

# The technics of environmental education

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An ambivalent, sometimes destructive, relationship between modern humanity, technology and ‘outer’ or external nature has historically attracted the critical attention of scholars and commentators from a wide variety of backgrounds. The effects of technology on postmodern ‘inner’ nature warrants similar scrutiny. This article examines how technology structures human experience and is structuring education for sustainable development. Propositions about the ‘technics of experience’ and questions for environmental education are posed so as to invite more earnest discussion about the inroads technologies and ‘vicarious’ learning experiences are making into the equally unproblematic ontological treatment of postmodern learners/subjects. Consideration must be given to the question of what users of the technological medium ‘become’—an ontological issue of crucial relevance to the ongoing aspirations and legitimacy of environmental education.

## Introduction

Michael Leunig, a noted Australian social commentator and cultural critic, graphically outlines why this article critically examines the increasingly influential role of technology in environmental education.

‘Internet Leunig’ [see over page] reproduced with personal permission from Michael Leunig.

My guess is Leunig’s child has experienced the local pond of considerable interest to him/her in many different ways over a considerable period of time. Elements of play, exploration, wonder, trepidation, mystery, joy, with and without friends, spring to mind. If the pond surrounds were to be developed for new housing, or became polluted, or its wildlife harmed, I sense the child’s care for its strangeness would quickly change to concern, a sense of loss, perhaps outrage and action. The ‘teacher’s’ interest obviously lies elsewhere. I wonder how and what the child might have learned

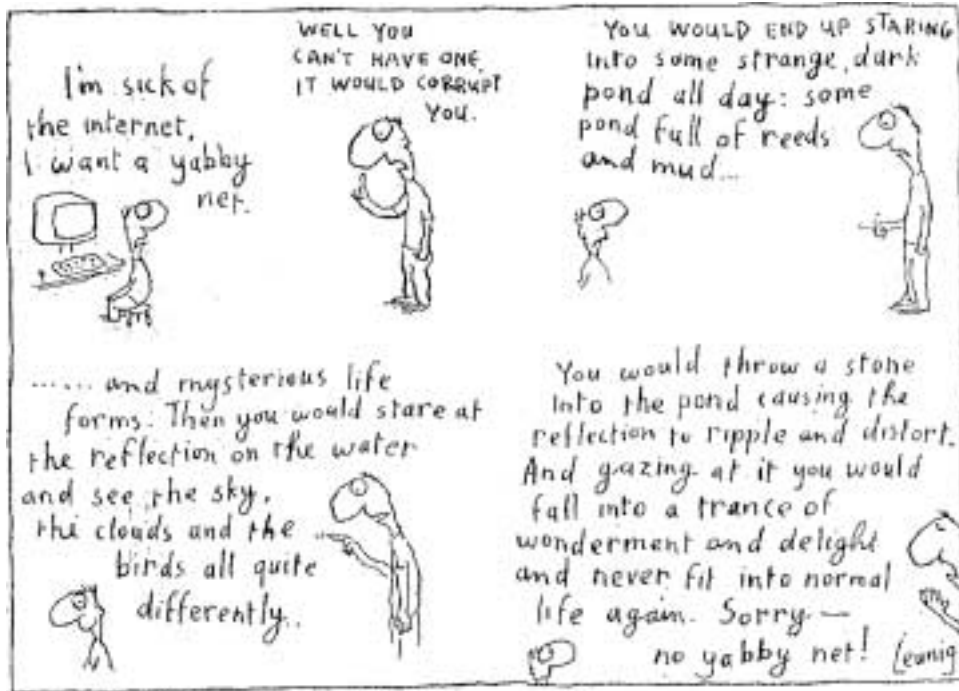


Figure 1.

about a pond if it had been ‘experienced’ and ‘studied’ in the way his/her teacher obviously wants, if at all. What version of which ‘pond’ might appear ‘interactively’ via the Internet on the two-dimensional, plastic screen? What is crystal clear to the child in Leunig’s imagery of a ‘dark, strange pond’ is also the teacher’s ‘muddy water’ blurring of technology, self-conception, environmental sensitivity and care.

The systemically driven technological mediation of human experience and learning is not a pedagogical question that ‘educators’ and researchers preoccupied with *epistemological* solutions like the alleged ease and efficiency of the electronic medium are prone to ask. High-tech, tool-driven teaching, ‘instrumentalised’ learning and the virtual mobility of ‘flexible’ experiences are now, by and large, viewed as educational ‘goods’. Amongst other things, Leunig addresses the underlying assumptions technology’s ‘boosters’ fail to make *ontologically* about the bodily, emotional, intellectual, linguistic, human, social, cultural and ecological experience of the proposed beneficiaries of the electronic mode of experience.

