Appendices

Appendix 1

Explicating the Research Process

Questions:

> *What has been my research process?*
> *What has informed my research methodology?*
> *What concerns do I have about the research methods and processes?*

What am I wanting to know and how can I come to know?

My research has not exactly gone to plan because I have been very ill in the middle of it, which may (or may not) be considered serendipitous. I started out specifically intending to research my teaching practice as a Year 11/12 Physics and Journalism teacher between 1996 and 1999 in order to explore deeply *what it means to move towards being a holistic teacher*. I have now integrated that within a larger context of examining the implications of Holistic and Integral referents for curriculum design and for the conceptualising of science education and science. My research can now be best described as several studies within a bigger study. But in truth there has only been one study – into myself.

I started doing a Doctorate of Science Education in June 1996 with my big question being "*What does it mean to teach holistically? How can I make my classes more meaningful for my students?*" This is something I had been exploring in my classes over the previous years. Taking on a doctorate meant a continuation with the exploration but now with a more rigorous research process and input of educational referents.

My participation in the various sessions of the course exposed me to new ways of conceptualising education – a whole world of theorists, philosophers and critics. I was

introduced to the world of relativism, plurality and postmodernism – a pretty big journey for someone with a science background and a pragmatic approach to teaching. Whereas before I was looking at improving my teaching by experimenting with practical classroom activities and principles, now I was being asked to look at the cultural metaphors that underpinned my assumptions of learning and education.

Holistic education had earlier introduced me to the notion of worldviews but my engagement with it was not at the level of the theorists; rather looking at what other teachers like myself had trialled in their classes and how I could learn from that; modify or value add for my own purpose. From that I might deduce principles which I could transfer to new situations, working with teachers and curriculum design.

So what research approach would suit my research questions and my own way of learning? I was attracted to the 'lived experience' genre of research (Whitehead 1989) based on action research models (Kemmis and McTaggart 1982). I am after all a practical person who needs to experience things for myself to understand something. I found myself exploring in two key ways:

> 1. **Seeking to find underlying principles** / systems / significant meanings which could inform the generation of classroom practice. This set up a loop - *Theory* to *practice* to *evaluation* to *reflection* to *modifying an understanding of the theory* to....

> 2. **Trialling different practical strategies** in my classes to seek the emerging themes / principles / meaning and significance. This research loop was *practice* to *evaluation* to *reflection* to *theorizing* to *practice with revised intentionality* to.... This was more aligned to grounded research methodologies where theories emerge from the research.

In seeking to find underlying principles that could guide development of holistic practice I asked the following key questions:

> o *What does it mean to be a human being? How do different notions of human beingness articulate into educational models?*
> o *What is the purpose of education? How is this affected by notions of human beingness?*
> o *How does a human being develop and how is this affected by notions of human beingness?*

This started a journey of reading, embracing a range of viewpoints drawn from literature on **spirituality in the everyday world** (e.g. Brussat 1996, Pearmain 1998, Hanh 1991, Moore 1994, Hubbard 1998, Grof 1993, Capra and Steindl-Rast 1991, Sheldrake and Fox 1996, Wilber 1997), **the new sciences** (e.g. Zukav 1979, Wheatley 1994, Talbot 1992, Prigogine 1997, Peat 1987, Lovelock 1979, Laszlo 1996, Capra 1982, 1988, 1991, 1996), **ecoliteracy** (e.g. Orr 1994, Capra 1993, Knudston and Suziki 1994, Fox 1990, Bateson 1972, Macey 1991), **feminist discourses** (e.g. Belenky et al 1986, Goldberger et al 1996, Noddings 1992), **indigenous education** (Cajete 1994), **Holistic Education practices** (e.g. Miller 1994, 1996, Flake 1993, Palmer 1993) and **development models** (e.g. Brennan 1987, Childs 1996, Egan 1986).

Sometimes I read broadly, just dipping to get a sense of the whole and sometimes I stopped and spent a long time trying to get to terms with a particular standpoint through reflection, dialogue with others and then articulating it into practice and determining outcomes…coming to understand the ideas through experiencing them in action. I read with the lens of a teacher looking for practical ways of incorporating big ideas into her teaching.

Meanwhile, I was also exploring a range of teaching strategies that were individually justified and supported by research and teaching materials - eg. constructivist teaching strategies (Tobin 1993); conceptual change strategies (Duit and Confrey 1996); multiple intelligence strategies - such as conceptual mapping, metaphors, visualisations, and role plays (Gardner 1985, Lazear 1991); whole brain learning strategies (as researched by Julia Atkin); thinking strategies (de Bono 1992); and collaborative learning strategies (Bennett 1991, Gibbs 1994). However, few of these were explained or positioned in relation to my key questions above.

What I discovered was that my two processes became reflexive of the other. Experiencing the teaching strategies enabled me to get at an understanding of the principles I was reading about by having concrete exemplars to make sense of the wave of theorising words. And the principles that I was exploring enabled me to question the strategies from a bigger picture standpoint than originally indicated by the researchers, leading to imbuing the strategies with greater intentionality. There was a coming together, a synergy, that enabled me to creatively model and synthesise many principles together and play with them in practice in my classes in new and richly meaningful ways.

