Chapter Five: How do I use technology to enhance a dialogical and inclusional epistemology? Examining how technology and holistic approaches to education can merge.

In this chapter, I wish to outline how I perceive the role of technology in my work practices and how I see it in the articulation of my ontological values into living practice. I have shown in other chapters that I use technology to improve the learning experiences of my students. I would now like to explain and describe my understanding of its role in my educational practices. As I develop an understanding of my practice as the enactment of my ontological values, I am developing a living educational theory that is embedded in my emergent epistemology of practice wherein I perceive knowledge generation as being personal (Polanyi 1958), and holistic (Palmer 1996) while also being inclusional of all the traditional understandings around knowledge (Whitehead 2005). I have aimed to demonstrate the validity of the claim with substantiated evidence throughout this thesis, and show that I engage with the social criteria of comprehensibility, truth, sincerity and appropriateness which form the basis of Habermas's (1976) theory of communicative action. I will discuss these validation processes in greater detail in Chapter Six.

In this chapter, I will outline some of the current debates around technology and its role in society. Drawing on the ideas I have explored in Chapter Four, I will outline how technology can play a role in both perpetuating traditional technicist approaches to learning (Bromley 1998, Loveless 1995) and in liberating learning as a dynamic and exploratory process (Heppell 2001). I will also outline the transformation of my ontological values into living practice as it enhances how I live to my embodied values around spirituality and connectedness in my work. I will explain how I now understand my use of technology as an engagement with open and creative forms of learning and describe how, frequently, some uses of technology in education increase the fragmented nature of our lives (Kraut *et al.*. 1998) and are embedded in the Cartesian mind/body divide. This 'closed' approach with technology is in conflict with my ontological values around love and the recognition of the wholeness and human-ness of the person. (As

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noted earlier, I use the term 'human-ness' when referring to my engagement with the wholeness of the human being.)

This chapter is organised in the following manner:

Section One: Dominant perceptions of technology:

(i) The 'romantic' view of technology in society and in education

(ii) A less idyllic view of technology in society and in education

(iii) My perception of the role of technology in education: developing an understanding of my practice in terms of its inherent recurrent patterns as the transformation of my ontological values into living practice.

Section Two: Technology as a means of developing holistic approaches to education.

(i) 'Closed-world' discourses in technology

(ii) Technology as a preserver of technical rationality

(iii) Technology as an enhancer of my ontological values

(iv) Holism and technology

(5.1) Section 1: Dominant perceptions of technologies

I understand technology as something akin to a tool; something fabricated that assists us in our lives, or as Encyclopaedia Britannica (2005) suggests; 'the application of knowledge to the practical aims of human life or to changing and manipulating the human environment'. Encyclopaedia Britannica continues to explain that technology includes the use of materials, tools, techniques, and sources of power to make life easier or more pleasant and work more productive. Bromley (1998) is critical of the metaphor of the 'tool' because while he acknowledges that tools may be flexible, their design favours certain usages and prohibits others. He suggest that ultimately technology calls on human action to activate it and therefore humans make decisions on how it ought be

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used. Murray (2003, p.195) explains how humans invent new technologies to adapt to new situations to help us 'survive and thrive'. With reference to the use of technology in education, there is much discourse around the reluctance of educators to include technology (see Becker 2000 and Heppell 2001). Somekh and Davies (1991) explain the role of technology thus: 'It is neither a tutor nor a tool (but instead) …is part of a complex of interactions with learners, sometimes providing ideas, sometimes providing a resource for enquiry, and sometimes supporting creativity' (1991, p.28). I agree with Somekh and Davies that when educators include technology in education, the interactions that can arise are complex and multifaceted. Every culture, according to Postman (1993), has to negotiate with technology, but Postman suggests that they can choose to negotiate intelligently or not. Postman uses the example of Thamus's judgement to explicate his thinking. He outlines Socrates' story of how Thamus once entertained the god Theuth who invented number, calculation, geometry and writing. As Theuth displayed each invention, Thamus either approved or disapproved of each one. Theuth felt that writing would improve the wisdom and memory of the Egyptians but Thamus dismissed writing as something that would encourage forgetfulness and damage memory. Postman points out that Thamus may have been correct in thinking that writing could damage memory but was erroneous in believing that writing would only be a burden to society. He suggests that people might learn from Thamus's judgement; that it is a mistake to assume that technology and innovation have a one-sided effect, and he proposes that every technology can be both a burden and a blessing and that every culture 'must negotiate with technology whether it does so intelligently or not' (Postman, 1993, p.5).

Bearing Postman's thinking in mind, I can appreciate that industrialised modern technology has appeared in most facets of human life of western cultures in the past decade, and society can decide whether it is indeed a blessing or a burden. Mobile phones, satellite dishes, instant news reporting, databases with a plethora of our personal details and twenty-four hour online banking, flight booking and shopping are now the norm (Breen *et al.* 2003). However, conversations around the use of technology in society and especially its inclusion in education tend to be of a polarised nature (see

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Barlow *et al.*. 1995, Cuban 2001 and Roszak 1994). There appear to be two diverse camps (see Campbell 2003) which I will discuss below: those who believe that technology in education is the long awaited perfect addition to the twenty-first century and those, on the other hand, who believe that it will destroy human communication and interaction as we know it (see Roszak 1994). In this section I will outline (i) the 'romantic' view of technology in society (see Barlow *et al.* 1995), where technology is embraced as a long-awaited panacea, (ii) the 'negative' view of technology (Cuban 2001) where technology will wreak unknown havoc on our society and (iii) my own view of technology in society. (Please note that in subsequent sections of this chapter, I will use the terms 'technology', 'Information Technology' (IT) and 'Information and Communications Technology' (ICT) interchangeably in reference to the use of computers, electronic media, the internet, digital imaging and video and digital sound recording and reproduction).

5.1.1 (i) The 'romantic' view of technology in education

The 'romantic' viewpoint of modern technology and the internet talks about the 'global village' and the 'information superhighway' (see Riel 1993 and 1999); terms that are now synonymous with internet connectivity and which seem to infer an endless supply of important information and society's re-birth into a cosy but large village. The utopian perspective is perhaps best described by Barlow *et al.* (1995, p.40) who say 'We are in the middle of the most transforming technological event since the capture of fire' – a notion which encapsulates the hysterical excitement of technology. Bell and Gray's (1997), 'By 2047…all information about physical objects, including humans, buildings, processes and organizations, will be online. This is both desirable and inevitable' (cited in Nardi and O'Day 1999, p.21), is of a similar vein. With reference to the role of technology in education, Cuban (2001) cites Gerstner, the Chief Executive Officer at IBM, who explains that public schools are 'low-tech institutions in a high-tech society' (2001, p.13). Gerstner continues that the changes that have improved 'every facet' of business 'can improve the way we teach students and teachers…and the efficiency and effectiveness of our schools'. Microsoft use terms like 'anytime, anywhere learning' and 'learning without limits' and claimed that their products were 'bridging the gap between

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learning in and beyond the classroom' (see Buckingham *et al.* 2001, p.31). Similar sentiments were echoed here in Ireland in the mid to late 1990s, as the Minister for Education and Science, Micheál Martin, initiated the Schools IT 2000 programme which represented investment of IR£40 million over a period of three years by the Irish Government in the training of teachers, the provision of computers and the development of good models of practice in relation to the inclusion of ICT (see NCCA 2004a). IT 2000 was a policy framework for the integration of new technology in first and second-level schools. The main objective of the policy was to put in place an infrastructure to ensure that: 'pupils in every school should have opportunities to achieve computer literacy and to equip themselves for participation in the information society' (Ireland, Department of Education and Science 1997, pp. 2-3).

Advertising for computers and their peripherals in the media supported this romantic perspective also with persuasive slogans that suggest that one can have access to endless educational opportunities when one buys a computer or acquires internet access. Advertisements such as 'The world at your fingertips' and 'Give them every advantage…Your window to a whole world of interactive education, streaming video and lots more' (PC Live, July 2001, pp.2-34) are samples from that time. Advertisements such as these implied that unless children became computer literate and began to use the internet, their education would be lacking, while those who subscribed to the internet would become more literate and more intelligent. Such advertising continues today. Parents are persuaded of the educational advantages of a ready access to knowledge in the form of computer or internet access. Buckingham *et al.* (2001) explain that such advertisements capitalize on parental anxieties about testing and they identify the ideal reader as a 'concerned parent'. According to Bromley and Apple (1998), one reason why the rhetoric of inclusion of computers in education has been so successful is that parents legitimately want the best for their children and do worry about job prospects for them and therefore are easily convinced by arguments promoting technology in education. However, initial findings by Buckingham *et al.* (2001) show that parents are more likely to purchase software which claims to influence testing and literacy standards than more progressive titles which promote 'discovery' learning.