Following Leunig, the problem this study of the technics of environmental education dwells on is the ability of computers to ‘order’ and ‘correct’, or cybernaturalise, children’s ‘educational’ experiences and socio-environmental relationships with people, places, spaces, times and, even, cultures. The study of how human experience and subsequent environmental relations are structured, visibly and invisibly, by higher technologies is developed below. The purpose is to identify issues for further discussion, debate and research about the use of information and communications

technologies (ICT) in environmental education. My primary concern is to introduce the notion 'technics of experience' to pedagogy, curriculum and research. For example, in regularly using a computer how is the human body physically positioned and socially arranged; what subsequent perceptions, interactions and relations with the wide range of 'others' are structured; and how might such a computer 'form of experience' shape constructions of 'nature'? More broadly, what is the role and 'place' of higher technologies in environmental education, where there is now a discernible shift from pedagogies that historically have attached great importance to direct or 'raw' human experiences of various environments and natures, to pedagogies that increasingly employ vicarious, 'second-hand', and virtual/abstracted learning experiences of artificial or contrived environments/natures? These two examples of technics, the first about the raw interactions of technologies and humans; the second about the influence of technologies on pedagogical/curricula trends, identify interrelated concerns about human agency and educational structures that are addressed in this essay. Thus, the title 'technics of environmental education'.

The broad aim of this study is, therefore, to make visible for discussion and debate that which all too often is invisible. Human experience, as organism-environment interaction, has always been mediated by a vast array of historical factors, be it the Gods, the seasons, language, religion, science or economics. Given the newness of environmental education, and most recently Education for Sustainable Development (ESD), there is urgency in examining the connections of higher technologies, human experience and knowing, or ontological and epistemological considerations, as they inform the problematic relations of humans/culture and environments/nature. Obviously, technology itself is not without a history—its contributions to the culture/nature problem are widely discussed (for example, White, 1962; Ellul, 1964; Marcuse, 1964; Bookchin, 1982; Ferre, 1989; Feenberg, 1991; Ferkiss, 1993; Germain, 1993). However, the effects of technologies on 'inner' nature have largely escaped close attention. As the moral, social and political spotlight now focuses on issues such as human cloning, genetically modified foods and asexual reproduction possibilities, there is good reason to believe that 'inner' and 'social' natures are now at risk in much the same way as the problems of 'outer', external nature have earned the title 'ecological crisis'. Put simply, the pathways and passage of technology through outer nature to social and inner natures must be of concern for 'defenders' or 'conservers' of 'nature' and the 'natural'. Of interest, therefore, is the passage of higher technologies like ICT in environmental education into its teachers, learners and researchers.

### **Environmental Education and 'Higher', Electronic Technologies**

Recently, I received the predictable findings of an electronic survey about the Internet and environmental education. Apparently, the findings had already been circulated to 700 participants attending a 1-day 'Millennium Forum' somewhere in Japan. Gleaned from 20 'expert' respondents from nine countries, my contribution was missing from the itemised summary. Curiously, on my reading of the author/

researcher's text, the 'findings' said much more about 'weaknesses' than they did about 'strengths', despite a cover note that authoritatively proclaimed:

Basically, there was a split between those who prefer children to gain their environmental education in the field and those who support the use of new technologies like the Internet. However, after we gave demonstrations of various pilot experiments using the Internet, the audience almost completely shifted to support the role of the Internet as an [sic] useful addition to the environmental educator's tool box.

At about the same time I received this conclusion, some 'catch up' reading of *Environmental Education Research* included Justin Dillon's (2001) Book Review of the ESDebate on Education for Sustainable Development. This IUCN-commissioned debate was conducted electronically by 50 invited participants over 4 months. Again, 'experts' were invited to participate in the debate. Dillon cites the editors' views from the now published report of the debate: '... technically speaking the exercise was not a real debate'; that it was more of an exchange of 'opinions, anecdotes and new ideas'. The 50 participants were pro-ESD in general—'which reflects the way in which they were selected'. Dillon concluded, 'Not only the outcome of the debate is contestable but the process itself'.

The point of these two stories is that the 'nature' of 'expert' intellectual exchange in environmental education is, undoubtedly, undergoing a rapid and significant change. There is a non-problematic escalation of an equally unproblematic 'globalised' discourse about environmental education and ESD amongst self-appointed or anointed experts. Presumably, there are 'glocalising' consequences of major educational significance when this 'abstracted' discourse and its technological medium of electronic transfer is non-problematically down-loaded/uptaken by teachers and students in vastly different sociocultural circumstances and environmental contexts. This article, therefore, focuses critically on how human experience is formed and structured at the 'micro' level of human action and interaction by the technological medium.