This wasn't real research, I thought, just play. Though play which I journalled and where I interviewed students, gave them questionnaires and asked them to write journals to give me feedback for this play of mine.

The questions I was exploring were:

- what learning experiences are rich and meaningful for my students and my colleagues
- what experiences and ways of thinking can empower students to seek that which is meaningful for them
- what models of thinking (underpinning systems or principles) are useful in giving greater intentionality to everyday teaching strategies in order to create meaningful experiences for students
- ways of assisting other teachers to move from traditional reductionist and disconnected practices into more holistic ones and as a result gaining better understanding of the constraints to such movement.

Then in September 1997 I had a doctorate institute that forced me to look critically at my research process and notions of validity and rigor. How rigorous was I when doing action research? What can I claim to know and why? Is this really the best methodology for me and what can I learn from others? So now the whole world of the social sciences opens up for me… phenomenology, ethno-methodology, personal experience, grounded research, feminist research, seventh moment research, research as writing (as described in Denzin and Lincoln 1994). What can I take from these?

Situating my action research

First of all I am situated within the realm of personal experience research methodologies as described by Candinin and Connelly (1994). The advantage of researching one's own personal experience compared to researching someone else's is that it takes a whole interpretive loop out of the research (Fenstermacher 1992). The downside is that when the researcher and the researched are one and the same it becomes difficult to retain enough detachment and objectivity. The researcher becomes bound by their own ways of knowing and being which creates self-validating research - the knower and the known shape each other. The different types of personal experience methods aim to deal with this problem in different ways.

Phenomenological and grounded research methodologies both interpret lived experience. In both of these, the researcher is trying to interpret with a clean slate, with no theoretical assumptions guiding the interpretation, listening for the emerging themes and theories. Unfortunately, no matter how hard we try, our life experience gets in the way and the interpretations are not theory-free or value-free. In my case, while I wish to draw emergent themes from my lived experience, I am deliberately starting with a theoretical underpinning. While I can use the interpretive procedures suggested by phenomenological researchers such as van Maanen (1990) I am not situated exclusively within that research framework.

The *action inquiry* of Torbert (1991) attempts to address the problem of self-validating research by suggesting a *'critical subjectivity'*. He shows a hierarchy of operation that a researcher can be in - from an impulsive and un-aware position to stages where the researcher becomes aware of the different levels of paradigms that they are working under. (His model was later adapted and further researched by Cook-Greuter (2002) and underpins the perspectival stages that I have been referring to throughout this thesis.) He requires as part of the research that the researcher undergoes a rigorous self-critique and self-examination. By doing this, the epistemological and ontological assumptions of the researcher become explicit and greater honesty and authenticity can be brought to the interpretation. In the process of doing this the researcher herself is transformed to higher stages. Therefore, as part of my research I have adopted an ongoing deep personal reflection that questions the underlying influences and constraints in the way I am thinking and seeing.

What is action inquiry?

I initially adopted an action research process along the lines of Kemmis & McTaggart (1982). This involved a *'plan, action, reflect'* iterative cycle. The action research of Kemmis and McTaggart requires considerable attention to goal setting, planning and following an established process in order to ensure procedural rigour. However, Argrys et al (1985) warns about setting a paradigm for action research, which involves setting goals seeking firm outcomes. The researcher should be aware of what attitudes about their research that they bring to their research (as opposed to theoretical or value positions). An attitude where the researcher shifts from wishing to achieve specific effective *outcomes* to wishing to achieve an effective *process* will open up the research, enabling greater participation of others and new ideas and possibilities to emerge. This means being reflective about how the process is enabling the attainment of valid information, free and informed choice and internal commitment.

Torbert (1991) describes action inquiry as *"knowledge gained in action for action"* or *"consciousness in the midst of action"*. So my research process is actually an iterative spiral of *planning or intent, trial, feedback, reflection, theorising, planning* etc which may be happening as I am *in* action as a teacher (where I am responding *in the moment* to student response and then modifying what I am doing), **or** is being done at separate and distinct times. In order to capture my 'in the now' *inquiry in action* process I am recording through journaling my actual experience and then reflecting on this experience using a phenomenological interpretive approach.

A more staged formal approach to the cycle includes getting student feedback via interviews, journals and questionnaires and then applying interpretive and analysis methods to these 'field texts' as suggested by Connelly & Clandinin (1988). Then, using this information new plans and strategies can be developed for further research, linking to appropriate theoretical frameworks. Previous understandings might be reinforced if the implementation of new activities seem effective, and those that fail perturb to new insights.

As well as having a planned process / cycle I have also tried to keep an open mind, being ready to listen for whatever happens without having specific expectations or intent - providing space for surprises.

I find that action research now becomes a way of life and not something I can switch off. I am constantly examining my experience - whatever I am doing – whether in conversation with friends or playing with my nephews. I find myself almost being *too* reflective, *too* eager to seek meaning and create new actions…. and forgetting just to *be*.