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While people might be easily convinced of the linkage between technology and learning, a similar assumption connects technology, learning and good citizenship. The 1983 *Nation at Risk* report in the United States informed the people that their 'once unchallenged preeminence in commerce, industry, science and technological innovation is being overtaken by competitors throughout the world' (Government Printing Office 1983, p.7), that their future was being threatened, and that dedication to education was now called for, and learning was described as the 'indispensable investment required for success in the information age we are entering' (Government Printing Office 1983, p.7). This report, along with the belief that automation in industry implied efficiency, fuelled the belief that information technologies could accelerate American workers' productivity (Cuban 2001).

The equating of technology with efficient models of productivity has also been reflected in educational discourses (Bromley 1998). Cuban (2001) surmises that there exists a belief that the inclusion of technology in education will provide efficient teaching and learning which in turn gives rise to talented graduates who will, in turn, serve the economy well. For many parents in the United States, computer oriented schooling implies that their children will be ready to attend the best universities and become part of an efficient labour market in the future (Bromley 1998). These sets of assumptions dominate much policymaking in the United States and are embedded in ideas around the commodification of education in the United States where being a good citizen can be equated with being a good consumer (Cuban 2001). The basic message here is this: if educators bring computers into the classroom, then our students will learn better and will enhance the economy when they graduate.

In Ireland, similar utopian ideals appear to have motivated policymakers also. The IT 2000 initiative (a technology in education initiative) was introduced in the late 1990s because:

> Ireland lagged significantly behind its European partners and the US in the integration of information and communication technologies (ICT) into first- and

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> second-level education. Meeting the need to integrate technology into teaching and learning right across the curriculum was seen as a major national challenge that had to be met in the interests of Ireland's future social and economic well-being.
>
> (Ireland, Department of Education and Science 2001, p.19)

It appears therefore that the purpose of including technology in education in Ireland was mainly to play catch-up with other European countries and the US. The catch-up was called for regardless of the plethora of research which shows technology as being of dubious value in education (see Cuban 2001; Collis 1994; Conlon and Simpson 2000; Oppenheimer 1997 and Russell *et al.* 2000). This notion of catch-up appears to feed directly into the idea that technology in education implies a good education which, in turn, implies the production of students who will enhance the economy.

In a similar vein, the OECD report 'Learning to Change: ICT in Schools' (2001) tells us that 'Huge investments are now being made to equip schools with ICT' but warns us that 'Governments want to know the conditions to be satisfied for this to lead to improvements in student attainment' (2001, p.9). The report calls for schools to learn to change in light of the enormous investments being made in computers and internet connectivity for schools. This is an interesting insight as it begs the question, is student learning moulding the use of technology in our schools or is technology shaping how students learn? The language of the OECD report seems to imply that technology might indeed be shaping how and what we should learn. Such questions remind me of Marcuse's (1964) fears that society commits to technology not so that it can help understanding, but more in a manner such that society is controlled and subjugated by the technology. The report (OECD 2001) includes an introductory section entitled 'Why schools *have* to adopt ICT' (my emphasis) which includes 'the perceived need of the economy' and 'the widespread expectation on the global scale that those nations successfully embracing the information age will benefit economically' (OECD 2001, p.10). Here again the idea of the commodification of education creeps in (see Apple 2004, Ball 2004, Brown 2002, and Lyotard 1986); the notion of the student as a product, a thing that will enhance the economy, regardless of their personality, their learning

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strengths or their interests. Brown (2002, p.3) states the dilemma well: ‘Education policy is increasingly dominated by a vocational emphasis that prioritises individual and collective economic efficiency as objectives’.

The BETT (British Education, Training and Technology) Show is a prestigious and large educational trade fair which is held in London each year. Buckingham *et al.* (2001) outline how one of the recurrent themes of BETT is the idea the technology can present society with ‘solutions’ while no problems are apparent. There are ‘solutions for education’, ‘solutions for schools’ ‘hand-held solutions’ (2001, p.32) and so on until the technology almost assumes metaphysical dimensions; ‘…a magical ability to facilitate and expand teaching and learning’ (2001, p.32). Solutions are also provided for teachers in the wider aspects ICT, according to LeCourt (2001), as she explains how technology is mooted as a time-saver and agent of change for teachers; something which will make our lives easier. Buckingham *et al.* (2001) point out that technology appears to provide a ‘solution’ although it is not quite clear what problem it might solve.

Discourses around the *Information Age* seem to imply that benefits will automatically amass (Bromley 1998) and that it will act as catalysts for educational change (Becker 2000). Jaber (1997, cited in Muir-Herzig 2004, p.113) says that when students use computers, they are able to collaborate, use critical thinking and to find alternative solutions to problems. Winner (cited in Bromley and Apple 1998, p.13) sums the fallacy underpinning such thinking succinctly in his aptly entitled essay *Mythinformation* when he says:

> The political arguments of computer romantics draw upon four key assumptions: 1) people are bereft of information; 2) information is knowledge; 3) knowledge is power; and 4) increased access to information enhances democracy and equalizes social power.
>
> (Winner 1986, p.108)

While Winner’s ideas may oversimplify the complexities of the integration of technology in society and in education, the key message he imparts is worth considering. His arguments are helpful as I explore ideas pertaining to a less idyllic perception of technology in the next section.

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5.1.2 (ii)A less idyllic view of technology in education

In the previous section above, I outlined some of the literatures that perceive the inclusion of technology as a 'good thing'. In this section, I will give a brief overview of some of the literature that adopts a more critical stance towards the inclusion of technology in education. This second and oppositional view of the integration of technology in education is well described by Roszak (1994). He explains that while Luddites are generally understood to have rallied against progressive new technologies in weaving in the North of England, in fact their grievance was with those who used the machines to lower wages and then questioned how the machines were used and for what purpose. Roszak considers himself to be a neo-Luddite because he embraces Luddite forms of critique and engages in 'measured criticism' himself (1994, p. xviii). Despite Roszak's allegedly measured approach, he says:

> The computer is inherently a Cartesian device embedded in the assumptions of a single intellectual style within a single culture of the modern world. The very metaphors that surround it bespeak a conception of the mind as logical machinery…
>
> (Roszak 1994, p. xxxv).

Cuban states similar ideas: '…there is little hope that new technologies will have more than a minimal impact on teaching and learning' (2001, p.197). These views are from a substantially different perspective to the romantic perspective outlined above. Supporters of these views sometimes see technology and the internet in particular as being the 'devil's playground, wherein children are stalked daily by paedophiles intent on destruction and mayhem' (Breen *et al.* 2003, p.7). Bromley and Apple (1998) describe how some people believe that technology is inherently evil and can only be adequately addressed by total avoidance. While the dangers of internet usage can not be underestimated, especially where children are involved, they must, however, be perceived in perspective.

While I read the literatures outlined above, it becomes clear that a blurring of understanding around 'knowledge' and 'information' has occurred. Issues of

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epistemology pertain to such understandings and perhaps this is because people have different understandings of 'knowledge' and 'information'. As outlined previously, dominant practice prioritises technicist understandings of knowledge in the form of facts (see Gardner 1993 and Lynch 1999). Roszak explains in the unfolding story of including technology in our society, how the terms 'knowledge' and 'information' have become interchangeable. Roszak talks about how minds that are 'loyal to the empiricist love of fact' (1994, p.103) have grasped the idea of the computer as a model of the mind, 'storing up data, shuffling them about, producing knowledge, and potentially doing it better than its human original'. Roszak is highly critical of the notion that knowledge be synonymous with information and particularly of the idea that knowledge is being 'mass produced'. Roszak cites Naisbitt's *Megatrends* (1982) thus:

> We now mass-produce information the way we used to mass-produce cars. In the information society, we have systematized the production of knowledge and amplified our brain-power. To use an industrial metaphor, we now mass-produce knowledge and this knowledge is the driving force of our economy.
>
> (Naisbitt 1982 cited in Roszak 1994, p.22)

Roszak queries, quite rightly, that since knowledge is created by individual minds, how can it be related to assembly-line construction? Bromley (1998) grapples with this issue too as he claims that information in the form of raw data and facts does not amount to knowledge until is organised. I will discuss my understanding of the role of technology in the generation of knowledge in greater detail in the second section of this chapter (5.2). While common sense would suggest that information is not knowledge, it perhaps signifies the successful ploys of the technology pundits who promote the 'knowledge' equals 'information' idea, that much of the literature is devoted to arguing the notion that information is or is not synonymous with knowledge.

