions of ecological modernisation and ecological managerialism. I don't restate this instrumentalist position in order to demolish it, but to hold it up for later evaluation.

Meantime, and as I have suggested in B.4.1, a different view of environmental education has emerged in perhaps the last ten or so years. Many environmental educators are now concerned with the kind of learning experience that is necessary, if we are to nurture personal or social transformation towards sustainability through learning. This is essentially an idealist, *constructivist view,* which asserts the intrinsic value of education and learning. The emphasis is on the quality of learning, and often, on building the individual's capacity (for example, to think critically, systemically and reflexively), rather than encouraging particular social or environmental outcomes. It recognises the importance of the learning context and the prior experience, disposition and uniqueness of the learner. The guiding questions are developmental and may be characterised as: 'how can we facilitate learning, critical thinking and self-development in the context of the sustainability issue?' In terms of the sustainable development debate, this constructivist position is logically resonant with capacity-building, self-determination and autonomous development, although in my view, the constructivist position is often rather weakly linked to both to social critique and critical sustainability discourse.

Hence, I suggest that underlying the international sustainability education debate, there are two fundamental positions. In terms of worldview and ontology, this dichotomy reflects the *realism-idealism* tension; in terms of learning theory, it reflects the *behaviourism-constructivism* tension; in terms of methodology, it reflects the *content-process* and *transmission-transformation* tensions. In simple terms, the first orientation is more interested in the 'environment' part of environmental education, while the second orientation is more interested in the 'education' part of environmental education: a difference between 'education for the environment' and 'education for being'. In learning theory terms, the first orientation is more interested in the *corrective* aspect, while the second is more interested in the *meaning-making* aspect (see discussion on learning in B.1.3).

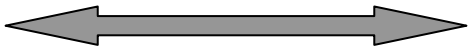
Yet, if we look at the environmental and sustainability education literature, it has been common to see the spectrum of paradigmatic positions represented as a *three*-part model, particularly in the early nineties. For example, Robottom and Hart (1993) (positivist, interpretivist, and critical), Fien (1993) ('vocational/neo-classical', liberal/progressive, socially critical), Sauve (1996) (rational, humanistic, and inventive). These models still have currency, and can be used to interpret positions within the debate. In more recent years, a wider spectrum tends to be acknowledged, reflecting debate in social science. Hence a range of methodological positions (such as positivist,

postpositivist, interpretivist, transformative, postmodern, poststructuralist, are distinguished (see Gough and Reid 2000, Denzin and Lincoln 2000).

At a deeper level, however, I suggest that the two archetypal positions or tendencies outlined above are operative, and these are represented simply in Table D.1. These are not peculiar to environmental education but influence it.

Table D.1: Fundamental orientations influencing environmental/sustainability education

Position	**Behaviourist**	**Constructivist**
Ontology	Realist	Idealist
Epistemology	Objectivist / Positivist	Constructivist / Interpretivist
Theory of learning	Behaviourist	Constructivist
Function of EE/ESD	Remedial	Developmental
Main emphasis	Goals / Outcomes	Learning experience
Focus	Knowledge acquisition(and values / skills)	Meaning-making
Seeks	Behavioural change	Capacity-building, self-development
Reflects	Instrumental values	Intrinsic values
Pedagogy	Transmission / Instructivist	Transaction / Constructivist
Desired change	Integration (environmental responsibility)	Autonomy - individual as decision-maker
Intrinsic problem	Objectivism	Relativism



It is important to note that these are not two simple ‘camps’ - the arrow at the base of the table indicates that there are a spectrum of possible stances based on these two platforms.

In particular, I have not shown here *critical pedagogy* which is a third key strand in environmental and sustainability education (reflected in the three-part models above). Before proceeding with the argument, I will comment on this important ‘third’ key position. With a basis in critical theory, it draws on elements of both the fundamental positions shown above, as does the ecological position. However, it also differs from

the ecological position in some important respects. Critical pedagogy is particularly reflected in development education, but has also been influential in the environmental education debate, especially in the UK and Australia. It is associated with participatory action research methodology, and in terms of sustainable development, relates to movements for self-reliance and alternative development models.

Critical pedagogy in some ways bridges the two main orientations above, as well as differs from them. Thus, it is a materialist philosophy in acknowledging a 'real reality', but also has a "subjectivist epistemology, where socially constructed knowledge is not considered to be a matter of deriving timeless, abstract principles but of…uncovering the historical, structural and value bases of social phenomenon as well as the contradictions and distortions within" (Robottom and Hart 1993, 11). Its learning theory is therefore *reconstructivist* rather than (simply) constructivist, and there is emphasis on place and local knowledge as opposed to 'scientific' universalism. It differs from both the main orientations because its primary interest is in emancipation and empowerment which can realise social conditions which, dialectically, can in turn favour these ideals. This position is often characterised as 'education *for* the environment' or 'for sustainability'.

For some years, the main tension in the environmental education debate was between the more positivist tradition, outlined above, and the socially critical theorists. However, in the early nineties, an important change in the debate occurred with a strong critique posed by constructivists of what they saw as a deterministic, 'destination view' of education propounded both by the socially critical 'education *for* the environment' school, and differently, by the behaviourist 'environmental responsibility' school. This 'destination view', the critics said, was represented by the emergence and uptake of the term 'education for sustainable development' (Jickling 1992, Jickling 1994, Jickling and Spork 1998, Sauve 1998). Jickling's 1992 paper (entitled *Why I don't want my children to be educated for sustainable development)*, helped open a 'pandora's box' in this debate.

I have felt somewhat apart from this debate, seeing the partial validity in both the socially critical and constructionist positions. However, I think socially critical environmental education was and is much less deterministic than Jickling and his supporters perceive it to be. From socially critical theory, I have learnt something about the relation between the dominant social paradigm and structural injustice, about the

relation between social context and distorted power relationships, and about the 'politics of knowledge', and I largely endorse its commitment to social justice and participative methodology. At the same time, I find critical theory too materialist in its conception of the world, too rationalistic, and too anthropocentric. The valid idea that nature is 'socially constructed' or mediated through "cultural meanings, discourses and representations" (Huckle, in Corcoran and Wals, in press) seems to take precedence over ecological realism, although the latter is acknowledged. Further, despite this constructivist view of nature, I also consider this stance too insufficiently cognisant of the powerful influence of worldviews at a deep level and of the mechanistic metaphor. Rather the emphasis is primarily on political and economic structures, and consequently critical pedagogy tends to be ideologically bound into the language and political economy of socialism, and a presupposition of conflict. Lastly, I have some difference (as explained in Part C.1.2) with the emancipatory agenda which tends to be characteristic of critical pedagogy. Meantime, the understanding (or misunderstanding) by socially critical theorists of the systemic ecological viewpoint is one where the latter is sometimes seen as potentially "romantic, utopian and reactionary" (Huckle 1998, 72).

I now return to the realist/instrumental position in environmental education. This is the stance that is most aligned with the dominant social paradigm discussed earlier in this Thesis. There are a number of problems with this orientation. It tends to:

- emphasise 'responsible environmental behaviour' the nature of which is often determined by 'experts'
- have a 'deficiency' view of the learner: education is seen as remedial of ignorance and thereby also of ecological 'ills'
- accept unquestioningly the mechanistic/positivistic/techno-scientific worldview which gives rise to this instrumental view of environmental education
- see itself as apolitical
- privilege scientific forms of knowing above others ways of knowing and thinking
- focus on the individual, and give insufficient weight to social and economic conditions and forces which constrain action, and to the possibility of social learning.

Further, it tends not to encourage critical and systemic thinking: rather it seeks to integrate the individual into a deterministic pattern of thought or behaviour deemed desirable by the programme designers. (See for example the critiques in Robottom and Hart 1993, Firth and Plant 1996, Wals, Albas and van Arcken 1999.)

More positively, as noted above, environmental educators sharing this viewpoint tend to point to the urgency of the state of the planet, and in this, I totally concur. I also consider that the environmental science that this view tends to propound is an important element of ecological literacy, a point which tends to be overlooked by constructivists who emphasise process over content. However, in terms of epistemology, the problems intrinsic to this orientation are objectivism and universalism and therefore insufficient cognisance of the participatory nature of knowing. Despite these problems, and considerable critical debate in environmental education circles in recent years, this orientation is still strong in environmental education, particularly in some North American movements - as has been evident in much of the discourse represented by the North American Association for Environmental Education.