### **A Phenomenological Analysis of Human Experience**

Computer-driven learning is one example of a 'form' of experience, so is a child playing in a local pond. Various forms of everyday experiences such as drinking a cafe latte on the footpath next to the busy road or running a wild river in an unbreakable plastic kayak might similarly be examined for indications of how the technics of each experiential form 'works' (Payne, 2000a). How in education might we as learners, teachers and researchers 'excavate' and interrogate what is taken to be human experience? One possible frame of analysis identifies four dimensions, or layers, of a *form* of experience (Payne, 1999, 2000a, 2000b). These dimensions for analysis include the *body*, in *activity types*, with *participatory styles* or performances, as 'lived' ontologically by *historical subjects*.

The briefest explanation of the difficult term ontology is required. Ontology is not being used in the usual philosophical sense of extracting a foundational, essentialist or universal metaphysical-like conception of 'human nature'. Rather, ontology denotes the ways in which human experience is structured, or 'constituted' and

‘reconstituted’, by various underlying personal, social, economic, geographical, cultural and historical factors. These factors enigmatically ‘pattern’, ‘code’ and ‘routinise’ human conduct and behaviour. They shape who and what we are, and what we do, *beyond* that given to subjectivity by biological function and capability, genetic inheritance, language and intergenerational legacy. Simply, ontological inquiry of the type recommended here aims to shed phenomenological light on how we are also ‘socially constructed’ through experience. A ‘social ontology’ is, therefore, a more appropriate conceptualisation of ‘getting at’ the underlying conditions of human experience and, in this instance, environmental relations. Table 1, therefore, very broadly outlines how an excavation and interrogation of a selected form of experience such as kayaking, an allegedly pro-environmental human experience, might proceed.

Socio-ontological inquiry conducted through phenomenological means is most useful for *praxis*-oriented researchers, such as myself, in developing interpretations of human agency and action (Giddens, 1987). Interrogating what ‘real’ *bodies* actually do in various *activities*, using certain participatory *styles* as carried on by the biographical *subject* provides one pragmatic basis for describing and ultimately assessing human action and lifeworld consequence. In so doing, the embodied ‘nature’ of action and interaction with other people, places, spaces and time might be clarified. Excavating and interrogating the underlying conditions and embodied relations of a wide variety of human forms of experience is, I think, the grist of an environmental education that might be more actively and critically predisposed. We might interpretively ‘see’ more of the underlying conditions of individual existence, patterns of social association with others, and lived interactions with the environment.

Table 1. A social ontology of a human ‘form of experience’ for educational inquiry (Payne, 1999)

Constitutive dimension of experience	Conditions	Relations	Agency Example ‘The Kayaker’
1. Embodied	Positioned and corrected Technically and culturally circumstantial	Proximal space/time	Kayak’s tools/cockpit River/banks
2. Activity	Situational and circumstantial	Embodied relations in space/time according to activity type	Various technical skills and manoeuvres in certain rivers Intensified actions
3. Style	Engagement/encounter maintenance	Performative and commodified.	Adventurer/risk taker/ competitive Individuated
4. Historically contextualised	Embedded Circumstantial/given Enigmatically positioned and situated	Demographic/globalising; ‘glocalising’	Young, capable, male, mobile, affluent

## The Visible Conditions of the 'Lived' Computer 'Form' of Electronic Experience

One increasingly popular form of experience promoted in education is the use of ICT. Following momentary reflection, it is not difficult to see how the four ontological dimensions of inquiry listed above shed light on the electronic medium of teaching and learning, or phenomena of intellectual exchange and information transfer. The following 'interpretation of agency' is indicative of the way lived experience is physically and materially structured in the actual use of ICT. In interpreting human agency and action my aim at this stage of inquiry is to be relatively neutral and descriptive, not exhaustive.

First, the individual *body* and collective bodies using computers are typically 'positioned' in a certain manner—bodily on a chair, fixed, aligned in a particular configuration, often for considerable but variable periods of time while 'located' in reasonably standard environmental conditions, as is the case in most schools. Laptop use follows a similar physical configuration but in variable environmental conditions. Second, the *type* of activity involves a limited range of manual tasks such as keyboarding and shifting the mouse, according to particular predetermined procedures which follow 'soft' ware rules that may or may not require much intellectual insight or mental activity. Third, the *style* of experience is primarily individualistic and 'self-determining' according to a combination of the activity requirements or task choices, intentions of the software design(er) and penetration of the manufacturer's corporate identity and politic. Immediacy and ease of manipulation of the tool for the user is sought, captured best in the term 'user-friendly'. There may be some 'face-to-face' social interaction and verbal communication between actors, as bodily positioned next to each other when in a laboratory setting. 'Interactivity', however, needs to be seen in the stylistic light of retrieving information from physically absent unknown and unseen others who produce such information, or exchanging or disseminating information to these non-present others. This individualistic style of information management is inherently consumptive and carried on in the abstract, in the first instance, but might also be 'productive' or 'creative' depending on user intentions and 'soft'ware/'hard'ware characteristics. Fourth, *historical subjects* bring to the phenomena their individual autobiographies. In the case of learners from different backgrounds and settings, this history may or may not include a family (or school, or cultural) circumstance amenable to either the access to, or sustainable use of, the electronic/computer medium. Finally, low-level computer jargon such as 'interactivity', 'friendly', 'chat room', 'visit', 'site', 'trash' and so on aims to (positively and altruistically) normalise the (abstracted) individualised conditions and (absent) social relations of use. High-level 'experts' enter into a cryptic mode and style of communication reserved primarily for other experts.