Brown and Duguid (2002) use the term 'information fetishism' to describe the idea of using technology to replace the social relationships between people, as people appear to become obsessed with acquiring information and with the desire to replace human communications with digital versions. I perceive Brown and Duguid's (2002) idea of 'information fetishism' as something akin to Roszak's 'conception of the mind as logical

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machinery' (1994, p. xxxv). Brown and Duguid (2002) outline how they perceive that much of the current literature around technology suffers from tunnel vision; where the focus is on information on the one hand and on individuals on the other; both being regarded as separate entities. They continue that they believe that technology alone cannot dictate its own ultimate route; social life and social aspirations remain critical in influencing how technology impacts on our lives. Bromley (1998) and Loveless (2001) echo similar ideas. Bromley compares the use of technology dramatically with the use of guns and reminds the reader that 'guns don't kill people, people kill people' (1998, p.4). Loveless explains that 'technology doesn't change practice, people do' (2001, p.64). She explains that there is now an 'altered view of knowledge' that educators need to acknowledge and that technology might assist people's understanding of this altered view. However, Heppell (2001, p. xvi) also points out that educators continuously make the 'error of subjugating technology to our present practice rather than allowing it to free us from the tyranny of past mistakes'.

Cordes and Miller (1999) warn that computers can pose serious health problems for children as they encourage a sedentary lifestyle while technology distracts children from making personal bonds with other human beings. They suggest that the 'sheer power of information technologies may actually hamper young children's intellectual growth' (1999, p.3) and lament the decrease in face-to-face conversations that is a 'constant factor' in the use of technology. Cordes and Miller (1999) suggest that the technology used in schools today will be obsolete when the children leave school and that over-use of technology in learning can stunt the imaginative thinking that is a prerequisite for innovative thinking. They warn that an overemphasis on technology can weaken the important bonds between teachers, students and families, and children need 'live' lessons that use their hands, bodies and minds and not computer simulations. While I agree with the concerns of Cordes and Miller (1999) regarding sedentary lifestyles, I disagree with most of their other sentiments. I will explore my own ideas around technology in education in the next section.

5.1.3. (iii) My perceptions of the role of technology in education

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My own view of the role of technology does not fall readily into either perspective as outlined in (i) and (ii) above. Roblyer, (2005) makes the point that there has not been enough quality research into the role of technology in education and that more needs to be done to establish what impact technology has, if any, on education. But, as Heppell (2001, p. xvii) points out, ‘the problem with genuine steps forward is that it is so hard to reference them against a criteria from the past, thus providing evidence that a step forward has really been made’. Therefore, research about the inclusion of technology in education is difficult to undertake as the questions that need to be asked are as yet, being formulated. While concurring with Roszak’s interpretation of Luddite critique (Roszak 1994), I too am drawn to questions about how machines are used, by whom and for whose benefit. These are questions that have informed my research and my practices. Yet, I am concerned that Roszak (1994) may be taking an exclusional stance. Even though his rhetoric is of an inclusional nature in that he purports to have an open but critical attitude to technology, the tone throughout his book, though informative and engaging, is dismissive of most forms of technology. Despite questioning Roszak’s thinking, I agree with Roszak’s concerns around the danger that human understanding and knowledge may be confused with the quest for information and data that information fetishism can imply. Sharry and McDarby (2003) use the term ‘information view’ to explain a narrow view of human understanding, which expects people to find the answers to human dilemmas on a search engine and perceives people as becoming ‘passive recipients rather active learners in knowledge creation’ (2003, p.122). I believe that Sharry and McDarby are echoing Roszak’s fears as outlined above. These fears are located in the Cartesian view that perceives mind and body as separate entities and understand knowledge as something external; something to be had (Fromm 1979).

While the above arguments are interesting, I subscribe instead to Sharry and McDarby’s (2003) ideas where human values are kernel to how we teach and how we learn and as Sharry and McDarby point out, human values are central to their aim to make technology ‘sensitive to our individual and collective needs’ (2003, p.117). I am drawn to Sharry and McDarby’s (2003) idea of using technology in a manner that is driven by my values and is sensitive to individual and collective needs. I see coming to know as a process and as

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something emergent and I also agree with the idea that practice (whether in technology or education or both) should be values driven.

Brown and Duguid (2002) quite rightly point out that videophones and video conferencing tools will never capture the essence of 'a firm handshake or a straight look in the eye' (2002, p.4). Technology will never be able to replace human, face-to-face contact, to capture the essential meaning of facial expressions or to reconstruct the magic of communications as humans engage with one another. In my view, the debate ought not to be about computer-based communications versus face-to-face communications; it should be more about how computers can complement human communication, as Brown and Duguid (2002) points out. I am drawn to Putnam's ideas because they are from an inclusional perspective. In my work practices, I am not attempting to replace human connectedness with e-mail or web pages. Instead I am attempting to enhance open-ended and dynamic relationships between people with my use of technology and thus enhance learning. This is a critical factor of my research because I believe that I am developing a theory of practice that locates the possibility of learning in the relationships that are created between people. Somekh (2000) explains how the presence of technology in the classroom has the potential 'to change the culture of the classroom and the relationship between that teacher and students…since traditional classrooms are not ideal learning environments' (Somekh 2000, p.25). While I am not sure that the introduction of technology in itself changed the culture of my classroom, I acknowledge that the relationship between my students and myself has changed. Miller (1996) reminds his reader that

> Holism acknowledges the individual part and that things are in process; however, underlying the process and connecting the parts is a fundamental unity. This unity, however is not monistic; instead the emphasis is in the relationships between the whole and the part.
>
> (Miller 1996, p.21)

These are ideas that are repeated frequently in the projects in which my class and myself engage and are also elements of how I use technology. I will develop this idea below with a sample from my practice (see Fig. 5.1).

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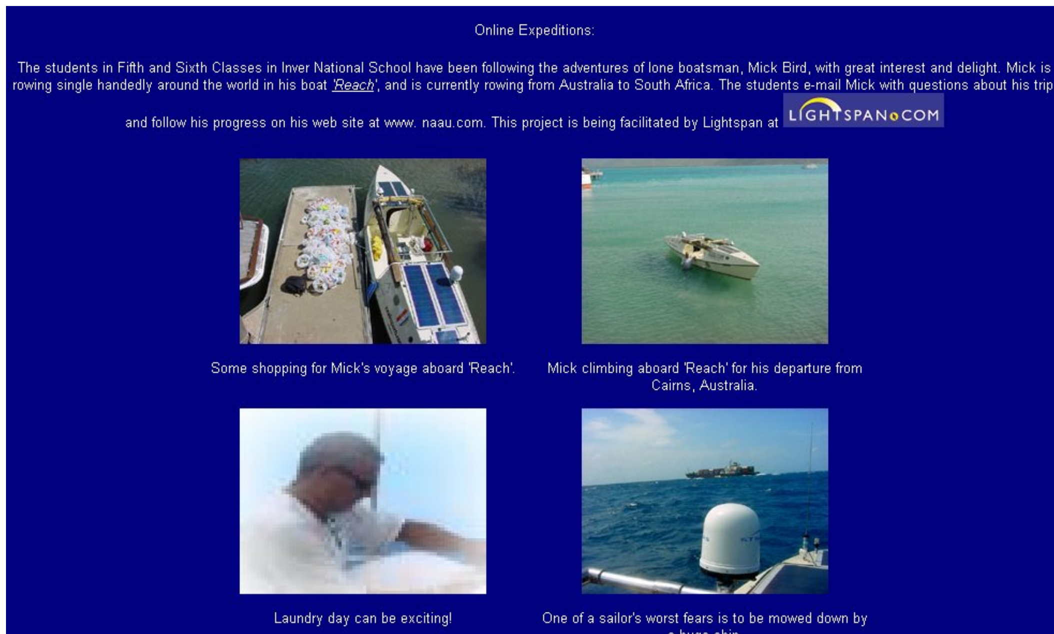

Fig. 5.1 Screenshot of our *Online Expedition* at http://www.iol.ie/~bmullets/mick.html

The *Online Expeditions* project was undertaken with my class of eleven and twelve year olds under the auspices of Globalschoolnet.org. In this project, the class followed the progress of a lone oarsman as he attempted to row single-handedly across the ocean from Australia to Indonesia. Each day, he would update his web site, give his location and describe the adventures that had befallen him in the previous twenty-four hours. The children had the opportunity to email questions to him, which he invariably answered. The class discussions gave rise to some blood-curdling creative writing and some creative turtle artwork. The highlight of the project was when the oarsman used his satellite phone to call the class and have a conversation with them.