How does one achieve authenticity and trustworthiness in the **action research** process?

The problems with research of this kind and the responsibilities of the researcher are well described by Clandinin & Connelly (1994). Can I claim to know the other? I can't even claim to know myself! My research relies heavily on my interpretation of what is going on around me. I am making assumptions about students and colleagues that are based on conversations, observations, my journal reflections, their journal reflections and interviews with them. I am making them through my own interpretive lens of which I need to be constantly aware.

By using a hermeneutic discourse process over long periods of time I can deepen my understanding and appreciation of my students. I can provide space for their voices and teach myself to listen with care. I find mindful practices help me in being more fully present to their states – seeing their body language, their energy, hearing their voice and listening for what is unsaid. With all these clues I still can not claim to know. I have to be mindful not to bring my history with them to cloud how I see them *this* moment, yet still use this to help me read the clues in order to see beneath the words that they say.

By providing a caring space between us (not just informed by ethical tactfulness, but also the deep loving *natural care* of Noddings (1984)), students can trust me and thus be honest and tentative in reflecting on themselves. In this moment I am not just seeing who they *were* but also how they *are becoming* as this act of self-reflection creates change.

By providing a spiritual space within me I invite them to share their deep being and when I listen in this space perhaps I connect with their souls as well as their voices. This is perhaps the *mind-body* connection that Heshusius and Ballard (1996) suggest are important in interpretive discourse….

Fig A1.1
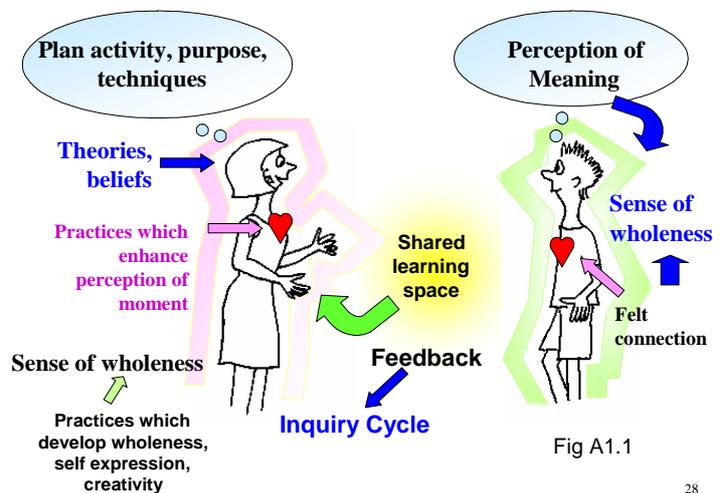
embodied discourse. That we go beyond rational knowing and knowing through feelings, into direct modes of knowing. That in this place of *embodied discourse* we can break down the separation between self and other. This is now using *seventh moment* research techniques (Lincoln and Denzin 2000) where we value the sacred.

But do I really know? In this spiritual place I have participated in a *transient moment of being* with this young person. How do I capture it? Their verbal discourse does not illuminate the whole.

I capture it through impressionistic writing (Taylor 2002) of 'field texts' where the narrative tries to capture the whole - the feelings, the student/teacher connection, the body language, dialogue, competing needs and underpinning values. It is so important to capture the *heart* of the words, the underlying humour and the humanity. So now I have captured

lasting images in my journals as well as the memories in my head which are constantly being 're-membered' in context of my new meaning-making structures.

Yet even these stories/texts in my journals can be read and interpreted in a different way according to my need. I find in the process of the action research cycle I look at them from different stances as described by Torbert (1991) – how can I use this to design an effective activity, how can I use this to understand principles of learning, how can I use this to understand systemic relationships, how in reading this and reflecting on it am I changed? And how do these different field texts relate? What are the themes? What is the essence that is being revealed here? Where does the meaning lie? So I am now engaged in a process of hermeneutical phenomenological reflection.

Using **triangulation processes** as described by Denzin (1988) can also assist in the trustworthiness of the research. One aspect of triangulation is ensuring other perspectives are taken. Now there are the different perspectives that I take as a result of the stage of conceptual framework that I am at. But there are the perspectives of others. As well as using my students' voices and texts in my research, I have also used a professional researcher to run a focus group for my 1998 Physics class (see Appendix 6 for her report). I have had other teachers and lecturers in my classrooms giving me feedback.

I have also sought other perspectives on my ideas about learning through running workshops for science teachers and gaining feedback. I was able to test many of my understandings through dialogue with colleagues, my husband and educational discourse groups, enabling me to move to meta-understandings of these ideas I was playing with. Then the test was in the pudding… how well did my ideas lead to better learning, enjoyment and improved outcomes for my students?

There is also triangulation in the instruments used. I used conversations, student work, questionnaires (including the CLES survey – Appendix 8) exam results, student journals and taped and video taped interviews, … as well as my own personal journals which also include 'field texts', poems, concept maps, diary entries, cartoons, fictional stories.