Now to the constructivist position. This position is in some ways closer to my own, but as noted in Part C, there are problems with this stance too. As we have seen in the discussion on deconstructive postmodernism, human mediation is central to the constructivists' understanding of reality and nature, and in an extreme form, there is deemed to be no independent reality. In terms of environmental education and sustainability, this characteristic can translate into problems of relativism in evaluating truth claims with regard to the nature of sustainability issues, whilst scientific knowledge is devalued through its being seen as socially constructed. Thus, the validity claims of any curriculum content tend to be disputed, and at the same time, there is often insufficient ecological realism in the constructivist position - which can detract from accepting the urgency and necessity of the sustainability transition. A second key characteristic is the liberal view of the autonomy of the individual and the importance of choice for the individual. This valuing of the individual can divert primary focus attention away from critical thinking about society, economy and ideology (unlike in the critical theory tradition), and towards individual agency. (This is one of Bowers' key arguments against constructivism.) Robottom and Hart (1993, 10) suggest it "remains essentially conservative in terms of its imperative for social transformation". The problem in constructivism is that by seeking to transcend positivism and behaviourism, it has tended to weaken its grip on independent reality. Heron (1996, 163) suggests that it is "an unnecessary mistake" to "abandon concepts of validity and truth just because positivists and sociopolitical structures have misappropriated and abused them for oppressive purposes". Despite all this, I feel constructivism to be a more satisfactory position than the realist position.

In sum, and with regard to the international debate, it is not oversimple to suggest that much of the rhetoric and international documentation over the last two decades has reflected an instrumentalist orientation, whilst the professional community of interest - the theorists and practitioners - has increasingly moved towards a constructivist view of sustainability education. At the same time, others have pursued a socially critical, reconstructivist view of education and society.

This analysis helps account for the relative lack of progress of sustainability education, both in terms of take-up in national systems and at local and institutional level. The behaviourist view tends to provoke an *accommodatory* response from education systems, a tinkering with curriculum content or greening of the estate, which may or may not take place to any great depth and level of coherence. The constructivist approach suggests a deeper *reformatory* response, but one which education systems find hard to grasp, or to distinguish from 'good education' that they may claim to be providing already. Meanwhile, the reconstructivist approach often suggests a revisioning of education and society too radical or apparently ideological for most educational systems to accept or find starting points for.

Thus, it appears that environmental and sustainability discourse has been somewhat 'stuck' and therefore has had a limited ability to lead a shift to a transformative view of education as a whole, as argued for in this Thesis. Thus, I want to suggest how we might reconcile and subsume previous paradigms into a greater integrative whole - a fourth paradigm, which I have described as 'sustainable education'.

From a whole systems viewpoint, the two main paradigmatic positions of behaviourism and constructivism, and the third position of critical theory, have value but are of themselves insufficient. Like the allegorical tale of the blind men and the elephant, I suggest they are all partly valid, but also incomplete. And like the blind men each asserting their truth it is not hard to find environmental education writers ready to critique other positions, for example Wals and Jickling (2001) against what they see as behaviourism, Bowers (2001) against process-oriented constructivism, Walker (1997) against socially critical reconstructivism. To return, rather, to an appreciation of partial validity: positivism asserts a material reality but misses the critical importance of our participation in knowing, understanding, and shaping it. Critical theory is helpful in highlighting the importance of empowerment in the light of structural injustice and the role of dominant ideology, but is itself often too ideologically bound. Constructivism highlights the critical role of the knower in the known, but can fall into the trap of

relativism and lack theory in, and commitment to, social change towards justice and sustainability.

- Keypoint: After two more than decades of involvement in this debate, my view is that all these positions have some important value, yet that each of them is inadequate.

Further, that whilst contestation between them as evidenced in the pages of the environmental education research journals may be illuminative, it often misses a deeper level of insight and argument. As I have suggested in Part C, if these paradigms are arranged along a chronological spectrum (see Robottom and Hart 1993 for example), at one end, the environmental education community needs more cognisance at a meta level of the currency of mechanistic paradigm roots in our collective psyche, at the other, a greater sense of the postmodern ecological worldview. In other words, it seems we need a keener sensibility regarding where we have come from and where we might be going to.

At the same time, recent debate about the direction of environmental education suggests a questioning about its nature and role in postmodern times (see for example Jarnet *et al.* 1998, Hesselink *et al.* 2000) and I look at some positive trends below. Meantime, it is possible to outline some of the problems common to a good deal of the thinking and practice that goes under the environmental and sustainability education banner.

Box D.1: Common problems of environmental and sustainability education

- *Dualism* - despite the ostensibly holistic outlook, there is a significant degree of 'residual dualism' in the discourse, in strong distinctions made for example in educational aspects such as value-fact, theory-practice, content-process, teacher-learner, sciences-humanities *et cetera* but especially in the people-environment or culture-nature distinction (see next point).
- *Environmentalism* - most discourse reflects a dualistic environmentalism rather than a systemic ecologism, in other words, dualism rather than duality.
- *Scientism* - there is still a bias towards scientific experience and interpretations of the world, at the cost of balance with aesthetic experience and the 'inner dimension' of psychology, intutition, emotion and spirit, and other ways of knowing.
- *Missionaries and relativists* - there is a tension between those that wish to alter the thinking and behaviour of others specifically towards a view of sustainability, and

those that believe that education can and should go no further than encourage critical thinking. The former tend to lack sufficient philosophic and sociological grounding, the latter sufficient attention to context (see next point).

- *Autonomy* - the notion of the autonomy of the learner as rational decision-maker tends to underplay the social and political structural contexts which condition the possibility and nature of individual autonomy and responsibility.
- *Individualism* - as regards focus, there is still more emphasis on the individual learner than social learning, community and the learning organisation.
- *Territorialism* - the definitions of 'EE', or 'EfS' or 'ESD' raise the question of boundaries: what educational theory and practice lies within and without these boundaries, and why, and what the relationship is between education on the 'inside' and on the 'outside'. A tendency to maintain borders also tends to diminish the ability of environmental education to work for paradigm change in education as a whole, and to engage in a co-evolutionary way with sustainability movements in wider society (see C.2.4).

At a deeper level, these issues are consistent with the critical conditions I have suggested at various points in the Thesis, through which progress towards articulating and realising an ecological worldview at epistemic level might be judged. To reiterate, these concern how those subscribing to any education paradigm or subparadigm are sufficiently aware of and engaged in:

1. its own value bases at a deep level – in relation to the dominant worldview – and of the influence of the dualistic epistemological 'error' or inadequacy
2. learning levels and the need for epistemic learning
3. the postmodern ecological worldview
4. whole systems thinking
5. sustainability in relation to complexity theory

I will take stock at this point. A key argument in this Thesis is that:

1. the ecological worldview is emergent
2. environmental and sustainability education has an important role as a transitional agent in elaborating and spearheading a corresponding ecological educational paradigm, but that
3. this requires those involved in such education to become more cognisant of its own intermediary position with regard to roots in realism, constructivism and

holism, as a necessary condition for epistemic change in environmental and sustainability education, so that it is more able to fulfill the role outlined in (2) above.

If the argument that the ecological worldview is emerging is sound, we might expect that the environmental and sustainability education discourse - of all educational discourses - is already reflecting the ideas and tensions involved in its emergence. So what follows is a brief critical review of some of the literature to assess how far some key aspects of the ecological worldview are currently reflected. (In Part B.4.2 I have already pointed to evidence of an incipient ecologism in some writers' work.)

Dualism - Colwell (1997, 4) argues that the nature-culture distinction is a dualism that "contradicts the ecological vision of a unified world". If environmental education is to acknowledge the world as a unified system, he argues, "it needs to relinquish its outmoded dependency on words that represent it as a dualism". He suggests the dualism is addressed through the concept of 'earth system' which "expresses the relationships between human and non-human environments as *intrarelationships*"(my italics). This seems to be an interesting idea which is consistent with my own view about the need to transcend dualism in environmental education. Similarly, Smith and Williams criticise the dualism of most conventional environmental education, and seek instead to distinguish and advocate what they term 'ecological education' (1999). In addition, Thomashow (2002) suggests a developing a 'place-based perceptual ecology' and a 'biospheric curriculum' through which relational pattern learning is encouraged through 'interspatial', 'interspecies', 'intertemporal' and 'intergenerational' concepts.