The astute reader will see various pros and cons in the somewhat brief interpretation of the different dimensions of the computer form of experience. For the critically disposed, there are numerous moral, social, political and ecological issues requiring further deliberation. The 'ontological' form of (computer) experience is primarily



mentalist, individualist and discursive/textual; sensorily static, repetitious and monotonous; socially constrained and environmentally restricted; geographically limited but spatially fluid; temporally concentrated but flexible and, in sum, corporeally instrumental within the manufacturing, ordering and codifying, or governmentality, of the conduct of the particular experience. Language-use and naming games deliberately obfuscate the actuality, or phenomenology, of the computer 'experience'. Only through language games, for example, can 'surfing' be equated with a very simple hand movement on an equally misleadingly termed 'mouse'. Much more could be said critically about this particular form of experience and the jargon of its 'authenticity', but the point about socio-ontological inquiry is to develop interpretations of agency, action and, even, identity/life 'style' concerns in selected forms of experience. This material excavation of agency can then be interrogated for critical purposes; a task I now turn to, albeit briefly.

When this socio-ontological process is applied to the aspirations of environmental education, we see how the technologically mediated form of experience abstractly intensifies [1] and individuates [2] experience of both self and 'others' (people, cultures and environments). This is the 'hidden curriculum' of the technological 'manufacturing' of the body and its time/place/space relations. The electronic medium (re)constructs subjects as abstractions whose 'knowledge' is 'exteriorised'. Environments other than the computer one fade away into the background. This intensified and individualised reconstitution of the self is due largely to the immersion of the subject(s) in an assortment of plastics and microchips that merely act to transfer 'information' and act as an artificial conduit of the self. The more frequent this form of experience, the more likely is the ontological 'correction' of the acting self over time (and his/her self and social conceptions and perceptions) with the concomitant distanciation, dilution and devaluing of experiences of other environments (i.e. socio-ecological sensations, conceptions, perceptions, awareness, associations). The prioritisation of a self effectively reworked (or rewired) as an individualised electronic information hunter/gatherer is cause for concern, presuming this is what learners actually do, or even achieve. Needless to say, apart from the two-dimensional computing/electronic visual 'environment' on the screen perceived directly through this ontology, 'other' environments that might be learned about or experienced electronically are virtual or, more emphatically, fabricated, artificial and 'fake'.

My concern, however, is not to dwell so much on the above critical interrogation. I conclude, however, that the boosters' push for electronically mediated learning in environmental education has the potential to 'inscribe' learners in pre-designed ways while (invisibly) enframing their modes of being-in-the-world (Heidegger, 1977), disciplining their conduct (Rose, 1996) and codifying their perceptions, conceptions and constructions of the environment/nature (Ihde, 1990). This may or may not be educationally acceptable, but surely is a question that underscores Langdon Winner's (1986) concerns about the 'politics of the artifact', an important idea elaborated below. More to the point, in boosting the role or place of technology we might expect the 'marginalising' of direct learning experiences of various environments, as is so well depicted in Leunig's illustration. Put plainly, the so-called efficiency of electronic

versions of environmental education may 'risk' field trips, site investigations, excursions, expeditions and so on while providing an easy solution to administrators for timetable problems, burdens of staff:student ratios, rising costs and safety/legal concerns commonly associated with direct learning experiences in the field. Put another way, as Max Frisch (undated) is reported to have said, technology has the 'happy knack of so arranging the world that we need not experience it.'

### **The Invisible Moral, Social, Political and Ecological Conditions, or Social Ontology, of the Technics of Human Experience**

In relation to Winner's (1986) notion of the politics of the artifact or Andrew Feenberg's (1991, p. 3) statement about '... the design of technology' being 'an ontological decision fraught with political consequences' and Don Ihde's (1990) interest in phenomenological praxis, my more philosophical concern now is to outline a social ontology of technology, specifically a 'technics of human experience'. To that end, the following summary of the 'grounds' of 'environmental conditions' and 'embodied relations' in technics is useful in explaining how technologies, as tools 'structuring' experience, 'live' in the body, often as an invisible form of moral, social and eco political 'work' (Payne, 1996). Word limitations preclude detailed elaboration, but the brief elaboration of the computer form of experience should help the reader contextualise the following interrelated propositions about a technics of human experience.