Broadening my research questions

Now, all this exploration into research methodologies had another impact aside from just situating my own research. Authors such as Guba and Lincoln (1994) and Wilber (1998)

really criticised the scientific method. Initially I agreed with them, thinking quantitative research was inappropriate in the human sciences. Then I started questioning what they defined as science. I began to think that their view of science was an impoverished one that had little to do with the way I had done science as a research scientist in a paper mill for three years. This really niggled at me and I started questioning *what is science really?*

- o What would a holistic science look like?
- o Is science changing and growing - can it include qualitative forms of research and still be science?
- o How can we know anything?
- o What are students' beliefs about science and where do they come from?
- o How can I get students to think critically about the process and nature of science and what are the benefits?

So now I had three strands that started interacting and informing each other – *holistic principles*, *holistic practice* and *research epistemologies*. Soon it was to be joined by a fourth - *communicating* to the reader. For me, all these strands were problematic individually as well as in relation to each other - usually the research method is independent of what it is that one is studying but in my case it became an essential part of *what* I was studying. I spent the next year reading and trialling what it meant to research with rigor, to teach with moral tact, to empower others without manipulating, to help construct a reader's understanding to empower without patronising.

My efforts to make meaning of what I was doing for myself and for a reader, and how to teach in meaningful ways merged with developing ways of helping my journalism students make meaning of their writing for others. All of a sudden in both science and journalism I had found that in my effort to create frameworks and develop epistemological metaphors to inform my understanding I was encouraging my students to do the same. In their modelling of their ways of thinking and knowing the world they stumbled upon intellectual freedom and discernment. For some, they will never be the same; particularly in the way they perceive the world.

I couldn't help it but it seemed that I was caught in a fractal (as opposed to a time warp). Is this what it is like to do holistic research, I wondered? Connectedness; synchronicity; systems within systems; living the question, the answer, the process simultaneously; emergent systemic properties greater than the parts; a relational dynamism; a cosmic joke

full of ironies. And probably the most important in terms of the rigor question, the researcher in turn becomes the researched - an integral part of the research process.

I had found in asking what it meant to *teach* holistically I couldn't separate that from what it meant to *research* holistically or *write* holistically or *think* holistically or even *be* holistically.

And who is this holistic being who *is* me? In 1998 I spent some time remembering and re-contextualising the experiences of my life and my teaching in an effort to critically reflect about the influences which had shaped my way of seeing and being in the world. I was engaged in autobiographical narrative as suggested by Connelly and Clandinin (1988) as a way of exploring my personal practical knowledge. It wasn't for the purpose of publication, but for the purpose of critical self-study. It was a peeling away the onion layers; seeing where my culture and my history had created this person I was now. As I remembered, I re-storied it and drew from my past experiences greater and greater meanings and connections.

It forced me to a new perspective of seeing; in fact I had now developed new conceptual frameworks in which now to interpret my world (as described by Yorks and Marsick (2000)). Again I storied and now my history shifted again. It could be interpreted in another way and connect in new meaningful ways. I now saw myself, not as an independent being, but as someone whose definition was only in her relationships with the world and the story she chose to tell of that. My history (mystory) was in itself a construct. How could I ever ensure rigor now, when even the tools/perspectives I could bring to examine myself were shifting as well as these assumptions, intentions, values and history which were loosely attached to this being called 'Sue'. I am now fully into relativism and I am questioning everything.

Where is the ground that I can stand on and from which I can anchor my research? Can Torbert's notion of *critical subjectivity* help me here? Can I walk the tension of being in this place of continual critical reflection without blowing up? Am I now too overly aware of the dangers of self deception in research (Salner 1999)?

And yes for a while I did blow up and it was not pretty.

I know now I cannot represent reality. I wonder if I can even represent my own experience of reality. Because even that changes now as I move into different perspectival views.

Salner suggests that a solution to the trap of self-deception is the collaborative process where one's meanings get tested by working with others.

In 1999 and 2000 I was coordinator of a collaborative action research project with at a university physics department. It was a co-operative inquiry project with 5 university lecturers looking at improving the learning experience of first year physics students. This provided me with a major test of my own understanding of effective pedagogies in the teaching of science. It challenged me to find inclusive ways of assisting others in exploring new ways of teaching and conceptualizing themselves as teachers.

It honed my interview and observation skills with students and gave me confidence in my ability to understand and represent student voices. This project was carefully researched using various instruments and acted both as triangulation as well as a prompt for my own research, particularly in understanding what it meant to be a *practicing scientist* as opposed to *science teacher* or *science student*.

Perhaps this was an anchor? But I continued to unfold and unpeel and perhaps like a caterpillar needing to push against the cocoon in order to harden its wings this was a process I need to go through before I could move to the next stage. And this stage is the deep emergence and experience of spirit. Oh dear, yet another perspective. But now at least I truly have a lived experience of what the mystical stages are like. I have sat for a while in these places and they have given me perhaps the insight to make meaning of the essence of spirit and how it can be present in what we do. I can now interpret my experiences again with another layer of meaning or realization.