Embodiment - Payne (1997, 134) also addresses dualism and is critical of the three main traditions in environmental education (positivist, interpretivist, socially critical) through all sharing "to different extents, a Cartesian view of 'I' and 'world'". Interestingly, Payne argues for (what I would term) a systemic conception, a 'critical ecological ontology', whereby "the locus of understanding, explanation and praxis 'for the environment' should be 'in here, with me and you' rather than 'out there', somewhere to be found, identified, studied and solved" (133). The focus of inquiry is how the experiencing body, in actions and interactions, might be used as a localised 'site' for understanding, explaining and acting on 'embodied' environmental problems or issues. I take Payne's located curriculum approach to be significant in attempting to address and reconcile the dualisms of: education 'for the environment' and education 'for being'; the inner and the outer dimensions; and constructivism and realism.

Epistemism - Wals and Jickling (2001, 4) welcome the notion of sustainability as a way of stimulating new thinking in education.

> Focussing on sustainability provides an opportunity for accessing higher learning (epistemic development) and new ways of knowing (the paradigmatic challenge)….serious attempts to integrate sustainability into higher education brings academics into whole new pedagogical worlds - experiential, epistemic, and systemic - which in turn brings them into whole new worlds of learning and indeed, researching.

They take far more space critiquing a modernist, deterministic approach to education for sustainability than they do either explaining why such determinism remains strong, or more importantly, exploring the meaning and grounding of systemisism. At the same time, I find their ideas on methodology and pedagogy largely in tune with my sense of what the ecological paradigm implies.

Revisionary postmodernism - Sauve suggests that environmental education "involves nothing less than the re-construction of systems of relationships among persons, society and the environment" (1998, 44) and states that postmodern education "has to be reconstructive" (44-45). I strongly agree, yet there is very little in her writing about the ideas of revisionary postmodernism that could inform such re-construction. Like Jickling, she is very critical of the notion of sustainability and sustainable development, and thereby of *all* 'education for sustainability' or ESD - which she associates with economism and instrumentalism. My comment on this is that if such critics interpreted and reclaimed 'sustainability' through the lens of revisionary postmodernism, ecologism and ecological design, they would better discover a basis for the "deep commitment and transformation" in environmental education they advocate.

Second-order change - Fien (2000) is one of the few established EE writers who explicitly mentions the need for second-order change if education is to respond to the sustainability challenge. Such reorientation requires, he suggests, a commitment to the reconstructionist tradition in education. Whilst he critiques modernist education and its "social and economic reproduction" (273), there is little basis explicated for second-order change other than critical reflection, and a process of educational reform and innovation. There is also no mention of third-order change.

In addition to the authors mentioned here and in B.4.2, one of the most interesting recent books in the field to my knowledge is Van de Bor *et al.* (2000). As noted in Part C, this looks at the issues of epistemic learning in a network of agricultural colleges, and touches on the nature of an alternative ecological epistemology. Further, Smith and William's book on *Ecological Education in Action* is based on the notion that most environmental education lacks "a recognition of the deeper cultural transformations that must accompany the shift to more ecologically sustainable ways of life" (1999, 3). Bowers is another important writer in the field, who has a strong sense of culture and ecologism, but who, in my view, is too dismissive of constructivism and seems to ignore the possibility of epistemic learning in the individual.

In the literature then, there are intimations of the educational and cultural worldview that is the subject of this Thesis, but few clear expositions. One (quite early) exception is Robottom and Hart in their 1993 monograph on environmental education research. Drawing particularly on the work of Skolimowski and of Reason, they argue for a "paradigm shift in educational inquiry" consistent with an emergent worldview which is "more organic, systemic, (and) holistic" (1993, 46). In a section interestingly titled 'Congruence of the emerging new worldview and environmental education research', they note - echoing Reason - that the shift involves a "move to participatory and holistic knowing based on a participative and dialogic relationship with the world", a shift from objective consciousness to "critical subjectivity" and to "knowledge about" to knowledge in action. (1993, 53). The chapter is disappointingly brief, and I feel, its significance has largely been missed in the general discourse that followed in the period following its publication (which was largely dominated by the Jickling-led critique of determinist forms of ESD). From a personal conversation with Paul Hart (July 1996, University of Bath), it was clear that it was he, rather than Ian Robottom (who strongly supports the socially critical view), who penned this section of their 1993 monograph. Yet strangely, Hart's later work makes little mention of this emergent worldview, and this absence is also reflected in recent discussions of environmental education research - see *Environmental Education Research* (*EER),* 2000, vol 6 no 1, for example.

In this special issue of *EER* on qualitative methods of inquiry, Hart almost invokes Ashby's 'law of requisite variety' (though Ashby is not credited - see my comment on this law in **Appendix I** section 1.2) regarding the necessity and validity of the existing variety of qualitative research paradigms. Each research path, Hart writes, "needs to be valued for its unique metatheoretical and methodological assumptions". I agree. These multiple paradigms of educational thought, he says (2000, 40):

> …require reconciliation not at the paradigm level but at the level of metaparadigms – for example, whether people can agree on the relationship of education to the goals and ideals of democracy or social justice.

Or of sustainability, I should add. There is an important point that Hart has raised here, which touches again on the *difference between paradigmatic levels*. It also echoes the point made in C.1.3 about Denzin and Lincoln's 'bricolage', and it concerns the nature of our metaparadigm, at the deepest level. The issue is whether we have - and can articulate - a metaparadigm that is capable of reconciling the research paradigms and putting them in a new light. Hart goes on to say that qualitative researchers will face many decisions which "go beyond quality criteria" and will deal with "larger questions of paradigm" which will govern the researcher's stance on what counts as knowledge and therefore what methodologies will be used. This internal questioning is vital because, he says (Hart, 2000, 44):

> …in the future, the postmodern turn will require that researchers address a crucial problematic in educational research, between the reconstructive project of the modern, and the deconstructive project of the postmodern, that has not yet been examined.

Similarly, Jarnet *et al.* (1998, 1) state "environmental educators must decide whether they will follow (postmodernism)…or remain anchored, overtly or implicitly to modernist traditions". What is sorely missing here is awareness of the grounding and possibility of the reconstructive *post*modern 'project' and metaparadigm. It has indeed "been examined", as the many sources referred to in this Thesis bear out, but - and this is key - it seems to have been largely missed by the environmental and sustainability education community. We do need multiple perspectives and approaches (Scott and Oulton 1999), and this is, paradoxically, intrinsic to the ecological/systemic view (see discussion of Bell and Morse's work on sustainability indicators in B.1.7, for example). Yet at *meta*paradigm level - as I have argued in this Thesis - we need to recognise the emergent and urgent shift from the mechanism, scientism, objectivism and reductionism of the dominant old paradigm, towards the ecologism, holism, participativism, and systemisism of the new. This is a task - as I have indicated in Parts B and C, that necessarily involves epistemic re-perception, re-cognition and realisation.

To summarise this subsection: environmental and sustainability education should not be limited to the realist/behaviourist position, which I have elsewhere characterised as the '*learning of ecology'* (Sterling, 2003). This has a partial role and validity, but also limits and weaknesses (as outlined above). Further, neither can such education be

restricted to individual agency and critical thinking, as important as these may be. Rather, a transformed view of environmental and sustainability education subsumes both these positions into a wider schema which may be termed the '*ecology of learning'*. Learning or teaching *about,* or *for* sustainability in some preparative sense has some value, and may be important, but ultimately limited, first steps. Deconstructing sustainability also has some - limited - value. But a deeper level, the issue becomes - much more - a question of *being* and *becoming.* That is, learning towards thinking, working and living ecologically and sustainably - the enacting, experiential, experimental 'learning as sustainability' position outlined in C.2.4. This transformed and transformative 'ecology of learning' orientation, wherever practicable, seems to me much more in tune with the way the world works, and in a real sense - taking all that has said above about sustainable systems and edge of chaos states - 'wishes' to work in a teleological sense. Here we have, according to Reason and Goodwin, "a postmodern paradigm of learning to participate in an unpredictable, but nevertheless, intelligible world" (1999, 287).