I believe that this project is an example of how technology can enhance education in an open and dialogical process. The class learned about the climate, the marine life and the geography of the southern hemisphere, not because they had to learn it by rote, but because they wanted to find out how the oarsman was surviving and what his challenges were. Through dialogue with him over e-mail, they empathised and imagined the loneliness and the possible horrors that could befall him. They expressed their learning

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through creative writing and artwork and presented it on the web so that others could engage with their learning too.

This sample of my work with my class shows how technology can transform my embodied values around spirituality and connectedness in education into living practice and give opportunities to students to develop and express their own learning. As outlined in Chapters One and Two, my ontological values around love are enmeshed in the recognition of the humanity of people in terms of experiencing the wholeness of the person (Crowell 2002). The project outlined above is embedded in a dialogical process, a flow of understanding (Bohm 2004), in a sense of connectedness between the lone oarsman and the class as they conversed with the aid of technology and learned from one another (see http://www.goals.com/transrow/laterprtbr2.asp). This understanding of how technology can act as a catalyst in the development of spirituality and connectedness in education is substantially different to the 'information view' as outlined by Sharry and McDarby (2003) above. This difference is of an epistemological nature as it reflects yet again the epistemological conflict in which I find myself enmeshed. The 'information view' reflects a technicist epistemology, one where knowledge is objectified, reified and transmitted and the teacher's task is to 'fill the students with the contents of his [sic] narration - contents which are detached from reality, disconnected from the totality that engendered them and could give them significance' (Freire, 1970, p 57). Like Bohm (2004), my epistemological understanding is one of knowledge generation as existing in the flow of understanding between people. The flow in this particular project may have been further continued when others read the reports that my class produced on the internet about the project and perhaps these educational conversations have continued in other spheres of learning, as yet unknown to me (see Chapter Six for samples of projects where the flow of learning continued towards other people). I believe that projects such as this can be significant for developing new epistemologies in education and opening up learning as an enriching and engaging process. I could have taught my class about the Indian Ocean in a more traditional manner; they could have looked up their atlases and located the Indian Ocean, read their geography books and found out about the climate, the sea creatures and the islands that are located in the area. However, through engaging

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in this project, the class developed an empathy with the oarsman (see Burbules 1993). His adventurous trip was real and the class rushed in every morning to see how he had survived the previous twenty-four hours. Their learning took place against a background of empathy and connectedness (Noddings 1997). The connections that were made between the communications by email and the web page creation created the opportunity for an enriching and creative form of learning.

I return here again to Postman's (1993) ideas from the introductory section of this chapter where he suggests that one might learn from Thamus's judgement; that it is a mistake to assume that technology and innovation have a one-sided effect, and that one's interaction with the technology is kernel to the role that the technology plays in one's culture. Bearing Postman's warning in mind, I remind myself that I must be careful not to become smug in thinking that this is the only and the correct way of being and working. Such thinking in itself would be as fundamentalist as the technicist thinking that motivated me to work in this way initially (McNiff 2005a). I need to check that my claims are accurate and justifiable and I need to produce evidence to show the validity of my claims. These issues around accuracy and validity will be discussed in detail in Chapter Six but I know that at all times I must always ask myself and my students if my work opens up learning for them or if it is a form of closing learning for some. Every now and then, I get a reminder, that my ideas may not be the best for everyone. For example, one student looked at me balefully one evening as I gave him the school digital camera to take home to help him with his project work. He explained that his mother hated when he took school equipment home because it made her anxious in case it got damaged. I had not considered this possibility previously in my enthusiasm to use the technology. I then suggested that a drawing would be equally as useful for the project. My learning was substantial. I should never assume that my ideas suit everyone and be aware that there is always room for modification.

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(5.2) Section 2: Technology as a means of developing holistic approaches to education

As outlined in Chapter Four, I learned in the process of my research that my work practices were the live articulation of my embodied and once tacit (Polanyi 1958) values. Now recognising that I valued connectedness and holism as spirituality in learning, in this section I would like to explore how technology can help the transformation of these values into practice. First, I will give a snapshot of the current status of technology in education and then outline how diverse epistemologies are reflected in technology. I will describe how, frequently, some uses of technology in education can be perceived as a dispiriting and diminishing process for many learners and that this 'closed' approach to technology can be linked with closed-world discourses of war (see King 2001) and to closed theories of learning (see below). I will outline how these perceptions are in conflict with my ontological values around love and the recognition of the wholeness and human-ness of the person and in conflict with my epistemology of practice as an articulation of love at work (see also Lohr 2006). I will conclude with descriptions and explanations around how I perceive technology as a catalyst for connectedness and spirituality in education.

(5.2.1) (i) Closed-world discourses

Edwards (1989, cited in Bromley and Apple, 1998, p.21) uses the term 'closed-world discourses' to describe 'military concern with control, the treatment of humans as machines, the shift to a formalized, structural mode of social organization' which views the world mechanistically. He describes how the Pentagon 'came to view Vietnam as a token in a political game played between two superpowers' (1989, p.152), using systems engineering and thus developed an abstract conception of war, such that the understanding of the human element of war was diminished in favour of a perception that the war was about machines and technology. The link between such 'closed-world discourses' as outlined by Edwards and the role of technology in education is traced by Bromley. Bromley (1998) reminds us that 90% of university funding in the top university computer science departments in the US (MIT, Stanford, Carnegie-Mellon and others)

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came from the Department of Defence in the late 1980s and how a convergence between computing and the military can easily be traced. He reminds us that whenever closed-world discourse is mentioned, it has the 'computer at its core' (1998, p.21) and equates integrated learning systems (ILS) with such discourses.

King (2001) also talks about power and the role of technology in wider society. He draws on the idea of Bentham's panopticon, and describes how it has become an electronic panopticon in today's society. King (2001) describes how today, given our advancement in electronic forms of banking and communications, it is possible for the activities of any individual to be traced at any given time and that we are always visible. King reminds us that Bentham's original panopticon was designed for administering prisons. The building was to be circular in shape and the occupants of each cell were always visible to the keeper but the keeper was not visible to them. The inmates were always visible to the inspection tower and believed they were under constant surveillance and thus the inmates in their isolation and vulnerability became self-regulating. Bentham's original model was to be profit-making and to be used in many institutions such as schools, hospitals and asylums for the purposes of discipline. Foucault (1980) reawakened interest in the panopticon in more recent times when he described how the panoptic mechanisms 'such as isolation, classification and observation have become de-institutionalised and circulate freely in modern society' (King 2001, p.43). Foucault (1980) saw similarities in the power-constituted nature of the relationships between people in our society and the mechanisms of the panopticon. Robins and Webster (1988) perceive that technology has made us permanently visible as we use bank machines, book hotels with credit cards, log on to the internet or use our mobile phones. King (2001) suggests that now, as in Bentham's panopticon, people can be isolated into groups where they can be observed and classified. Drawing from my own experiences, I frequently buy books from the online bookshop Amazon. Because of Amazon's ability to track my purchases and to log my browsing through their website, it makes suggestions, based on my browsing and purchasing habits, about what books I might like to examine on each visit to its web site. There is a sense that the site can 'see' what I am thinking as frequently Amazon email me and makes suggestions as to what I might like to buy. Although I find Amazon useful, I

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am aware that it forms part of a larger body of unseen 'watchers' who possess a substantial amount of information about me and many others like me. King continues (2001, p.49): 'The electronic panopticon is not a prison that locks up its inmates; it is an idea that has been effectively applied to explain how technological advancements have been employed in capitalist society to exploit power relations'. It is a cause for concern that such power can be invested in unseen bodies of people who exist at the click of a mouse button.