Synthesising through storying

So, now, in 2000 and 2001, I make an effort to capture the questions, the processes, the reflection, the theorising, and the outcomes of these last few years. I draw on all my experiences of the previous few years: my relationship to my classes (journalism, physics, pastoral care), my students and ex-students, my colleagues, my role as mentor for student teachers, my role of running professional development for teachers, my role as coordinator / researcher at the university physics department in *and* my inner life.

I start to write up my thesis as a novel with characters drawn from my experience of science teachers. Each character represents a different development stage as suggested by Torbert

(1991). And so I put them into interaction with each other, playing out through dialogue how the different perspectives interpret and make meaning of my research. It was playful and enabled me to express myself in each of these stages… all of which I had visited in my journey. In this way I incorporated the difference stances without necessarily saying that one was better than another, except for one who still a bit of a dinosaur. I was engaged in a multiple voicing technique as suggested by Gergen and Gergen (2000) which doesn't try to resolve difference through coming to a singular, integrative conclusion, but rather helps to keep pluralities alive to provide deeper meaning.

This storying was an important part of my meaning-making process and helped me to integrate as well as make explicit what good learning and science looks like. I made some major insights about science and the limitations of our current conceptualisation of what science is. I was able to stand back from my entanglement with my own spirituality and extract some essences.

I now revisited the literature on Holistic Education and Spirituality in Education finding a new range of literature had opened up before me. (e.g. Tacey 2000, Nakagawi 2000, Forbes 2003, Nava 2001, Palmer 1998, Krishnamurti 1983, Kessler 2000, Zohar and Marshall 2000, Miller 1996, Gerber 2001, Wilber 2000a, Wright 2000). Whereas before I was reading the available literature from the eyes of a classroom practitioner, looking for practical implications for the classroom, now I was reading with a mind to cohesive theories and understandings – *How can spirituality be at the forefront of curriculum discussions? How can it inform whole program planning? What ways of thinking about whole curriculum structures can support spirituality?* I was more interested in the big picture – extracting essences and themes.

I was also reading with a view to writing about the literature and its implications. So in my reading I had moved from someone trying to *construct their understanding* of the text to the act of *reading-writing* as described by Spivey (1995) which aims to look at what might be cohesive, relevant or usefully disconfirming. And in this process my interpretive lens ensured a certain selectivity.

Moving into an integral perspective

And then I collapsed because I had been trying to do all this with Chronic Fatigue. I took a break from it all – went and enrolled in a Year 12 Art Course alongside students I would

normally teach … and learnt so much from being a student with them. As a developing artist I discovered that the world does look different when perceived through the lens of an artist as opposed to a scientist. I had been able to broaden my perspective of the world from the empirical/critical lens of the *scientist* and the inner lens of the *meditator*, to the lens of the *social scientist* as a result of my doctorate studies … and now to the lens of an *artist*. The art was no diversion but an important element in my understanding of what it might mean to experience the world integrally.

In 2003 and 2004 I started back part-time teaching a maths class for 'students-at-risk' while developing a career as an artist. Maths was the opportunity to try out my understanding of Holistic Education and principles; however it challenged my notions of Holistic Education and I realised I needed a much better structural understanding of human development. Enter Integral Theory.

Ken Wilber had been a key referent for me during my 1996-99 action research process … he had continued to develop his models to the point of what is now called Integral Theory (Wilber 2000a). I had engaged with this model in 2001 before I had collapsed and now I revisited it. I discovered that he had come out of seclusion and was now engaging many sectors of the community and disciplines in conversations in how this could be applied to their practice.

In late 2004 I became a participant in the Integral Theory Educational Theory group who were looking at exploring how Integral Theory could be applied to education. In the group we had people from Steiner and Montessori backgrounds, high schools and universities. I was providing a Holistic Education perspective. Although I was just a small contributor in this group, I have been involved in many long and detailed phone calls and forum conversations which have been so helpful in my teasing out aspects of the theory. As Wilber continued to write and publish online we would take on board his new theories. Representatives of the group had regular meetings with Wilber taking our questions and understandings and checking their interpretation.

This process of dialogue has been essential for me in engaging with Integral Theory at the level where you are not just an isolated person applying it as you wish (which had been the case in my application of other theories such as Egan (1986)), but rather in a very disciplined and rigorous testing of what we are coming to know in a consensual community. There is so much to know and I have only scratched the surface, but I hope that this process of

hermeneutical dialogue has at least helped align my understandings to others in the field of Integral Education.

So now, in 2005, I find that I can move from the messy richness of my whole experience and structure it using Integral Theory. I have moved into another sort of reading – looking for cohesiveness between development stage models, revisiting my earlier influences (spiritual, ecoliteracy, new science, feminism, holistic) and seeing where they might be positioned on Wilber's framework. Not because I want to organize everything and have it in its place, but because I believe that it can help me see beyond the trees to the forest…. which in turn is just a stepping stone to another way of knowing and being in the world. In revisiting I find so much I had missed in my earlier readings. I am able to draw forth key essences and questions as I am involved in the process of trying to understand the inter-relationships and inter-weavings of the different perspectives.