- Technologies are 'non-neutral' tools. Tools are instruments that act on users and the world. Tools have distinctive design functions and redesign attributes that have been determined according to particular problems and precise historical functions.
- These design characteristics and capabilities 'shape' a purpose, 'normative intentionality' or 'calculative rationality', in 'ordering' certain human actions, social interactions and subsequent modes of socio-environmental relations.
- In ordering human action and interaction, the actual use of (higher) technologies powerfully and enigmatically transforms time and reduces and/or extends the experiences of places and spaces.
- Technologies, therefore, mediate the 'authenticity' or 'naturalness' of human 'experience', 'physicality', 'emotionality', 'sociability' and influence action, interaction, association, communication and other 'relational' forms of 'being-in-the-world'.
- Technologies act to reduce or magnify sensory/perceptual experience of the lifeworld or affordances of the socio/cultural-environment according to relative degrees of the tool's 'withdrawal', 'ambivalence', and 'ambiguity' in time, place and space.
- Technologies extend or contract the acting and interacting human body as a cultural instrument in the lifeworld.
- Technologies transform and 're-naturalise' 'inner', 'social' and 'outer' natures by constantly 'correcting', 'intensifying' and 'individualising' human experience, social existence and their 'externalised' socio-environmental manifestations and consequences.



- Technology is a non-neutral form of human, social, cultural and ecological ‘capital’.

These propositions can be applied to many forms of experience, for example, the use of guns and, for critique, the notion ‘guns don’t kill people’. More importantly for the socio-ontological purposes here, the propositions listed above have the potential to provide environmental educators with keener insights into the artifactual politics of technologies’ non-neutral ‘ordering’ of human self-conception and socio-environmental action. The e-mail survey of the strengths and weaknesses of the Internet was a problematic form of experience for this author. Its technological reconstitution of my ‘self’ warrants investigation for the manner in which (my) self has been ordered and corrected (ontologically) in respect to self, social, spatial, temporal and communicative understandings. ‘Applied’ interpretations of agency beyond what I have already offered might be arrived at by:

- Examining the impact of the medium on the receiver, in particular developing an interpretation of how the tool and its software constructs and codifies particular types of experience, subjectivity and identity for respondents/browsers/surfers/players;
- Examining how the receiver/respondent is ‘reconstituted’, in particular how the subject embodies particular senses of intensified and individuated time, space and place (or embodied relations with ‘others’);
- Excavating the purposes/design of the tool and, in this instance, the consequential functions of the software;
- Excavating the motivations or ‘normative intentionality’ (or moral, social and political aspirations/values basis) of the messenger, and the text and, in this instance, the treatment, representation and dissemination of the findings, as a version of ‘truth’ and the ‘right’;
- Excavating the assumptions made via the medium about the intensified nature of intellectual exchange, the type of (expert) information provided, the individuated level of ‘trust’ and ‘risk’ assumed or implied between sender and receiver, and subsequent determination of what stands for or counts as a public truth;
- Interrogating how the above considerations impact educationally on issues concerning status, class, gender, race, ability and culture (and extend into other areas of human existence/endeavour, such as [commodified] leisure [3]);
- Interrogating the ultimate contribution of the messenger’s technological/electronically mediated discourse and practice of environmental education and its public effect, particularly as it might impact on younger learners’ knowledge, values and *being in the (virtual, abstract) world*.

### **Reconstructing the Problem of a Technics of Environmental Education**

As informed by the socio-ontological propositions about a technics of experience, a number of broader practical, theoretical and philosophical ‘postmodern challenges’ for environmental education are summarised.

- The probable devaluing of direct individual and social experiences of various environments by virtual, vicarious and abstract forms of experience;
- The pedagogical logic and value of replacing 'real' natures and environments with technologically manufactured natures and surrogate environments that, paradoxically, aspire to replicating the authenticity of those natures and environments 're'placed;
- The rise of rhetorical claims by teachers and 'researchers' about the teaching and/or learning efficacy of ICT in education, in general, and in environmental education and other human development/issues-based curricula, in particular;
- The metamorphosis to an education (in, about and) 'for the computer' which, if so, should be treated in a manner similar to the debate about education 'for the environment' [4].
- The saturation, intensification and individuation of learners' experience, subjectivity and identity-seeking with electronically mediated information;
- The individual and collective physical, health, social and environmental risks and costs of the abstract/invisible electronic and physical/material computer environments;
- The elevation of 'risk' in the 'trust' relationship between individuated electronic user, technological medium and sender/messenger/designer (non-present and unknown 'others' as surrogate 'teachers' and information conduits), as self, social and environmental 'investments' expand in an 'education for the computer';
- The entrepreneurial role of academic environmental educators as curriculum producers, re/deconstructors and pedagogical advisers in the production, representation and 'glocalising' dissemination/'downloading'/'uptake' of centralised/privileged/expert fact, information, knowledge, opinion and colonising value;
- Equity in environmental education, extending into the consequences of globalisation and detraditionalisation in the human experience of the lifeworld.