The articulation of whole systems thinking and an integrative metaparadigm, makes the transcendence of the fragmentational influences of our mechanistic paradigm legacy becomes much more possible. The concern here is not only that body of theory and practice we have chosen, reasonably, to call 'environmental education' over the last thirty years, nor is it just education as a whole. It is our fundamental view of the world, as individuals, societies and cultures, living in watershed and dangerous times.

In sum, I have outlined the three main positions that underlie environmental and sustainability education, and suggested that there are problems with each of them but also that each has a partial validity. I have mentioned some recent work which indicates realisation of the need for a more integrative and systemic paradigm. From this review of the field, I now look further at the nature of a whole systems paradigm for sustainability education.

1.2 Towards a whole systems thinking paradigm for environmental and sustainability education

Let me first comment on the tension involved in setting out a propositional theory. If I lay out a *detailed* picture of the implications of whole systems thinking it might be seen as:

- totalising, prescriptive and universalistic
- contrary to the participative ethos of the ecological paradigm

- exclusive of other views

On the other hand, if I paint a general picture, it might be seen as:

- lacking substance and meaning
- poorly defined
- lacking commitment and practical application

The challenge for anyone interested in 'change in education' and 'education for change', is to find a path between these dangers, one which is indicative and invitational rather than prescriptive and impositional. Part of the problem here is that the 'delivery' oriented educational culture is geared to implementation of, rather than critical reflection on, schemas and frameworks.

My aim then, is to suggest appropriate bases for the revisioning of environmental education and related educational movements, which others can, if they wish, interpret, critique, adapt or reject according to their own values, experience, and work context. To that end, I have already discussed some ideas regarding the 'vision' and 'image' of a change of educational paradigm and these are to be found in Part C and in **Appendix II**. Certainly, I would like others to engage in a debate and an owned epistemic learning process around this alternative paradigm, but I can do no more than lay out some ideas which may or may not resonate with others. (The success of my Schumacher Briefing (Sterling 2001) indicates that for some at least, such ideas have helped their re-thinking of theory and practice, and I exemplify this in more detail in Part D.2 below.)

What is most important, both to capture and convey, is the essence of the whole systems view. This is not an easy task. If the argument is valid (that it is indeed a whole cultural paradigm that is at issue), then clearly a short description - however well put - cannot encompass it. Such a description tends to render a body of meaning that is rather less than adequate. A key device throughout this Thesis has been to juxtapose the new paradigm against the old, and thus suggest its nature by contrasting against that which it seeks to both transcend and include. Another problem, discussed earlier in Part B, is that the paradigm is emergent, in flux or a state of becoming, and therefore cannot be viewed with the clarity of hindsight. This said, I will try to restate, summarise and re-mind us of some key ideas, using the triadic model of paradigm again.

Epistemology/Ethos

Re-perception. The realisation that we are deeply implicated in the (spiritual, ideal, and material) world, that we are co-creators in what it becomes, for good or ill, is uppermost. Because of this deeply systemic relationship we 'need to perceive that we need to perceive' in this way, and knowingly then, as far as possible, see the whole and work for the welfare of the whole. This is, as far as possible, a participative epistemology of recognising duality or di-polar unity rather than Cartesian dualism, and based on critical subjectivity and conscious co-evolution. The ideas of participative knowing, holistic and transpersonal ethics, the metaphors of wholeness, healthy system, and living system, and the concepts of self-organisation, and autonomy and integration are helpful in realising this epistemology. A further aspect is trusting our 'inspirational knowing'. As Glazer (1999, 2) states, 'Once we forget how to look to our inner experience as a resource for knowledge and understanding, we lose resourcefulness, connectedness, our sense of well-being, and confidence'.

Ontology/Eidos

Re-cognition. The ontology is both realist and idealist, recognising the dynamic 'given cosmos' and our part in interpreting and acting in, on and shaping, the reality we see. We are 'neither separate nor the same'. This ontology is also both material and spiritual. The shift here requires recognising pattern, process, connectivity, and wholeness - Bateson's 'pattern that connects' - and a primary orientation towards wholeness rather than 'partness' in cognition and description.

Methodology/Praxis

Realisation. The methodology is one that is appreciative, recognising the nature and value of 'what is', as well as transformative in working towards the realisation of 'sustainable systems' - 'what might be'. It is essentially cooperative, action-oriented and transformative through reflexive learning and lived experience. The ideas of integration, systemic coherence, emergence and synergy in design are guiding principles in this praxis, as well as sufficient time and space.

This three-part model is congruent with the familiar educational triad of 'values, knowledge and skills' but my concern here lies at the level of paradigm rather than provision. From this deeper basis, I will now comment on some of the implications for environmental and sustainability education, revisiting some of the issues and problem areas discussed above.

Commensurability of paradigms - this is key. As I have argued at several points above, I do not concur with the Kuhnian view of the incommensurability of paradigms, but share the Wilberian evolutionary view of the increasing adequacy or wholeness of succeeding paradigms, such that aspects of preceding paradigms become integrated and transformed within a new and greater whole (see earlier discussion in B.1.5). Interestingly, environmental education writers tend to reflect a Kuhnian view (Robottom and Hart 1993, Wals, Albas and van Arcken 1999, Wals 1999). The problem with this latter view, is that the partial validity of earlier paradigms becomes lost in a dualistic attempt to distance the advocated paradigm from the old, and prove the validity of the new. Further, followers of earlier paradigms then feel threatened and obliged to defend their stances, resulting in the so-called 'paradigm wars'.

Instead, I suggest that the new paradigm transcends and includes - it is "related but distinct" (Heron 1996, 10). Thus, returning to the fundamental positions (summarised in Table D.1), the new paradigm integrates elements of both, into a greater whole, thus:

Table D.2: Towards a participatory paradigm in environmental education

Position	Participatory
Ontology	Realist / idealist (relationalist)
Epistemology	Participatory
Theory of learning	Participative / systemic
Function of EE/ESD	Remedial → developmental → transformative
Main emphasis	Towards transformative learning experiences
Focus	Meaning-making and change appropriate to context
Seeks	Wholeness and sustainability at all system levels
Reflects	Intrinsic and transformative values
Pedagogy	Transformative
Desired change	Contextually appropriate balance between autonomy and integration (i.e. healthy, sustainable relationships) in and between systemic levels

Purpose - there is a sensibility of purposefulness in this paradigm which is neither crudely behaviouristic nor helplessly relativistic. This is based on the belief that we need to urgently work towards (and through a whole systems approach, we can reasonably know and distinguish between) 'more' and 'less' healthy/sustainable relationships and systems.

Environmentalism, ecologism and dualism - in the new paradigm, dualism is as far as possible transcended through conscious appreciation of the whole, and caution in the use of language. The pervasive notion of a separate 'environment' is downplayed in favour of integrative, systemic, concepts and approaches, whilst still fully recognising the 'more-than-human' world.

Behaviourism v. constructivism - beyond these two poles, there is a strong sense that people's behaviour patterns need to change to achieve more sustainable lifestyles, that the general direction of necessary change is known (as evidenced by successive global reports, for example Loh 2002), and that education and learning has a critical role in enabling such lifestyles. At the same time, this sense is also informed by awareness of the worldviews that inform both behaviour and the social structures that influence behaviour, and by a belief in the necessity and value of participative and epistemic learning in transformative change towards a more sustainable state of being.

Content and process - the ecological paradigm recognises the primacy of relation - as regards the nature of *content*, the quality of *process*, and the relationship *between* content and process. To take the latter first: content and process are not separate issues. It is not a matter of 'content versus process', but their systemic relationship and recognition that 'knowledge-making' emerges from their synergy. *What* we know, and *how* we know are mutually influencing. We need to be more aware of how and why we may value some knowledge above others, the importance of context to determining what is worth knowing or learning, and our constructive role in meaning-making. The 'content is everything' view is suspect because it does not respect the learner's needs, uniqueness, and participative role. In addition, the question of 'who decides' the content and on what basis, remains. At the same time, the 'process is everything' view is insufficient because there is a general lack of ecological and systemic understanding in society: and as a colleague has said to me, unless there is access to new ideas, we are stuck with the same conceptual frameworks no matter how good the process. There is a parallel here with Capra's view of the learning organisation - that "emergence of novelty is a property of open systems, which means that the organisation needs to be open to new ideas and new knowledge" (2003, 107).