Issues of power and control are causing concern in educational discourses too. Robbins and Webster (1989) make the case that learning theories that see the mind as an information processor are engaging in discourses about control in closed worlds and they draw parallels between closed-world discourses in military and education milieus. Van Nieuwenhove (2003) reminds readers that Heidegger warned of the dangers of technology in how 'calculative thinking becomes the only way of relating to the world' (2003, p.186). Bromley (1998) claims that when computers are introduced into schools, they bring with them closed-world discourses. He draws on Edwards's metaphors of 'symbols of power' and 'scientific precision' to explicate the centrality of the computer in closed-world discourses. Much research in education (see Sandholtz *et al.* 1997 and Kulik 1994, for example) points to our understanding of the inclusion of technology in terms of closed-world discourses also; where the student's role is seen as the receptacle of knowledge, success is measured by standardised testing (Freire 1970) and mechanistic ontologies are dominant (Lynch 1999). Similarly, Heppell (2001) talks about 'worksheet teachers' and students whose 'adept creativity or oracy does not quickly enough translate into notational form and is discounted' (2001, p. xvii). My understanding of such discourses is that closed-world discourses, those that de-humanise the learner, that perceive learning as the transmission of information or knowledge, can close down learning processes.

Constraints and Resources and Technology

As a teacher, because I believe that education should be liberating and not oppressive (Freire 1970), I need to ensure that the learning process for my students is open-ended.

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As I engage with ideas pertaining to technology and education, Brown and Duguid's (2002) insights prove to be illuminating. They talk about 'constraints' and 'resources' with regard to the implementation of technology in our culture. They understand 'constraints' as something that stop progress and 'resources' as something that enhance progress. They make the point that people should examine both the constraints and the resources that technology can offer before disregarding it, acknowledging that '…separating constraints from resources can be specially difficult with familiar objects ..' (Brown and Duguid 2002, p.7). They continue that constraints need not always be in the form of objects but can also include such things as social groups and institutions. They also maintain that constraints can sometimes transform from being constraints into resources. Frequently, according to Brown and Duguid (2002), there are good reasons to change social groups and new technologies can give us the means to do this. (In Chapter Seven, I will be discussing more about social groups in the manner of social formations and I will be making the suggestion that my research will hopefully be of significance for the education of social formations (Whitehead and McNiff 2006), as I invite groups of educators and policy makers to engage in critical reflection and to experiment with different approaches). Often, according to Brown and Duguid (2002), the resourcefulness of social groups can be overlooked in favour of their inherent constraints but sometimes 'once understood, such constraints may not block the way ahead, but rather point it out' (Brown and Duguid 2002, p.245).

My understanding of Brown and Duguid's (2002) suggestions here is that they are saying that technology can harness societal constraints and somehow enhance them. I perceive that Brown and Duguid's (2002) insights link in to my work and my understanding of how I use technology with my classes: I look at my classroom which is a normal, under-resourced, undersized classroom, typical of classrooms which were built in the 1880s and I see many constraints within it. But drawing on Brown and Duguid's thinking, the constraints are not blocking the way ahead, in fact they 'rather point it out' (2002, p.245). I am thinking here of my school's geographical isolation and seeing that the form of the projects I undertake with my class has gone some way in turning this perceived constraint into freedoms. I explained at the outset of this thesis how my sense of geographical

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isolation in the school was one of the key issues for me as a teacher and that much of the inspiration for my research has come from a desire to somehow diminish this isolation (see Glenn 2000, 2005). While working on projects with people and schools from diverse locations around the world will not physically alter our geographical location, they do help to diminish the sense of remoteness we feel as we make connections between ourselves and people in other schools and locations around the world. Brown and Duguid (2002) remind us that, 'communications technology…has not so much replaced the need for person-to-person encounters as rendered geography less coercive' (Brown and Duguid 2002, p.xix).

I believe that Brown and Duguid (2002) have gone some way in unravelling the dilemmas of Postman (1993) and Roszak (1994); they have acknowledged that technology can be both a blessing and a burden (Postman 1993) and have examined closely how technology is used and for what purpose (Roszak 1994). I have found their insights to be helpful as I try to make sense of my own work practices and develop my own living educational theory and as I develop an awareness of the role technical rationality has in the educational use of technology.

5.2.2. (ii) The role of computers in technical rational approaches to learning

Clandinin and Connelly (2000) compare the roles of Dewey and Thorndike in the history of education. They describe the battle for the supremacy of their thinking as a competition and citing Lagemann, they say 'Edward L. Thorndike won and John Dewey lost' (Lagemann 1986, cited in Clandinin and Connelly 2000, p. xxv). Thorndike is often perceived as a leading behaviourist who devised the 'Law of Effect' that has come to dominate many education systems with ideas around reward, punishment, promotion and incentives. Clandinin and Connelly (2000) see the competition between Dewey and Thorndike as a competition between two stories of how to do social science, whereas I see it as symbolic of an epistemological clash that is reflected not only in our approaches to education but in how people think about technology and its role in education. Gagne

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(1987), in his book on the foundations of instructional technology, describes early industrial technology as the confluence of the scientific study of human learning practised by Thorndike and his followers and the availability of new technologies. The links between Thorndike and behaviorist approaches to technology and education are still apparent today.

Much research on technology and learning and much thinking around the use of technology is from a technicist perspective. For example, one can find Kulik's (1994) study where he found that students who used computer based instruction scored at the 64th percentile on achievement tests compared to students who studied without computers and achieved a ranking at the 50th percentile. Sivin-Kachala (1998) found that students who used technology experienced positive effects on achievement in all major subject areas. Wenglinsky (1998) examined the impact of simulation and higher order thinking technology on mathematics achievement in the United States. He found that the eighth-grade students who used the technologies attained scores of fifteen weeks above their grade level as measured by the standardised tests. He also had similar findings for the fourth graders.

The research cited in the preceding paragraph cites raised standardised test scores as indicating favourable outcomes for the inclusion of technology in education. While a raised test score is admirable it is perhaps symbolic of a perception of education that is, in my view, inadequate or diminished. Equating standardised tests score with effective education (with or without the inclusion of technology) can serve to reduce our understanding of education to its narrowest meaning. Darder (2002, p 58) describes 'teaching to the test' as a 'sterile and enfeebling' pedagogical approach which reinforces conformity to the state's prescribed definition of legitimate knowledge and academic endeavour. Freire (1970) also condemns such processes and explains how standardised testing and teaching to the test perpetuates the myth that students exist 'abstract, isolated, independent and unattached to the world, that the world exists as a reality apart' (Freire 1970, p.60). Yet, much of our current research and thinking with regard to the inclusion of technology in education seems to be from a technicist perspective and predominantly

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based on the results of standardised testing; the perspective which sees children as ‘human capital’ and who are likely to be economically productive (Kane 1995).

Gibson (2001) asks more searching questions. He questions the definition of the ‘effective use’ of technology and suggests that the term ‘effective’ can be open to interpretation. He acknowledges that the inclusion of technology in learning has an effect, but that whether the effect is ‘good’ or not depends on many variables, including one’s interpretation of what is ‘good’. It appears that the learning environments that exist within schools impact seriously on how technology is used according to Gibson (2001). He describes two over-simplified scenarios; teacher centred and student centred environments, and explains how in a teacher centred environment, the focus of power is on the teacher, and teaching methods include lectures, drill and practice exercises from workbooks with a dependence on rote learning and the memorisation of facts. Technology in this situation is the ‘patient, non-threatening tutor’ (Dwyer 1996, p.18). The second scenario that Gibson describes is a student centred, collaborative environment. The teacher here does not ‘deliver’ knowledge, the teacher’s role is more as a facilitator, someone who helps students to become independent learners. The students collaborate and converse, solve problems using trial and error, and share information and critically review one another’s ideas (Gibson 2001). In this student centred environment, technology is a tool which provides learners with opportunities to access information, to collaborate and engage in creative thought and expression.

While acknowledging that the models Gibson (2001) has outlined in his paper are over-simplified for the purpose of explanation, I also acknowledge that they do exist. He continues that there is a very real need for educators, whether engaging with issues of technology or not, to consider the importance of the learner, their learning needs and their context at the outset of any learning process and that these considerations should influence the appropriate use of technology. He suggests that the two models of learning need not be incompatible; rather they may be viewed as different positions on a continuum. He concludes that the most effective learning environment is one where the

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teacher, either as guide or as instructor, selects the most appropriate strategy to benefit the individual learner and to address their learning needs (Gibson 2001).