In total, to play on words, the 'direct' postmodern challenge to the 'field' can be encapsulated in the concrete threat or practical risk of an emerging, abstracted, individualised and intensified technics of environmental education.

### **Reconstructing the Problem: the need for an ontological 'turn' in environmental education**

I have (hopefully) established how the politics of the artifact and design of technology 'orders' the experiencing human body and its 'consciousness' in invisible, intense and abstract ways. I have not yet stressed how ontological and phenomenological type inquiries of the type recommended here provide a point of possible resistance to the 'determinism' of technics and its infiltration of environmental education. At the 'micro' level of human *agency* and action, I have emphasised how a technics of experience visibly and invisibly 'corrects' (or defaults) socio-environmental perceptions, conceptions, actions, interactions and socio-environmental consequences. I have proffered the 'macro' view that the field of environmental education

is undergoing an abstracting, textual re-*structure* through this technological 'metamorphosis'.

I have also outlined the broad contours of a more 'politicised' theory of what I believe to be is the postmodern trajectory of environmental education. This critique highlights technologies' mediating role in reconstituting human agency/action in learning and in the emerging educational (re)structuring of postmodern education systems. One amongst numerous political manifestations of this 'technics' in both agency/action and educational structures is, I believe, the steady shift over the past decade in nomenclature to education for sustainable development. While many of the ideas and practices of 'modern' environmental education leave much to be desired, the 'postmodern' ingredients of abstraction and decontextualised intellectual exchange (amongst some educational experts/elites) about 'sustainable development' appear to be a 'legitimising' response in education to broader global economic imperatives.

For critical realists in environmental education and, perhaps, others concerned about the relationship of technologies, human experience and environmental considerations, I conclude with a call for an 'ontological turn' in future environmental education pedagogical, curriculum and research efforts. Why? Because ontological excavations, interrogations and explanations have the potential to lay bare how human experience is being 'ordered' and manipulated. Ian Robottom and Paul Hart's (1993) engaging of the debate in environmental education research theoretically identifies the relationship of epistemology, ontology and methodology within the politics of inquiry. There has been little engagement with the ontological dimension. Put practically, meeting the 'needs' and 'interests' of learners means that any theory of pedagogy, curriculum or research will only be as good as the presuppositions that theory makes about the subjects it purports to serve. It is crucially important, therefore, for the participating/attached teacher or 'detached' researcher to 'get right' those ontological presuppositions about postmodern subjects, as difficult as that task might be in arriving confidently at a postmodern version of experientially driven environmental education. Hence, given the pervasiveness of higher technologies in a postmodern world, the 'technics' of experience is a fundamental ontological consideration in any pedagogical or curriculum description that takes the role of human experience seriously in teaching and learning. Understanding the pervasiveness of the technics of human experience provides a lever to then deconstruct and reconstruct trends in environmental education pedagogy and curriculum. Mark Rickinson's (2001) review of empirical research in environmental education appropriately draws our attention to the relative paucity of insights into the educational experiences, preferences and processes of learners.

Like the social theorists Anthony Giddens (1984) and Theodore Schatzki (1991), I have given priority to socio-ontological considerations via a phenomenologically informed case study of the embodied, environmental relations of the electronically mediated computer 'form' of experience. Hence, a technics of environmental education that not only highlights the problematic role in human-environment and culture-nature relations of the electronic medium in teaching and learning but extends to

other experiential mediums like a strange dark pond, plastic kayak, or the equipment in the biology lab. I accept that ontological accounts of the ways in which human experience is structured presumes an epistemology but note that any epistemological account also presumes an ontology. Too often environmental educators and researchers have focused solely or primarily on epistemological considerations (including linguistic and textual considerations and their *deconstruction*). I *reconstructively* invert that priority. Ontological considerations lack in prominence and are undertheorised both in environmental and experiential education.