For better or worse, the chosen learning process and learning situation influences both choice of content, and how learners perceive meaning and participate in its

construction. (Technical training in industry, and A.S. Neill's Summerhill school, might be two very different exemplifications of this point.) In a designed systemic/ecological learning situation (see for example the Hawkesbury and Schumacher College examples in Part C), there should be coherence rather than contradiction or tension between content and process. The prior knowledge, interests of, and values and disposition of the learners are very important, but not *all*-important: the contextual issues of their learning situation are also important in determining worthwhile content. A whole systems view of the socio-ecological context suggests that systemisism and ecologism has to be reflected in content and curriculum, whilst a whole systems view of learning and the learner suggests that the participation and full engagement of the learner is essential to transformative change. As Stacey says (1996a, 332) in a statement which equally applies to the individual, "no-one can make a group learn. Whether or not it does so depends on its own spontaneous behaviour".

Education should rarely be either a matter of fixing detailed learning outcomes in advance, or its opposite, which is seeing what spontaneously emerges from an unstructured learning situation. Rather, the new paradigm suggests that we need to engage with the meaning of ecological or systemic literacy, preferably through learning/teaching in real and localised contexts. The methodology therefore is one of participative inquiry and systemic coherence in the learning situation which should - where possible and appropriate - relate to and engage with real contexts, issues, and places (see also discussion on curriculum in Part C.2.3). This contextual and systemic view of content, of 'located curriculum' or 'situational understanding' (Elliott, 1998), avoids both the extremes of behaviourism ('this is what you should know/do – and because we say so') and constructivism ('the only worthwhile knowledge is that which a group generates'). Rather, a systemic view of content/process is 'curriculum as lived experience' which reognises emergence rather than predetermined outcomes, and involves all dimensions of knowing: propositional knowing, practical knowing, experiential knowing, and inspirational knowing, the latter including the affective and intuitive domains.

With this said, some have asked me what concepts I would include in any taught curriculum as regards sustainability. My work in this area has had some influence (Sterling 1998, Sterling and Ali Khan, 1998), particularly in the English national curriculum, and has been taken up internationally. Whilst it is important to address the issue of content, and justify its selection and presentation, I worry about the status of 'content lists' in a performance and delivery-oriented educational culture - particularly

when such lists are detailed, prescriptive and linked to predetermined and measured 'learning outcomes', rather than general, indicative and allied to open-ended outcomes that can embrace emergence and the generation of knowledge in the learning situation. Some authors (Firth and Plant 1996, Wals 1999) have sought to provide 'process indicators' for environmental education, in an attempt to both provide an alternative to and yet subtly address the demands of a 'performance indicator' oriented educational culture. Such attempts provide a useful way to think in more detail about the content-process relationship, and engage educators in reflecting on their practice. Plant and Firth suggest six indicators based on the learners' experiences (note that these are relevant beyond 'environmental education' per se). How does the learning process:

1. give meaning to the learner's sense of self and his/her everyday relations with others and the environment? (interconnectedness and subjectivity)
2. allow the learner to experience the environment? (complexity)
3. address the notions of change, uncertainty, controversy and risk? (change and uncertainty)
4. develop experiences that link local to global contexts? (relation)
5. develop capacities for intelligent, individual, collective and reflexive action that is transformative? (transformation)
6. generate advocacy through lifestyle that demonstrates commitment to others and a real concern for the environment? (advocacy)
   (Adapted from Firth and Plant 1996, and from Blewitt's adaptation 2002)

Such indicators imply the operation of a participative epistemology.

Domains of learning - in the dominant paradigm, most learning is seen as a process which is predominantly cognitive: education *about* sustainability. In the participatory paradigm, the existential, ethical and affective, and practical domains of learning are also recognised through a whole systems view of the learner and of the issues which are the subject of study. Not least, this more whole approach is necessary given the existential anxiety that characterises 'the risk society', and the sense of despair that can be engendered in students who only learn at the cognitive level 'about' environmental and global issues (Hicks 2002).

Disciplinarity - the validity and contribution of disciplines is recognised, but they are also seen as 'systems of interest' which are too often interested in defending relatively closed and narrow boundaries and specialisms. Interdiscipinarity and multi-disciplinarity is welcomed in generating multiple perspectives on complex issues, but

the danger of confusion between ‘map and territory’ can still remain. Transdisciplinarity, mixing as appropriate with local and indigenous knowledge, and giving rise to new knowledge as an emergent property is seen as a significant and necessary approach to many complex sustainability issues.

Methodology - here, I re-iterate the point about the commensurability of alternative methodological paradigms, and the further point about the distinction between the level of methodological paradigm and the deeper level of cultural metaparadigm. I am not seeking then, simply to assert a participative methodology instead of, say, empirical-analytic traditions, in an attempt to negate the latter and affirm the former. Rather, whole systems thinking values the range of available methodologies, while seeing the emergence of the participative methodological paradigm as a more whole approach which both subsumes and changes the nature of other traditions (through operating within the context of the emergent ecological paradigm at meta level, which itself is seen as subsuming the mechanistic paradigm). This answers Hart’s call (2000, see above) for reconciliation of methodologies at a metaparadigm level.

View of learner - the behaviourist view of the learner is one of deficit and uniformity: learners (or ‘target groups’) are seen as unaware and/or ignorant, and all such learners will benefit from ‘delivery’ of the same programme therefore. The constructivist view of the learner is one of contribution and difference: learners have their own personal/tacit/local knowledge and experience and will bring this to bear in their meaning-making, and each learner is uniquely different. Again, the systemic view attempts to heal this duality. There is faith in, respect for, and appreciation of the learner: he or she may be relatively unaware or ignorant, say, of sustainability issues, but will inevitably construct and contribute to meaning from their own perspective. Through a process of transformative learning (see Part C.2.4), the learner is increasingly able to both realise and interpret the complexity of the world and their own responsibility, within the context of the well-being of the whole.

Autonomy and integration - this refers to the self-assertive and integrative tendencies of living systems (see discussion in B.1.6). As argued above, behaviourists argue for integrative, i.e. corrective, behaviour in the system to fit in with larger systems (this may be in the family, in the classroom, or in the ecosphere, on integration into systems of belief, for example). Constructivists emphasise building autonomy in the system/individual. From a systemic viewpoint, there needs to be a dynamic balance between integrative and autonomic tendencies at all system levels, and between

‘corrective’ and ‘meaning-making’ interpretations of learning. Too much integration leads to Wilber’s pathological hierarchy and loss of individuality and autonomy, while too much autonomy leads to a loss of appropriate response to context or metasystem and social and environmental breakdown. Both situations are unsustainable. In educational terms, this means working for autonomy and self-organisation in relation to the health of the greater whole. This comes back to a systems view of sustainability and the nature of viable systems.

Territorialism - from a whole systems view, ‘environmental education’, ‘education for sustainability’ and ‘education for sustainable development’ are seen as coalescences of ideas and practices with a degree of internal coherence, not as distinct disciplines. Practitioners need to maintain indistinct boundaries which are necessarily permeable to allow influences to migrate ‘in’ and ‘out’ - that is, they should be open systems. As systems of interest, they should serve to help transform educational thinking and practice as a whole, rather than primarily seek to preserve and strengthen their separate identity and integrity. They should seek co-evolutionary change through alliance with parallel and related movements in formal education (such as development education, peace education, citizenship education, holistic education, *et cetera*) and non-formal (such as Participative Rural Appraisal and community development) and with sustainability movements in wider society.