I now begin to explore curriculum metaphors (Doll (1993), Schubert (1988), Davis (2004)) looking at how they might be positioned on integral theory. I see myself moving from the *pluralistic mind* of research – the personal lived experience – now to the *systemic mind* … organising into grand schemas.

And how do I know that these grand schemes are any good?

This understanding I have of whole curriculum and curriculum metaphors is valued by curriculum implementers and designers… I am asked to be a critical friend to a high school implementing new curriculum as well as being a critical friend for the curriculum review process for the revisioning of Year 11/12 curriculum frameworks. This provides a very practical test of all these big ideas and I find that these organizational tools enable me to hone into issues which seem amorphous to the school leaders but make sense when understood from this big picture perspective. My role seems to be asking questions which help people lift into new ways of seeing their current issues.

I find that that the integral model is a powerful lens in helping me personally understand the different ways of experiencing Holistic Education in my quite diverse subjects. It helps me re-story Holistic Education and give it structure and rigor. I can see where different aspects can be related in the spiral dynamic model and therefore why it has been so difficult to easily pin down. I am ready to write.

Writing as Inquiry

2005. So what is my thesis about now? It has morphed as I write it. I am not merely using integral theory as an interpretive lens for my own lived experience, but also using my lived experience as a way of putting flesh on integral theory in the context of education.

I am trying to situate Holistic Education on integral theory and use both as a way of informing our current Year11/12 curriculum review. I am writing about enchanting physics, experiential journalism, dysfunctional maths, creative forums, the problems with science education. I am teasing out what I really mean about spirituality and really mean about science. I am asking who I am and what has informed me. I write, and reflect, move to new spaces and then write with greater insight. I am releasing, interpreting, creating, understanding. It seems that I am trying to capture the last 15 years of my life. Is this a thesis, or is this therapy? Yes, let me lay on the couch for a while.

I notice sometimes I just rant; all my frustrations and suppressed agency surfaces. Other times I write in a way that surprises me with its beauty and insight. There is so much here. I become selective, very selective. I explore further some aspects; try to provide some distance and detachment, some academic rigor. I try to be creative allowing myself to write in different ways that might reveal different aspects of self and the issue. I use the techniques of Bateson (1972) – creating a tapestry, rather than a single thread – using metaphor, dialogue, and monologue to create different spaces where meaning can be made in the space in between. Some writing might cohere with the whole, while other creates a dissonance. Sitting with these and allowing the meaning to emerge over time pushes me to new levels of insight. I am an artist, expressing self on a messy canvas, and I need time to sit back and interpret what I have done.

I am going deep into myself. This writing includes rational states alongside the transpersonal and so my process has also incorporated transpersonal inquiry processes (Braud and Anderson 1998) which value dreams, incubation, meditative insights alongside reflective rigor. So this process of writing is alert to the intuitive nudges I get; the need to go find a book, remember an incident, look for a specific journal entry, phone an ex-student. So my subconscious also becomes a selector of what needs to go in, as well as my rational mind. I open myself to this process, knowing that whatever is selected there will always be bias, and perhaps I can trust the story within to know how to emerge. I am using Wilber's *vision-logic*.

I am trying to balance my writing with the *eye of mind* (interpretation and analysis), *eye of senses* (empirical data and experience) and *eye of the spirit* (meditation).

And this writing is no longer constrained by my thoughts of an audience. I can even let go my earlier attempts in 2000 and start afresh, enabling *this* current me to find a way to tell this complex story. It is me trying to express the multiple dimensions of my reality… to honour the diverse voices within myself and the fractal layers in the education holon.

In the process of this writing emerges some deep understanding about the nature of spirituality and the nature of science and how these can be integrated. I begin to derive perspectival models of development for science education and models to incorporate spirituality as a key part of our curriculum. I am excited and I share these with others and get some positive feedback and some puzzlement.

I have moved from the *action research* of Kenmmit and McTaggert, to the *critical action inquiry* of Torbert, to the deep self-study *heuristic research* of Moustakis (1990) and now in this process of writing I have found a new process… *writing as inquiry* as explored by Richardson (2000) and van Manaan (2003).

Perhaps I am entering into the aims of *seventh moment* research (Lincoln & Denzin (2000)):

> This is interpretative research that refuses to retreat to abstractions and high theory. It is a way of being in the world that avoids jargon and incomprehensible discourse. It celebrates the local, the sacred, the act of constructing meaning. Viewing culture as a complex process of improvisation, it seeks to understand how people enact and construct meaning in their daily lives. It celebrates auto-ethnography, the personal account, "-'mystories', myth and folklore.

Epistemological tensions

I now send this writing to my supervisor, Peter, who gives me a one word response several months later after reading several chapters - "magnificent." He will read the rest soon. I am heartened. But when he gets back to me in March 2006, he has questions for me. What is my epistemological stance that each style of writing is representing? How does one bit connect with another bit? Is there supposed to be a chronological thread or a propositional thread? Where is the coherence? Am I over-claiming in this bit here? How can I make my epistemology a lot more present so the academic reader knows how to judge the quality of the research?