Needed in environmental education discourse(s) are insights and questions about who/what subjects/learners are, their *being* and *becoming*, and what they 'do' day in, day out that might be socio-environmentally problematic. Absent from discussion, let alone debate in environmental education, is how ontologies of the self and *being* are constituted non-discursively by habits, dispositions, somatic understandings, settings/locales, historical/generational legacies and tools/artifacts (like the computer) as well as discursively constructed by various mediums of instruction, imaging and other forms of practical disciplining, including software's reconstitution/training of selves. There is too much at stake for environmental educators concerned about human-environment relations and some notion of outer/external 'nature' to neglect how selves/identities as inner and social 'natures' are reconstituted in and by various micro and macro, local and global practices such as the invisible moral, political and ecological work of higher technologies like ICT.

### **An End-in-view: the integrity, distinctiveness and credibility of the (human and curriculum) subject in environmental education**

Preoccupation with the 'holy grail' of teaching/learning methods, pedagogical issues and related epistemological matters tends to subordinate ontological considerations about learners' mundane (forms of) everyday 'lived' experience. Evidence of this assertion can be found in the narrow focus of many educators on computer literacy and environmental literacy, as vague as the term 'literacy' is and as indeterminate notions about 'sustainable development' are. If so, the new cadre of teachers and researchers in environmental education, like the new-found 700 boosters at the 1-day Millennium Forum and 50 involved in the electronic ESD debate sponsored by IUCN will probably 'reproduce' this dominant logic and ontological lack in their teaching, curriculum or research efforts. How? By occupying themselves (epistemologically) with 'the' search for the best, most efficient software programs. Of real concern is that software programs can only ever be abstracted/vicarious 'constructions' of environmental places/spaces, information, values, problems/issues, skills or behaviours. Accordingly, it seems probable that methodologically constrained researchers will follow the epistemological straitjacket of evaluating and comparing the 'best' or most 'effective' 'green' software program and its effect on environmental 'literacy' and 'sustainability'.

There is a second more fundamental reason why ontological considerations demand an elevated presence in pedagogical insight, curriculum inquiry and research

development in environmental education. That reason is best stated rhetorically—what are we *becoming*? Environmental educators and researchers need to make some hard choices about their role in learners' *becoming* and, subsequently, the social environment they help *create* or *reproduce*. These choices so far have been hidden from deliberation because of the lack of insight, critique and debate about the (increasing) use of technologies in (environmental) education and lack of interest in ideas such as the technics of human experience. I have argued that the saturation, penetration and 'imperialism' of higher technologies in education effectively creates a 'new' ontology of human experience for those 'postmodern subjects' immersed in the electronic medium and engaged by the downloaded expert messages/information.

If there is some 'truth' in the ontological correction explained by the technics of experience, educators must address their (epistemological) complicity in abstracting the postmodern subject, diluting his/her direct contact with various environments 'other' than the computer environment and contriving to de-centre those 'natures' or environments that typically have interested environmental educators. At risk are real, 'concrete' educational experiences, connections and relations with various environments and places like Leunig's strange, dark pond where learners might 'bodily'/physically belong, appreciate, understand, care, develop accountability to, and responsibility for. Conversely, within the 'abstracting' and often invisible technics of environmental education lies one probable educational source of the atomisations of 'inner', 'social' and 'outer' natures whose contradictions theorists of postmodernity like Alberto Melucci (1996) and Guy Rundle (1997) lay at the heart of the ecological crisis. There is plenty of theoretical support in environmental education for those teachers and researchers inclined to focus on the promise or possibility of inner nature and human agency (Fien, 1993; Jensen & Schnack, 1997; Scott, 1997; Chawla, 1998) and learners' experiences, preferences and processes (Rickinson, 2001). The political and social roles of technology, in particular an appreciation and understanding of the technics of experience in learning, is central to the challenge Rickinson poses for teachers and researchers about undertaking more research into learners' experience, preferences and processes. Moreover, Paul Hart and Kathy Nolan's (1999, p. 41) meta-analysis of research in environmental education identifies the need for 'strategies ... that will make it possible for teachers and students to work with and as inquirers to confront their own notions and ideas about the way the world works and about the meaning of teaching and learning as a process rather than mere knowledge acquisition'.

### **Re-engaging the Debate**

Robottom and Hart's (1993) theoretical starting point for 'engaging the debate' can be reframed as a practical research agenda for those students, teachers and researchers who loosely endorse the view that 'reality' is, by and large, socially constructed, notwithstanding that various 'natures' exist independently and 'ecologically' even while 'evolving' culturally. Thus, how we as individuals and groups actively construct experiences and express their significance through actions, or not, needs to be seen in

the equally problematic light of those often dominant social constructions of the environment and nature.