Labels and ‘good education’ - labels both matter, and do not matter. They matter in as much as they carry and signify meaning. Labels like ‘environmental education’, ‘education for sustainability’, ‘education for sustainable development’, and similar others, are models. Like any model, they serve to simplify and communicate, but can also confuse through implying both more distinctiveness and shared understanding than may be the case. Intended connotation, and actual interpretation can differ markedly. So the undoubted utility of these names as shorthand in communication is countered by the possibility of misunderstanding between parties. Further, they can fragment: labels are banners around which acolytes gather and develop their common identity and often, an exclusive lexicon and literacy. Therefore, we need to look beyond the label, and it is here that in a deeper sense, labels do not matter. I am much less concerned about the label, whether any of those above, or ‘citizenship education’, or ‘personal and social education’, or ‘moral education’, or any other category for that matter, than I am about the manifested values and philosophy in any educational policy or practice. At the same time, the proliferation in recent decades of ‘adjectival educations’ - each concerned with some aspect of social change - seems ironic (if

understandable), given that many of those working in these areas seek a more holistic education than that offered by a compartmentalised and reductionist mainstream. This is why I have suggested 'sustainable education' - not as yet another adjectival education, but to suggest the need for and bases of a changed educational paradigm. (In doing so, I am aware of the communicative importance of labels, but also of the danger that this one may nevertheless be perceived as another adjectival education, or misconstrued as equivalent to 'sustainability education'.)

This raises the issue of whether 'good' environmental education is no more than, or can be equated with, 'good education'. This has been debated within the environmental education community (Hart, Jickling and Kool, 1998, Wals 1999, Scott 2000). To some extent this equation is justified: the recent emphasis in environmental education on the quality of the learning experience inevitably parallels discourse on learning in other 'non-environmental' educational fields. Thus for example, Hart, Jickling and Kool (1998, 220) imply that environmental education should be "interdisciplinary, participatory, critical, community-based, values-based, and inquiry-based", a methodology that most liberal educators would recognise as not belonging to environmental education, *per se*. Yet, seen against my notion of sustainable education, this is 'necessary but not sufficient'. There are two issues here, and the first we can dispose of quickly. Environmental education is *not* equivalent to good education where the latter is informed by unexamined 'old paradigm' mechanistic values. In this I would place much of the current debate and practice which is narrowly pursuing centralised curricula, 'standards' and targets (see discussion in Part B.3.3). This is not what Hart *et al.* mean by participatory education, of course. The second issue is that there is no equivalence if, in asserting 'it is all just good education', we lose our ecological context and the urgency of the sustainability transition - and in some forms of constructivism, as argued above (and in also in Part C), there is just this danger.

My view of environmental education is one that is predicated on the concept of *wholeness* as a normative, a descriptive, and a theory-in-action principle. It is not based on an idea of a *separate* 'nature' or the 'environment' as such, but on a whole systems view of human *and* non-human reality, which includes what we refer to as nature and environment. As I have suggested in Part A.3.1:

- Keypoint: an ecological epistemology suggests a conceptual meta-connective pattern which links sustainability, learning and ecology, based on such ideas as the development, creation and maintenance of potential through self-organisation and a balance of autonomy and integration between systemic levels.

Here we have an emerging philosophy of relation that is ethically tenable, scientifically supported, and practically indicative (the three dimensions again), such that we might learn towards a healing systemic wisdom.

An environmental education inspired by such a view is inclusive, systemically coherent and purposeful, and seeks to influence the wider context of educational thinking and practice accordingly rather than maintain a separate existence. Something of the synergetic nature of such environmental or sustainability education is reflected in Bawden's summary of the process of organisational and community learning and development at Hawkesbury College (see Part C), where he says the aim of the activities and outcomes of this process are (or were):

> …aesthetically acceptable as they are technically possible, as ethically defensible as they are economically viable, as culturally feasible as they are socially desirable, as spiritually compatible as they are practically manageable, and as ecologically responsible as they are politically supportable (Bawden 2000b, 300).

This manifestation of whole systems thinking in an educational context raises the issue of how such change is nurtured or facilitated, and the question of educational design and management. These issues are considered in the next subsections as way of drawing the main part of this inquiry to a close.

In sum, in this subsection I have attempted to look at some of the recurring issues in the environmental and sustainability debate, and comment on these from a whole systems viewpoint in order to indicate some bases of a whole systems or participatory paradigm for sustainability education that might help the field move forward effectively and be more transformative.

1.3 Design and the learning situation

A key question remains, one that has been touched on already in discussion on ecological design and on transformative learning. This is whether learning experiences and change strategies can be designed that nurture the ethos, eidos and praxis of sustainability.

Earlier, I have discussed *vision* and *image* from Banathy's model of systems design of education previously discussed in Part C (being vision, image, and design), and now I turn attention to *design.* As I have argued previously (see Sterling 2001), there is nothing intrinsically ecological about this triadic model, or my own triadic models, except when the parts are seen as an integrative and nested whole, and they are inspired by an ecological rather than mechanistic or relativistic vision. If the latter, design and strategy will be problematic. As individuals or institutions are guided by unexamined mechanistic or relativist assumptions and values, learning situations (particularly formal ones), are not likely to be designed well toward sustainability. Attempts to do so are likely to interpret sustainability in simplistic terms, and change in terms of goal-seeking strategy. But as Stacey and others point out, the usefulness of strategies based on corrective behaviour around fixed goals, is dubious in anything other than the very short term or simple situations, because of the uncertainty introduced by complexity. As Flood states: "…complexity theory casts doubt over the claims of traditional strategic planners" (Flood 1999, 129). The trouble with mechanistic strategies, management and design, is that, very often, they do not work - apart from perhaps, in the shortest time-scale and narrowest of contexts. The more detailed and long-term they are, the more likely they are to prove erroneous as time goes by. Instead, complexity suggests we have to "know within the unknowable, manage within the unmanageable, and organise within the unorganisable" (Flood 1999,129).

This means that, paradoxically, (and put simply) we are more likely to move towards sustainability by participative engagement, than by planning for it from the top - because it is an emergent property rather than a fixed goal. This does not imply we abandon design in education and learning, in policy and practice, but re-think it, paralleling the ecological design movement (examined in **Appendix I**). Echoing the idea of design as *intention*, it raises the question of purpose and fundamental ethos which guides our design and praxis, and this comes back to the question of 'vision'. If we are able to rethink our epistemology - that is the whole area of 'purpose/ethos/vision/metaphor/assumptions/philosophy' - then image and design change accordingly. Sustainable education does not imply planning for utopia but designing for healthy emergence, for what Smith has called 'sustainable learning' (2002). As we have seen, emergence happens 'anyway' - qualities such as trust or fear, buzz or boredom, collegiality or isolation, inclusion or alienation, innovation or stasis, creativity or rigidity, cohesion or alienation, arise depending on the total design and actuality of the learning situation. Stacey is wary of design if it means imposed vision or blueprints: rather, "any design consists of the basic design principles of the

system itself" (Stacey 1996b, 13), through which (I would add) healthy emergence and positive synergies arise. What he seems to mean - and this is a strong philosophic point borne out by chaos theory - is that in a real sense the design is 'there' already, order is immanent in chaos. We 'just' have to recognise it. As Stacey says, "we are a part of nature and so, not surprisingly, we are not all that different from it - we too are creative when we operate at the edge of disintegration" (1997, 21). In short, our understanding of complex living systems is providing us with new principles of ecological design and management. Mechanism, the idea that we *always* have to order, intervene and control prevents us from recognising and embracing this immanent design, and for this reason, paradoxically, we need 'design as intent' to realise, appreciate, and 'allow' living systems design.

Stacey stresses the role of leadership here (and this seems applicable to any educational situation, particularly in relation to trying to realise sustainability): "the true role of the leader of a creative system is, not to foresee its future and take control of its journey, but to contain the anxiety of its members as they operate at the edge of chaos, where they are creating a future that none could possibly foresee" (Stacey 1996a, 346). Similarly, Capra (2003) speaks of the importance of leadership to facilitating emergence, which he says means "facilitating creativity" (106). This requires openness and "a learning culture in which continual questioning is encouraged and innovation is rewarded" (107).

By contrast, the mechanistic, goal-driven, outcomes-oriented, performance-evaluated paradigm tends to suppress creativity and squeezes out the space where edge of chaos conditions can operate. Where then, are the design principles to be found that make a transformative learning situation more likely in any particular context, or bring us closer to the realisation of sustainable education?