While agreeing with Gibson (2001) on most aspects of his paper and particularly with his inclusional approaches to transmission and constructivist models of learning, I query his thinking around learning objectives. Gibson rightly maintains that the most important issue in learning is the learner and 'the learning objective that is to be accomplished… and to select the most appropriate learning strategies and applications of technology that best accomplish those tasks' (2001, p.58). Here, my thinking diverges from Gibson's, not because I disregard the importance of goals and objectives for teaching or selecting appropriate teaching strategies. Conversely, I consider them to be very important, because unless I as an educator ask myself why I do what I do, then my work is purposeless. Noddings (2003, pp.76-7) suggests that educators should ask themselves questions like: 'What are we trying to accomplish…? Who benefits? Should our efforts be designed to enhance society… or should they be directed as benefits for the individual?' I believe my research was motivated by such questions and that critical thinking can serve to improve educational theory. Returning to Gibson's ideas about accomplishing educational tasks, I disagree with his thinking about learning generally, and about learning with technology specifically. I believe that his thinking around learning (and learning with technology) stops short of what I understand learning to be. My understanding of learning is that it is a dialogical (Burbules 1993) holistic process; a never-ending and always organic process (Bentley 1998). Gibson (2001) appears to think that education can be reduced to a series of attainable tasks. He seems to have missed out on the open-ended, spontaneous and creative aspects of learning that are part of life in the everyday classroom. These aspects often occur when the teacher has specific tasks that they want to complete and aims they want to achieve, but in the actual learning process, the learning either supersedes those initial aims, or perhaps takes a different direction entirely.

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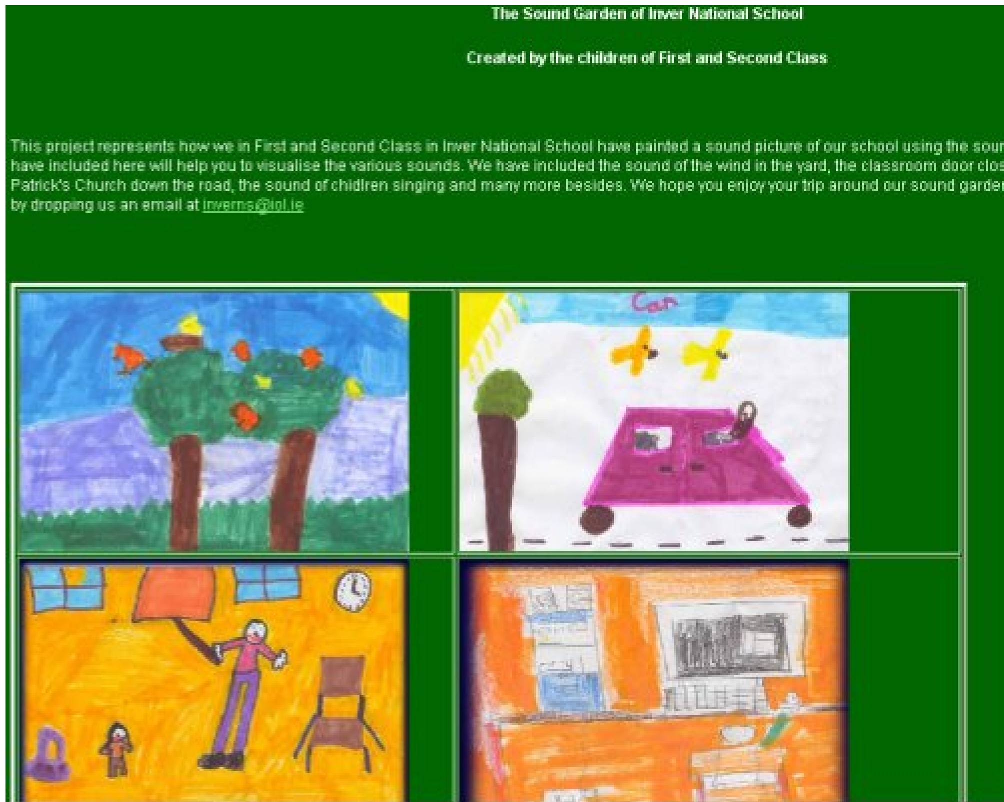

Fig. 5.2 A screen shot of the *Sound Garden* project

I will explicate this thinking with an example from my own work (see Fig. 5.2): Some time ago I had a class of six year olds who needed help with their reading skills. I noticed that their listening skills needed extending, so I devised games for the classroom that might help enhance their listening skills and auditory discrimination. One of the activities I devised involved us going around to different parts of the school and its environs, and recording sounds. We recorded the sound of the school bell ringing, the gate opening, the printer printing, the toilet flushing, a bird singing and so on. Each student then drew a picture of the sound they had recorded. The exercise then involved playing the sound and matching the picture to the sound. It was a simple basic exercise and I achieved the aims that I had established at the outset, as it sharpened the children's listening skills. I noted

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the children commenting about sounds around them as they became more aware of sounds in the environment and listened more carefully in class generally. Because I had experienced difficulties locating recordings of sounds from the environment on the internet at the outset of the project, I decided to publish the children's recordings and pictures on our website so that other educators who needed the recording of sounds from the environment could access them. I published them in a manner such that when one clicked on the picture, you would hear the sound (see http://www.iol.ie/~bmullets/sound_garden). When I published the project, three unforeseeable learning outcomes also occurred. Firstly, when I showed the children their work, their sense of pride was evident in their smiles and their requests to hear 'their' sound repeated. Then, the project also received special mention on the Scoilnet website (see http://www.scoilnet.ie), which is the national educational portal website in Ireland. Thirdly, it was also included as part of the in-service training for primary teachers in music as a sample of listening to sounds in our environment. These were three aspects of learning that the project generated that I had not anticipated. They had not been in my initial plan and they were unforeseen. Frequently, learning takes that form; while goals and aims need to be achieved, the potential for learning in each learning experience is a 'wild card' that cannot be predicted. Sometimes these 'wild card' learning experiences can be the most enriching and exciting occasions of learning that people may have. Like Bohm (2004), I also perceive that dialogue can generate a stream of meaning out of which some new understanding may emerge.

Technology can sometimes enhance such learning processes. Becker (2000, p.300) seems to recognise such potential as he points out that it is important to clarify how computer use is limited by teacher beliefs but in turn, 'under particular circumstances [technology] helps to change teachers' approaches to instruction and curriculum and their basic underlying pedagogical beliefs', and he talks about the 'possibly valuable role of computers as catalysts for instructional change'. Becker's (2000) ideas here are similar to Brown and Duguid's (2002) ideas around how technology can sometimes transform constraints into resources, as outlined above. As I understand these issues, the transforming of constraints into resources and the unpredictable nature of learning

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outcomes, come together in my thinking to form a new epistemology of practice. This is the epistemology that I am developing here as I share my thinking with others. I do not perceive knowledge as a reified, external object alone. Instead, I see knowledge as being personal (Polanyi 1958), embodied (Hocking *et al.* 2001) and holistic (Nakagawa 2000) while also being inclusional of all the traditional understandings around knowledge (Whitehead 2005). My epistemology of practice has been drawn from my work practices with my classes and is being theorised as I engage with my research. I do not see learning as limited to attaining adequate standardised test scores alone, nor do I see learning as the attainment of goals alone either, although it does embrace these perceptions as part of its inclusiveness. Instead it is embedded in Miller's (1996) ideas around spirituality and holism as a 'living sense of one's connectedness within a greater whole' (Kesson 2002, p.43). I believe that it is in this way that technology can enhance learning.