We spend an intense two weeks discussing issues and epistemologies. He suggests that perhaps after all what I have been doing is an *auto-ethnographical study* – enquiring into my own experience in context of the educational and science cultures.

"What!" I think. Not another epistemology! Do I need to start again? I now have a pile of papers to read on auto-ethnography. I find my brain only being able to take so much of the academic explanation of what these methodologies are. I much prefer to learn through the connective knowing of Belenky et al (1986) – through personal stories, getting inside someone's head and seeing what something looks like, smells like, sounds like. By accident, in a google search for something else, I come across a Master's dissertation by Narumol Reungnum (Mon), a student of Peter's. It is an auto-ethnographical exploration of her as a science teacher in a Thai culture.

What she is describing is the conflict between two value systems. It not only gives me an exemplar of an auto-ethnographic study using conversational style writing, but the notion of cultural conflict really resonates with me. Her dilemmas directly speak to me through her story and remind me of my own dialectic - trying to walk the tension between science and spirituality. I remember my novelistic writing attempts of 2000 where my different characters represented different aspects of myself – Dan represented the science self, and Mei, the spiritual self. I had put them in dialogue with each other then, but had forgotten that in my 2005 writing. While the dialectic was implicitly there, I had not really used my conflict as a tension which moved the story forward.

I now speak to Peter, and he says to me, yes, he should have thought of it earlier – that Mon's situation was very similar to mine – that he should have realised that really what I was doing was a cultural study (my spiritual culture was foreign to Western science in a similar way that an Asian or African culture might be.) He gives me a paper (Taylor 2006) in which he describes how the conflict between these two cultures (say, a Western science culture and the person's home culture) creates perturbation and growth, resulting in not just transformation of the person who is trying to resolve the conflict, but also transformation of their understanding and practice of their own culture and of science. And this reconceptualisation can become something that can enrich our collective understanding of science or of the home culture. There is a third space where both cultures are able to grow – value-added by the influence of each other.

I read this and I am going "Yes! Yes!" This really explains well my own journey and now I wonder if I can use this to help me structure things in a new way. I wonder if the explication

of my journey can help grow the science and science education communities' notions of what science education can be? Can I write in a way that might create praxis for science educators? Perhaps they are my audience, whereas before I had thought of Year 11/12 curriculum planners as my audience. Perhaps I can extract this one thread out of the complexity of my 2005 writing about holistic and integral implications for whole curriculum visioning and just focus on the science thread?

How can I represent such a journey? I imagine cartoon heads – science and spirituality – eying each other off at the beginning of my teaching experience and then gradually throughout my study being a lot more interactive and learning from each other.

So perhaps I can put in a chronological thread – my own journey of how my ideas changed and the impact on me. The playing field for this was my physics classroom and I realise that there is a third head here – my pedagogical head. Now this head I had fully explicated in my 2005 writing, reflecting on my key notions of pedagogy and the experiences that shaped them. I now thought perhaps I could use some of this and also make more explicit my science and spirituality heads.

So now I start writing (which is Part 2) of this study, using some of what I had written about my physics experience before but now contextualising it in a story of evolvement and transformation. I began to realise that there were key themes which I could extract and make into major chapters. At the end of each chapter I ask my science, pedagogical and spiritual heads to reflect on where they had come.

But I still liked the Bateson notions of creating both disconfirming and confirming experiences, so to counter the chronological, logical development I decided to use interludes at the end of chapters to create different spaces.

In my epistemological notes at the beginning of Part 2 I go into more detail about the inquiry issues and processes so I won't repeat those here. (For example, my use of lived experience methodologies of Whitehead (1998) (creating 'living educational theory') and the seven inquiry modes of Henderson and Kesson (2004).)

So now as I write this story I am integrating some of the writing from 2005 which is in a different voice and needs to be rewritten into a more speculative voice. I am trying to create impressionistic vignettes which help place the reader more into my experiences. I am wary of my role in interpretation; not just interpreting another's experiences but actually trying to

explain and model them. Am I being too modernistic? Is this modelling helpful beyond helping me to explicate my own thinking? Does it help others or is it too simplistic? Am I being critically self-reflective enough; not just in my interpretation about my past experiences, but in questioning the modes of inquiry I am bringing to interpreting these experiences? Or am I lost in the moment of re-telling my story? What is the academic rigor that I am bringing now?

I am also concerned with the amount of material. Do I need to put it all in? Can I say it with less? Should I be telling my story as it is, or trying to capture key bits as essences? How can I write about others without being denigrating? How can I balance the need to provide a sense of characterization and dramatics (Taylor 2002) for my impressionistic vignettes, with the fact that these characters are easily identified?

I am trying to balance too many academic requirements and epistemologies. In trying to be holistic in my inquiry approaches I worry that I might not be academic enough. Yes, I am perhaps trying too hard to cover all of Wilber's quadrants in my inquiry.