There is no formula or blueprint of course, but many of the concepts and models outlined in this Thesis suggest ingredients and broad principles that any educator, institution or organisation might consider as they develop their own visions and designs. By way of summary and reminder, some of them follow:

- my model of *extension, connection* and *integration,* and of *re-perception, re-cognition and realisation* (discussed in Part C) and illustrative 'image' of sustainable education (**Appendix II**, Box C.3)
- shifts in purpose, policy and practice, suggested in Part C.2.3, Box C.4

- the conditions that support transformative learning suggested in Part C.2.4
- learning levels and the distinction between learning 'about', 'for' and 'as' sustainability, outlined in Part C.2.4.
- key ideas such as systemic coherence, synergy, and the difference between systemic and piecemeal change
- the meta-connective pattern: connecting learning, self-organisation and sustainability
- Bawden's characteristics of a 'self-organising critical learning system' outlined in Part C.2.4
- ideas on viable and resilient systems, and the principles of ecological design (outlined in **Appendix I**)
- work on process indicators, such as Plant and Firth (1995), Wals (1999)
- adaptive management and other management principles suggested by complexity theory outlined in Parts C.3.1 and by Table C.3 **Appendix II** (Sterling 2001)
- Banathy's ideas (1991, 1992) on systems design and co-evolutionary change in education
- conceptual schemes such as Capra's principles of ecology (Crabtree 2000) or Thomashow's biospheric curriculum (2002), and my own work (Sterling 1998, Ali Khan and Sterling 1998).

Leadership is key if we are to escape the lasting influence of mechanist and reductionist thought patterns in education on the one hand, and the rather vision-less influence of deconstructionist thought, on the other. Stacey points to the importance of systemic thinking to leadership (1996b), and of reasoning by analogy and intuition rather than by formula (1996a, 313). Similarly, Reason and Goodwin suggest that seeking to influence systems beneficially, requires the "cultivation of the intuition as a way of perceiving the integrity of healthy wholes and hence the capacity to see disturbances from health" (1999, 293). This applies to all situations, all systemic levels, and nesting relationships, and perhaps to all of us - given Meadows' (1992) exhortation that everyone needs to be a learning leader in the sustainability journey.

Essentially, revisioning education is about re-discovering or reclaiming our own humanity, wholeness and connectedness. The possibility and the influence of a new sustainable education paradigm is perhaps summed up in what Zohar and Marshall (2000) call 'spontaneity'. This, they say (drawing on the original Latin), means a deep response to connectedness - we are responsible because we know we are not

separate from others or the world. Thus, transformative learning - at all systemic levels - towards a greater responsibility, is paradoxically, a sort of coming home to that which we already know, to ourselves and our one Earth. “Real transformation”, state Zohar and Marshall (2000, 274) brings us “back to the place from which we started, only now to live it fully alive and aware”. This evokes the original meaning of education, *educare,* to draw out and realise our existing potential, and in relationship to the wider ecology of others and the Earth.

2 THEORY AND PRACTICE

2.1 Looking at feedback

How does this Thesis relate to practice? Unless it does so, its standing as worthwhile inquiry is open to question. Discussion about paradigm and paradigm change can seem very remote from dealing, for example, with class 4C on a wet Friday afternoon, or with a community group concerned with lack of facililties. Yet, following Bateson, I believe that our individual and shared paradigm positions directly influences the set of possibilities that we consider and use in any practice, whether or not we are conscious of this influence (see ‘Levels of systemic knowing’ diagram in Part B.1.3). As I have said in Part A, this is an informative inquiry about transformation, that I believe might help others engage with issues of transformative learning and paradigm change. This subsection presents some evidence that helps substantiate this belief.

As related in the Preamble, the Thesis has not arisen in a vacuum but from the basis of over thirty years involvement in the field of environmental and sustainability education, variously as a teacher, lecturer, researcher, writer and consultant. Hence, I have been involved in dialogue through teaching, speaking, reading, writing and listening for a good many years. So I have written papers, given workshops and seminars, and taught (particularly on the London South Bank University masters’ course since 1994) and all this time have been evaluating ideas and listening to others’ views and experience, including of course, those of my students. The extensive feedback I have received, personal, direct and indirect, is evidence of the validity and usefulness of the arguments I have been developing, but has also indicated that a significant minority of educators are thinking along parallel or similar lines. In short, I have been encouraged and invited to write and lecture because it resonates with people’s own thinking and experience, and, it appears, helps them to move forward. What follows is not intended as a laudatory piece, but evidence that the kind of ideas that I have presented in the Thesis have validity because they affirm and strengthen other’s thinking and

professional practice, from student teachers through to policymakers. Where communication has been personal, I have kept people's identity confidential. Most of what follows concerns feedback on my book *Sustainable Education,* or on invited lectures based on the book.

A selection of personal communications

- 'I was hooked...it was easy-reading and I was immersed in a world that echoed a lot of the things I have been saying and writing to environmental educators down here in Australia for the last couple of years! I couldn't put the book down and within a couple of days I had read every word, cover to cover. Ideas were swimming in my mind...and I was excited about the direction of EE (or, should I say, sustainable education). By early September, I was using Sterling's work to inspire others in a keynote to educators taking time out for an environmental education residential conference. I used much of Sterling's ideas to foreground many of my own ideas on how to integrate EE in the school community...the keynote (about 2 hours with questions from the audience) was a hit and got people talking and thinking beyond the boundaries! Anyway, the influence of Sterling has not stopped here, by early December 2001 I was/am sitting on an expert committee to support a Review in Environmental Education in Australia...which is looking at the aspect of sustainable education. At one of the early meetings I highlighted some of the ideas presented by Sterling...and a key member of the Council commissioning the work, has since read the book and has been inspired by its contents...' – email to Schumacher Society, 14/1/01
- 'A colleague at Kingston University says he is basing most of his thoughts on curriculum review on your book.' - email from university lecturer, Swansea, 24/6/02
- 'I need a copy of your book to write policy advice for the Dutch government - any chance you can send me a copy quickly?' - email from professor, Netherlands 5/11/02
- 'I am completing a PGCE in Northern Ireland and was recently given a summary of your recent lecture. Your message at the conference really struck me...sometimes I feel very overwhelmed at the work that needs to be done... but to know I myself can have a small role in this work is exciting.' - email from student teacher, 12/01/03
- 'I along with many other educators in South Australia have been greatly informed by Sustainable Education....' - policy officer, Adelaide, email 15/02/03
- 'Thank you for your inspiring talk which has generated a lot of interest. Best wishes for your thesis and work to bring a more enlightened understanding of what education can and should be'. - lecturer, further education college, Hereford, email 9/03/03
- 'We used the Briefing extensively in the working up of our curriculum within the organisation, particullarly as a supportive ideology. We've had a lot of discussion about how to shift our programme away from transmissive approaches towards transformative approaches. Your Briefing helped bring together a range of philosophies into one source' – director, wildlife NGO, UK, email 19/6/03.

- ‘You have brought forward many of the ideas which need to be considered before any environmental education program can be effectively implemented. Without consideration of such fundamental concepts, a program becomes the application of a procedure empty of meanng for both teachers and students. With consideration of the deeper issues you present, a program will be subtly altered so that it leads to expanded understanding and a greater heartfulness.’ - education academic and systems scholar, British Columbia, email 20/6/03.
- ‘We have used your book widely in New Zealand re sustainable education and with regard to the need to move from a transmissve paradigm to an ecological one...key aspects of your paradigm follow the directions we are trying to move education in New Zealand.’ – New Zealand Association for Environmental Education, email 12/6/03
- ‘In seeking to set up an ecological education centre that would address the sustainability issues and educational challenges of our times, I came across Stephen Sterling's outstanding publication 'Sustainable Education'. This Briefing facilitated such a profound transformation in my worldview, that I immediately changed the name of the organization to the 'Centre for Sustainable Education' (CSE). Stephen's analysis of the need for sustainable education using whole systems thinking has laid the foundation for the CSE business model. His methodology for design has been instrumental in the formative process of CSE. When CSE is up and running, Stephen's seminal work will continue to inspire and guide all levels of the organization: from structure to operations to pedagogy. His Briefing is a masterly work - the definitive handbook for a sustainable future.’ - centre founder, Devon, email 6/8/03.
- ‘Fostering the ability to empathise, to think critically, to imagine, to design and create must be central to a sustainable education, along with fostering a desire to love and care for one another and the environment...Thank you for your heartwarming and inspiring book which makes me feel optimistic that a sustainable education will be acheived’ - senior teacher, letter, 7/10/03.
- ‘Since the Austrian government ratified the national strategy for sustainable development in 2002, a number of working groups were established and one of them is dealing with education in the context of sustainable development. The FORUM Umweltbildung is charged to design and implement education in the context of sustainable development especially for primary and secondary schools in Austria. We came across your publications in this context and found them highly interesting and very useful.’ - FORUM, email, 5/12/03.