5.2.3 (iii) The values-based role of technology in my practice

As I develop an understanding of my practice as I engage with my research, I realise that I now use technology in my work to enable me to live my values in my practice. My values merge into an understanding of my practice as a holistic and spiritual endeavour. These are the values that I attempt to live in my practice although I seldom fully succeed. As I attempt to give them life in my work, I find that I can use technology to help me work towards these values. This is quite a different approach to the use of technology than that outlined in the previous section, where the technology is considered to be helpful when it helps to raise test scores. It is also different to approaches which perceive technology solely as a tool to help fulfil learning goals. While these are pertinent issues in education and while technology may well assist in these cases, my own understanding of the educational nature and use of technology in education is when it helps people to make connections with someone or something, perhaps outside of the classroom, for the purpose of learning. In some cases, it enhances the flow of learning for people as outlined in the communications with the lone oarsman above. Sometimes, it helps people whose writing skills or speaking skills are weak to communicate with others in a dignified manner. Sometimes, technology becomes a catalyst in the learning process and it allows learning to soar into unimagined places, to open up the learning process and to give

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people an opportunity to grow in their learning. Wenger (1998) talks about the importance of striving to open new dimensions for the negotiation of the self in education. It should place students on an 'outbound trajectory toward a broad field of possible identities' and should be seen as not just being formative, but transformative as well (1998, p.263). Although Wenger is not referring to the role of technology in education, his ideas can easily be applied to my understanding of it. He perceives learning as being something social and is critical of systems that assume that 'learning is an individual process, that has a beginning and end and is best separated from the rest of our activities' (1998, p.3). He asks: 'What if we assumed that learning is as much a part of our human nature as eating or sleeping, that it is both life-sustaining and inevitable, and that - given a chance - we are quite good at it?' He suggests that education cannot be a closed system that encloses well-established training processes. Instead it must aim to offer 'dense connections to communities outside its setting'. Learning communities must 'use the world around them as a learning resource and be a learning resource for the world' (Wenger 1998, p.275). While not talking about technology in education, and instead talking about education itself, Wenger seems to have captured the sense of potential that learning experiences with technology can offer. I am drawn to Wenger's ideas because I see how learning, especially learning that is supported with technology, can be a launch pad for creativity and a flow of learning. As explained in Chapter Four, I call my understanding of this sense of creativity and flow of learning a 'spirituality in education'. I now discuss how technology can support a holistic approach to learning in the next section.

5.2.4 Technology and holism in education

As my research journey continues and as I develop a sense of understanding around my once-tacit desire to include collaborative technology-based projects in my work, I learned how my new epistemology was drawn from an acknowledgement of the importance of personal ways of knowing (Polanyi 1958) and a connectedness or spirituality in education (Miller 1996). For many, ideas around spirituality and technology in education can be

incommensurate. Dreyfus (2001) points out that technology can deprive users of the embodied experience that is kernel to human interactions and that rather than encouraging people to become involved in social causes, it can encourage voyeurism or social apathy. Kane (2002, p.245), while writing on spirituality in education, sees technology as something that encourages people to become 'effective processors of information' but that as a result of the inclusion of technology in our lives 'we have diminished the capacity to see into and appreciate the world, ourselves and one another in such a way as to give us a sense of purpose, connection and commitment in our lives'. I understand my commitment to spirituality and holism in education to be enhanced by technology. My understanding of spirituality in education (as outlined in Chapter Four) is that it exists in the relationships and connections between the person and other people (Yoshida 2002), both locally and at a distance (Conway 2003), and with the environment (Steiner 1995) and with the wider cosmos (Montessori 1949). It is embedded in holistic ways of knowing that acknowledges the human-ness of each person and enables people to be mutually respectful of one another and of their beliefs. It is rooted in an epistemology of wholeness, context and interconnectedness (Miller 1997). My understanding of technology in education is such that it can enhance and supplement holistic and spiritual approaches to education.

Bohm (1980) talks about fragmentation in people's thinking and ways of being and ways of learning and suggests that such fragmentation interferes with our clarity of thought to such an extent that we are unable to solve the endless series of problems that fragmented thinking presents. He continues that our attempts to live life in a fragmented way has brought 'pollution, destruction of the balance of nature, over-population, world-wide economic and political disorder' and an environment on the brink of destruction (1980, p.2). He concedes that division and fragmentation were useful for practical activities such as the division of land, but when this way of thinking is applied to 'man's [sic] notion of himself and the whole world in which he lives…he begins to see and experience himself and his world as actually constituted of separately existent fragments' (1980, p.2). Bohm warns that our fragmentary way of thinking and being has implications for every aspect of human life and suggests that because fragmented ways of thinking and being have

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become the norm, then ‘fragmentation seems to be the one thing in our way of life which is universal’ (1980, p.16). He offers his reader no easy solution to this dilemma and warns that even as people try to tackle the problem of fragmentation, their own fragmented thinking is so embedded in their lives that their thinking can cause further fragmentation unintentionally. These are the dilemmas I see in my own work every day, but against which I continuously battle as I engage with the various projects with my class. Palmer (1993) also sees the implications of such fragmented thinking in an educational context and describes how the education system is further fragmented by its subdivision into disciplines, with the result that people involved in education understand themselves as having ‘no more coherence than the fragmented world itself’ (1993, p.13).

This incoherence is manifested in the proliferation of new subjects that are being introduced in the Primary School Curriculum here in Ireland. According to Morgan (2002), the number of discrete school subjects has almost doubled since the 1971 *Curaclam na Bunscoile* (Ireland, Department of Education and Science 1971). Apple and Jungck (1998) also talk about the inadequacy of a curriculum which has been expanded. Morgan (2002) points out that, now, children are expected to learn too many subjects, within which there are too many topics and which impacts negatively on the depth of the learning for children. While agreeing with Morgan, I perceive that the creation of projects, and the use of technology, that draw on the multiple learning strengths of students, can also go some way in drawing on multiple aspects of the curriculum, thus diminishing the sense of overload experienced by many teachers. In my work I try to demolish the walls of the classroom, in a figurative manner, and encourage the class to enter into dialogue with members of the community both locally and at a distance (see http:/www.iol.ie/~bmullets/). I also attempt to integrate the discrete curriculum subjects so that they are less fragmented and I try to keep the natural pulse of nature as an undercurrent heartbeat in our everyday work. I am suggesting here that, instead of focusing on the divisions that exist between the myriad of school subjects and their supporting strands and strand units, sometimes, it might be helpful to examine how the subjects could be interlinked and show how they might support one another. I believe that many of the projects I have implemented with my class have demonstrated this. Miller

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talks about ‘subject/subject connections’ as an aspect of holistic curriculum, where connections between discrete curriculum areas are made (Miller 1996, p.125). My *Working as a Historian* project, for example, was simply a history project, but it drew heavily on other aspects of the curriculum such as English, Geography, Visual Arts and Social Personal and Health Education (see Chapters Six and Seven for more on our ‘Working as a Historian’ project).

It is interesting to note, at a local level here in Ireland, that even though educators are still in the process of implementing a new set of curriculum guidelines, there is little reference to the inclusion of technology within the curriculum documents. An ICT working group was formed in the National Council for Curriculum and Assessment (NCCA) in 1998 with the view of examining issues regarding ICT in the Primary School Curriculum (1999), but the curriculum was nearing the completion of its design phase at the time. Since then, ICT has been perceived as an ‘add-on’ to the curriculum and not as an integral part of it. Sometimes, I believe that while the role of ICT in education in Ireland has been marginalized, this marginalisation has also been a great source of freedom. Because there are few guidelines or objectives with regard to ICT, teachers are free to use technology as they so wish and how they so wish. In the United States, teachers must undergo a more prescriptive regime when including technology in education. For example, in the United States in certain states, at the K2 level, it is expected that the child achieves the following benchmarks ‘Knows that the keyboard and mouse are computer hardware…knows that the keyboard and mouse are computer hardware… knows that the keyboard and mouse are computer hardware and knows hard and floppy disks and their use…’ (McRel 2005). Our programme of technology inclusion here in Ireland is, as yet, of a more malleable and flexible nature and is seen more in terms of guidelines and suggestions (NCCA 2004) than standards and attainments. This flexibility has supported me in my work with technology as I develop my holistic and inclusional epistemology of practice.

It also interesting to note that while few of the writers who are at the forefront of holistic approaches to education (for example Crowell 2002, Kane 2002 and Miller 2000) address

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how technology can be combined with holistic approaches to education, some have approached this issue. Among those is Ron Miller whose understanding is quite different to mine. In his *Creating Learning Communities*, a book edited by Miller (2000), his understanding of how technology can assist holistic approaches to learning seems to focus solely on how technology can provide access to a large range of information. He points out that technology cannot replace face-to-face human interaction (an issue with which I have already dealt in this chapter). Heller (2000), another contributor to the Miller (2000) book, talks about the computer revolution in schools. He describes how in netschools (or what might also be termed 'e-learning' situations), 'hundred of colleges and universities have "packaged" college and secondary classes to independent learners around the world' (2000, p.182), and uses terms such as 'the delivery of educational content' (2000, p.182), 'mastery ', ' 'training' and 'attainment of education objectives' (2000, p.183) to describe his vision of community learning. I perceive such interpretations of the use of technology and such language to run contrary to my understanding of how technology can be used to enhance holistic approaches to learning. The 'packaging' of classes and the 'training' for the attainment of objectives can be closely aligned with the language of closed-world discourses and the concept of perceiving people as a public resource for the future of the state. These perceptions are akin to what Kane describes as a 'distorted view of the child and the nature of education' (1995, p.61) and they run contrary to my values around love and the recognition of the wholeness and human-ness of people. As Miller states elsewhere:

> Holistic education aims to call forth from young people an intrinsic reverence for life and a passionate love of learning. This is done not though an academic 'curriculum' that condenses the world into instructional packages, but through direct engagement with the environment. Holistic education nurtures a sense of wonder.
>
> (Miller 2000a, p.206)

Here, I agree with Miller, and these ideas permeate much of my own thinking around education. However, I also see how technology can assist and sometimes inspire such holistic, creative and spiritual approaches to education.