This research agenda for reconciling 'inner', 'social' and 'outer' natures is, indeed, a 'tall order', as Hart and Nolan (1999) observe. So too is the task of making the invisible more visible for ethical, political and ecological debate given the uncertainty, ambiguity and complexity of a technologically driven and increasingly abstract post-modern human, social, and environmental condition. The 'important challenge' Hart and Nolan also note can be addressed now in regard to many of the questions I pose about the abstracting consequences of the technics of experience as it is likely to be played out in environmental education. By conceding the presence of a 'technics of human experience' and the 'politics of the artifact' we begin to see the invisible 'correction' of what it is to (instrumentally) be a human being. This raises a host of moral, social, political and cultural questions, let alone the 'ecological' one about the culpability of technics in the abstraction, mechanisation, corrosion and reduction of human relations with various 'natures'. Our complicity in environmental education of not engaging the debate on such crucial matters as our individual and collective *becoming*, let alone not agitating for more direct experiences that 'rematerialise' the postmodern subject and his/her environments and natures, is a travesty for the field's aspirations (and continued legitimacy?).

The practical, educational and ethico-political burden for the boosters of technology in environmental education is to demonstrate how electronically mediated tools of information production, dissemination and exchange encourage ontologies of human perception, experience, understanding, meaning-making and action compatible with an articulated and defensible position about the socio-environmental problematic. This justification may extend into a statement about how such a position attends to the tensions between 'inner', 'social' and 'outer' natures that, in this author's view, remain at the (embodied) heart of the so-called 'ecological crisis'. Once these imperatives have been attended to in a satisfactory manner, the additional burden for the boosters is to demonstrate how, and on what basis, and in which circumstances and settings the Internet 'is a useful addition to the environmental educator's tool box'. In sum, there is a need for an unambiguous theory of experiential education, curriculum development and research inquiry that connects an (ontological) account of postmodern subjects, as agents and actors, it (the theory) purports to serve with an equally unambiguous statement about the socio-environmental 'ends-in-view' that theory of environmental education (epistemologically) presupposes. Subsequently, empirically based qualification is (methodologically) essential.

## Notes

1. Intensification processes entail a heightened penetration of the cultural world into the body via an increasing array of technologies. Intensification includes the concurrent 'collapse' of time, place, space with the increased colonisation of the organic body and socially collective bodies by various aspects of cultural capital. Intensification processes give rise to the notions of the 'cyborg' and 'technology of self', as well as 'globalisation'. For example, 'perpetual' cosmological time then 'cyclical' day/night and seasonal time has been replaced by the 'chronological'



and 'linear' measures of the calendar, the analogue watch with the 'mechanical' sweep of its hour then minute then second 'hands', in turn, have given way to the digital 'dot' or 'point' time of the electronic watch. Places and spaces are consequently reconceived, re-experienced and reconstructed, invariably in more abstract and denatured ways because of the changing social construction, technological mediation and correction/regulation of mechanical time and its disciplining consequences on the human body and mind in the everyday.

2. Individuation processes entail an increasing reflexivity required of individuals to analyse and plan their own lives and conditions of experience and existence as they are brought more openly under the control of abstract forces, be they social and cultural, structural and bureaucratic. Technology is a major conduit or pathway of the processes of individualisation. 'Designing' or 'inventing' the self are useful practical characterisations of the individuating and intensifying consequences of higher technologies while the oft-used term 'hyperindividualism' reflects the political and economical 'deepening' of this neo-liberal project that universally privileges the sovereignty, autonomy and authority of the rational, self-determining subject, even in its de-centred, multiple or fragmented forms. For example, place-based 'community' barter for self and social sustainability was eventually replaced by saving and depositing in the bank, whose objective/physical place and social space has more recently been dissolved by the ATM and credit card or BPay arrangements conducted electronically, increasingly in isolation from others, often at home, with 'trusted' but invisible expert others. Schools and universities are following the same pattern, thus providing the historical context for this case study of environmental education. Critique of this trajectory will locate the interrelated processes of abstraction, intensification and individualisation within the dominance of the commodity culture of industrial, now techno-capitalism, much of whose life'style' and identity-seeking imperatives I am concerned with in the interrogation of a 'form of experience' are often at odds with various versions of the 'environment' (Payne, 2000b).
3. See, for example Miah (2000), Kenway & Nixon (1999), Malbon (1998), Blackman (1998). With regard to virtual geographies and artificial natures, a prime concern of this essay about de-centred postmodern subjects and natures, see the outstanding illustrative essay on shopping for nature in the mall by Jennifer Price (1995).
4. The discourse of environmental education is marked by a fairly prickly debate about the (allegedly) coercive nature of educational practices *for the environment*. Paradoxically, there are deafening silences about learners 'having to do' a range of tasks, such as 'using' a computer, *being* timetabled to do so, or even having to purchase one. Perhaps ICT are uncontroversial and politically (economically/vocational) 'correct', a presumption this study challenges, particularly for advocates of the 'freedom to choose' 'educational' imperative that also licenses the allegation of the coercive nature of education *for the environment*.

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