A selection of reviews

- ‘I’d like to refer to Stephen Sterling’s book as the most challenging book written so far this century...Sterling has brought theoretical coherence to values which many of us whol worry about the global future share and he has expressed this cogently and lucidly.’ - Professor Michael Bassey, *British Educational Research Journal,* vol 28, no 6, BERA.

- ‘This is one of the most important books to inform and guide any person or organisation in being effective change agents for ecological health. Sterling has given personal insight that is lucid and senstive to the ecological perspective, obviously earned through years of experience thinking, teaching and attempting to effect systemic change.’ - Andrew Eldredge, freelance educator, California, review on www.wwflearning.co.uk, September 2001.
- ‘I recommend *Sustainable Education..*it led to a lot of discussion among me and my friends about what education should be about....it made us more determined to educate for sustainability in school.’ - teacher member of WWF on-line debate on ESD, www.wwflearning.co.uk 10/02/03.
- ‘That often over-used descriptor “ahead of its time” is also eminently applicable to *Sustainable Education...*what most impressed me about this book was the balance it achieves between a critique of existing mainstream education and its offering of a vision of an alternative, post-materialist ‘sustainability’ paradigm which already has a number of practical precursors worldwide’ - Richard House, *Steiner Education Journal*, 36 (2), 2002.

It has not been possible to keep track of how the book has been used but some specific uses of which I am aware include:

- Use in the development of the Baltic Agenda 21 initiative whereby eleven Baltic States produced a strategy to reorient their educational systems towards sustainability. The lead policy officer in the Ministry of Education, Sweden, referred to the book as ‘my bible’. A book incorporating some of my work was sent to all schools in Sweden in 2002, as one outcome.
- Development of the curriculum framework of a major British wildlife NGO (Wildfowl and Wetlands Trust).
- Development of a strategy framework for sustainable schools in South Australia
- Uptake as a set course book in at least four institutions (University of Strathclyde, University of Plymouth, London South Bank University, Macquarie University, Sydney).

In my own work, I have used my whole system approach in extensive lecturing, teaching, seminars, particularly since publication of *Sustainable Education*, and in my consultancy. My approach is distilled in Unit 7 *Education for Sustainability* of the London South Bank University masters’ distance-learning programme, a unit which is consistently highly rated by students, and applied and adapted by them in their own work contexts. I will be updating this unit in 2004. Consultancy where my systemic approach has been central has included a research report on curriculum change for Project Carrot, whereby Holme Lacey College has sought to transform its role and work

as a land based college toward being a centre of excellence for sustainability (Baines and Sterling 2001), and an evaluation and review for Schumacher College which looked particularly at the nature of transformative learing experience at the College (Sterling and Baines, 2002). I have written two book chapters by invitation, based on the Thesis (Sterling in Corcoran and Wals, in press, and Sterling in Blewitt and Cullingford, in press).

Lastly, since 1998, I have taken the lead role in a curriculum development project for WWF Scotland, called *Linkingthinking.* Through this project, which seeks to demystify and introduce systemic thinking to educators and students, I have been able to develop practical professional development and teaching materials which nurture whole systems thinking capabilities and perspectives. The materials were successfully trialled in the first half of 2003 and will be available early in 2004. Professor John Smyth, an internationally recognised authority on education and sustainability commented:

> The complaint is sometimes made by the educational establishment that EE/ESD consists of more or less everything, capable of being all things to anyone, with no hard, definitive academic core. But acknowledging that systemic thinking is a valuable and even necessary skill which is still unprepared for in all but some specialised tertiary courses, we have here the answer in a form adaptable to every level of education.
> (WWF Scotland, 2003)

In sum, I have tried to bring together visionary, critical and practical dimensions in my work, and feedback from the field suggests that many find this approach meaningful and inspiring in their own practice. Further, there is evidence that sustainable education ideas have not just been helpful to individuals but assisted people feel part of a movement or wider network of educators involved or interested in more integrative and transformative education.

2.2 Towards the sustainable institution

A critic might say that much of the argument in the Thesis sounds idealistic, given the very real policy, structural and market constraints facing formal education. Yet there are still choices to be made, both long-term and day-to-day by all members of the education community. I have said that the sustainable education paradigm is, by definition, indicative rather than prescriptive - and the feedback above shows that practitioners inspired by such ideas are able to interpret and innovate within their own

professional contexts. But some indicative picture might yet be illustrative to the reader. I will take the example of the educational institution or organisation, and to finish Part D, suggest some brief indicators which follow from the principles of the paradigm. These should be regarded as interrelated and constituting a systemic whole rather than as a 'ticklist of separate boxes'. How far does the institution:

- review its fundamental ethos, purposes and mission on an ongoing basis in the light of the sustainability challenge;
- audit its curriculum in sustainability terms;
- review its purchasing, investment and local spending with environmental and ethical criteria in mind;
- audit its ecological footprint including transport, energy, water, and use of other resources;
- pay attention to the quality of its built and natural environment in aesthetic and environmental terms;
- engage in a participative and democratic management style involving all members of the community;
- engage all members of the community and their enthusiasms in situated real-world issues;
- promote cooperative and critical inquiry;
- recognise the spiritual, affective, imaginal, and practical aspects of learning as well as the cognitive;
- encourage and facilitate creative, critical and systemic thinking;
- experiment with inter- and transdisciplinarity;
- work with staff to develop varied and participative pedagogies;
- live an ethos of caring and inclusion;
- develop the culture and critical reflexivity of the learning organisation and pay attention to 'learning about learning' both within and without the formal learning situation;
- develop an ethical and responsible research agenda;
- encourage interaction with the immediate and wider community;
- value time and space for reflection and innovation:
- increase connectivity and communication in the institution to facilitate emergence and creativity;
- pay attention to emergence in the learning situation.

Whilst not exhaustive, such ideas indicate the kind of 'lived qualities' that a sustainable institution - that is, an insititution attempting to be a reflective 'microcosm of a sustainable society' - would aim towards. Such change requires the evolution of a collective intelligence and culture. It requires not a top-down, piecemeal or systematic response, but systemic and owned engagement, which may be small-scale and gradual at first.

The emergence of an appreciable number of national and international websites and networks on sustainability and education over the last decade is evidence that significant innovation is occurring, particularly among smaller institutions which are more flexible. Given that there is growing evidence of the sustainability paradigm influencing mainstream thinking, policy and practice in such sectors as economics, politics, agriculture, energy, resource management, transport, health, production, waste, engineering, construction, design, and business and the professions - all areas served by formal education - a commensurate response by education as a whole, based on the primacy of *relation,* is both necessary and timely.

3 SUMMARY

In Part D, I have been concerned to look specifically at environmental and sustainability education discourse, and suggest how the ecological worldview, articulated through whole systems thinking, gives rise to a participatory educational paradigm that helps the field move forward by addressing many of the issues that render the field problematic. I have looked briefly at the issue of design and noted that many of the ideas here have found resonance with others' views and practices.

In the concluding Part, I reflect on the Thesis in terms of remaining issues and research challenges. To round off the Thesis' argument however, I begin the Part by using the 'edge of chaos' model to suggest further patterns of connection. I have already suggested above the possibility of a meta-connective pattern that brings together learning, sustainability and management, centred around self-organisation. I now want tentatively to push this argument another step, and in so doing, bring together many strands of the Thesis.