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Palmer (1993) suggests that an education in transcendence can help to step beyond the fragmentation and explains that transcendence is not an outward escape from the world but more of a 'breaking-in, a breathing, …a literal in-spiration that allows us to regard ourselves and our world with more trust and hope that ever before' (1993, p.13). I perceive this 'in-spiration' in how my class engage with the local environment, and with the local community, and can be seen in many of the projects I undertake with my class. The following is an example of a project (see Fig. 5.3) which demonstrates how technology can enhance a spirituality and a holistic sense of connectedness in my work:

Fig. 5.3 A screenshot from our *People in our Community* project

This project, entitled *People in our Community* (see Fig. 5.3), was undertaken with my class of six and seven year olds. Its aim was to engage with local people in the community and to find out about their work in a professional or in a voluntary capacity. I wrote to the parents of the children in my class looking for volunteers and for suggestions as to other members of the community who might be willing to participate. Eventually we got eight people who were willing to come in to the classroom to talk to the class. They agreed to being photographed, videotaped and audio-recorded. The children in the class took turns at being the 'technicians'; as sound recorder, filmmaker and cameraperson. Before the interview began we prepared a rough set of questions that might elicit the information the children wanted to hear. The interviews took place over a period of three weeks and after each interview the children wrote short descriptions using

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pictures and text about what they had seen and learned. When the interviews were finished and the children had completed their art and written work, I published their work on the internet at http://www.iol.ie/~bmullets/community where the video and sound files can be accessed using streaming media.

The learning for the children here was significant; they gained insight and understanding into the work the people do, they tried on handcuffs and held a truncheon when Gary and Amanda, the gardaí, came to visit. They learned about the work of a nurse from Eibhlín and learned how to take a pulse. They also learned the value of voluntary work as James talked about how he trains the local soccer team. These lessons could easily have been 'covered' using a textbook or a workbook, but for those of us who were present at the interviews, the magic of the flow of dialogue between the class and the interviewees was spectacular. The video clips help us to re-capture the sparkle of the interviews, which were often in the form of a raised eyebrow or the twinkle of an eye; this being especially true of the postman, John, who nearly convinced us all that he was Santa Claus's special helper!

This project is important to my research because it is rooted in what Capra (1997) calls a 'holistic worldview which sees the world as an integrated whole rather than a dissociated collection of parts' (1997, p.6). For me, I see the class as part of school which is part of the community and its environment as part of the greater world and its cosmos. In this project, I was attempting to make connections with the community members and parents as, together with the children, we created a flow of understanding (Bohm 2004). Like Iannone and Obenauf (1999) I see spirituality in education in how we become aware of the world and its inhabitants and recognise social needs and injustices. Negroponte (1995, p.230) talks about how 'digital technology can be a natural force drawing people into greater world harmony'. When Palmer talks about spirituality in education he means 'the diverse ways we answer the heart's longing to be connected with the largeness of life' (1998, p.5), and I perceive that this project went someway in meeting with the largeness of life. Conway (2003, p.228) explains that when interrogating ideas pertaining to technology and holism, the 'key question seems to be whether or not we have the inner

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freedom, or can develop the inner freedom, to engage with…technologies in such a way that they facilitate rather than frustrate the risky adventure into the heart of what it is to be human'. Like Conway (2003), I see how the internet and technology can be used to facilitate and strengthen holistic, dialogical and inclusional approaches to education. I perceive technology in this manner in its implementation in the project outlined above. The children used technology in the form of a video camera, a digital stills camera and an audio mini-disk recorder to record the interviews. They developed a sense of ownership of the work as they made decisions around when and how to record the various clips; these clips were theirs. Kahn and Friedman (1998) explain that children construct meanings more fully when engaged with issues that capture their interest while Karolides (1997) points out that, when people take ownership of their own learning, it becomes more meaningful for them. The use of the recorders and cameras here also ensured that all the children were able to participate fully in the project because it was not dependent on the written word (although some of the follow up activities involved a little writing). Writing for many six and seven year olds can be a laborious chore and for many, the recording of these interviews in written format would have been nearly impossible. Street (1998) talks about a 'new communicative action' which emphasises a mixture of text and images and the communicative choices that are now open to people. Using multimedia afforded every child the opportunity to participate fully in the project, regardless of their reading or writing strengths. The media clips that we recorded are now stored at our school web site to remind us of the interviews, to recall our learning, to re-engage with the flow of understanding that emerged during the interviews when we wish to re-visit them at a later date. They provide us with an opportunity to engage in further learning at a future date as perhaps our insights may change as time goes on. The recordings also connect our learning back into the community, as some members of the community may wish to engage with our learning process by visiting the web site. It may further enhance our sense of connectedness when others, from further afield, visit the site and learn from our learning. These multiple layers of learning are closely interconnected and interdependent. They go some way in demonstrating how learning can be a dialogical process, how education can be a holistic experience and how technology can enhance the sense of spirituality and connectedness that permeates my epistemology of practice.

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To conclude

Frequently I am asked if the use of technology in educational settings is the focus of my research. Despite my obvious commitment to the use of technology in education, my answer is vehemently negative. Instead I reply that my research is about developing a dialogical and inclusional living theory of educational practice. However, I acknowledge that at the outset of this phase of my research, my initial research question was around the inclusion of technology in education. Drawing on the research I initiated in my masters programme, I began this phase of my research by querying the value of internet based collaborative projects in my work (see Chapter One). I have since learned, as I have developed my living theory of practice, that as my new epistemology evolved, so too did the focus of my research. As I asked questions like 'Why am I working in this way?' with regard to my work with technology, I realised that the technology was not what was important. What became important for me were epistemological questions like 'How do we come to know?', 'What knowledge is important?' and 'Who decides?' and methodological questions like 'How can I best understand my practice?'. As I gained clarity around my ontological values and their emergence in my practice (Whitehead 2005), I realised that I used technology to enhance and strengthen the holistic and dialogical ways of knowing that were emerging in my research. Sometimes the technology was a tool to help communications, sometimes it was a springboard for unforeseen 'wildcard' learning experiences, but always its aim was emancipatory and life-enhancing.

I perceive these key ideas as being significant for future understandings of curriculum as an open-ended creative conversation (see Elliott 1998) between the student, the teacher, the topic of learning, the environment and other relevant bodies and I will discuss these ideas in greater detail in Chapter Seven. For now, I would like to trace the generative transformative movement of my values around holistic approaches to learning and how they transformed into live practice in the projects I engage in with my class. The transformation has been further generated frequently, as other educators explore my work

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and interpret their own understandings of it through exploring my work on the internet or through professional development programmes in which I engage (see Chapter Seven).

I am committed to holistic approaches to education, to spirituality and creativity and I perceive the interconnectedness of people and their environment as a locus for learning. I believe that people can develop their own learning potential and create their own knowledge. I believe that technology can be a vehicle for enhancing such interconnectedness and creativity. I no longer perceive technology as an 'add-on' to learning or as yet another discrete subject in the curriculum. Bohm (1980) and Palmer (1993) talk about how our world and our thinking is overly fragmented already and I perceive the addition of yet another fragment that we call 'technology' as perpetuating this fragmentation. Instead I see the role of technology as that of an aid to connectedness, creativity and self-expression. In the fragmented world we live in, technology may be a 'glue' to connect disparate parts of our curriculum, to connect the classroom with the outside world and to connect learning with the real world.

In this chapter I have explored how I perceive technology as a support to spirituality and connectedness in learning. I have outlined some of the current debate about the role of technology and framed it in the epistemological conflict between technical rational and personal and dialogical ways of knowing. In Chapter Six, I will discuss issues pertaining to the validation processes I undertook to test and validate my research claim that I am using technology to enhance dialogical encounters by showing how the form of communication I used to communicate my claim was comprehensible, true, sincere and appropriate (Habermas 1976).

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