4 Quadrant Integral Theory

Upper Left: "I" Interior-Individual	Upper Right: "IT" Exterior-Individual
phenomenology, psychotherapy, meditation, emotional intelligence, personal transformation	empiricism, scientific analysis, quality control, behavioural analysis
Lower Left: "WE" Interior-Collective	Lower Right: "ITS" Exterior-Collective
hermeneutics, multiculturalism, postmodernism, worldviews, corporate culture, collective values	systems theory, social systems, communications networks, systems analysis

Fig A1.2

Yet this process of inquiry has moved me to a new place; in writing about this transformational journey that I have being on and interpreting it through integral theory I now feel a lot more balanced – not just in myself, but also in the way I think about integral theory. I realise that some of my 2005 interpretation and analysis was quite simplistic and perhaps now I am able to see things a little more complexly. I am really concerned about the process of even trying to interpret experience through cultural and transformational models of development.

Part of my dilemmas in research are explained by Taylor (2006) in *Contemporary Qualitative Research for Science and Mathematics Educators*. I have been doing this research for a long time and the field of qualitative science research has grown from more practical styles of research closer to experiences of scientists (lived experience, auto-biography, action research) into much more critically self-reflective, post-modern research.

Some of my crisis of academic rigor stem from the reflexivity between my own transformation in perspectives (and particularly a flourishing of plural mind) and the research I was doing. As I grew, the type of research changed, and I changed as a result of the type of research. Denzin and Lincoln (2005) describe a scheme of nine moments of qualitative research. When I look at them I feel to some extent that I have been on that journey perhaps up to the 6th moment. It wasn't that clear at the time – because I was reading research papers that crossed different 'moments'. I was sucked into a particular point of view. I look at the criticisms of each moment and I think "Oh my God, I was and maybe still am guilty of that."

My conflict with spirituality and science has been one where I would like to reject modernism, but I can't because it is so much part of my make up as a scientist. I have been guilty of modernist interpretations all the way through my writing as inquiry – trying to pin down an 'objective truth'. It is a function of my need to have understanding. I can't just be in the world… I need to make sense of it.

Engaging in a spiritual life opens the door to other ways of being. I look at the nine moments and I feel sad that I have succumbed to a modernist need for interpretation. It is interesting that when you look at the perspectival levels that the *integral mind* level rejects excessive model making and

Nine Moments of Qualitative Research

1. Traditional Period (1900 -1950) – in which the heroic, lone field worker romanticises his subject in accordance with social realism, positivism and objectivism.

2. Modernist Phase (or Golden Age of the Social Sciences) (1950 -1970) – researchers as cultural romantics with emancipatory ideals valorize tragic subjects and critique social structures using the language of positivism and post-positivism.

3. Blurred Genres – (1970-1986) – naturalism, post-positivism and constructivism prevail, qualitative researchers become sensitive to the politics and ethics of their world, stop privileging their own interpretative voices, and produce multi-perspectival "thick descriptions" using Arts based genres.

4. Crisis of Representation (1986-1990) – research and writing become a lot more reflexively aware, a new politics of textuality contests the authority of the empirical sciences to represent the world of lived experiences, fieldwork and writing blur, writing as method of inquiry merges

5. Post-modern experimentation Ethnographic Writing (1990-1995) – researchers responding to the ongoing triples crises of representation, legitimation and praxis experiment with different ways of representing the 'other'; a major focus on participatory research and generating theory from small scale problem-solving research in local contexts

6. Post-experimental Inquiry (1995-2000) – researchers focus on novel ways of portraying and politicising lived experience via fictional ethnographies, ethnographic poetry, multi-media texts, visual form, and co-constructed multi-voice representations.

Fig A1.3 (continued over page)

interpretation and is searching for ways of pure being… but when you move onto the transpersonal levels there is an acceptance of all of life and all of experience, including the need for modernistic explanations. And when one looks at the quadrant model in Integral Theory you can see that all approaches are valued. So perhaps these 'moments' are not something we grow out of but which we *transcend* and *include*, finding those partial truths from each aspect which inform the whole, spiralling upwards in ever more spacious views.

So where is my research situated now? Can I proudly stand up and say I am happy with what I have done? Well, I feel it is the best that I can do for now. I may not perhaps have fulfilled all the requirements for

Nine Moments of Qualitative Research (cont)

7. methodologically contested present (2000-2004) – a time of debate and struggle born of massive deregulation within qualitative research and of political contestation with conservative regimes (that make claims regarding truth) over what counts as 'valid' research.

8. The immediate future (2005 -   ) – social sciences emphasises a social justice purpose, the rise of indigenous social science(s); decolonisation of the academy via graduate research and culturally diverse faculty; social scientists transforming their own institutions via "liberation methodology"

9. The fracture future – academic work as political praxis; generation of new ethics, aesthetics and teleologies for a globalised world.

Denzin and Lincoln (2005)

Fig A1.3

academic rigor in any one category – I am perhaps 'blurring the genres' too much, but I have tried to bring a critical self-reflectivity to this process which is not just one based on the *eye of the mind* but also draws on insight from the *eye of the spirit*.

Am I trying to find my way into a 10th moment – could it be *the integral future*? Perhaps this moment is one where integration occurs in the holistic experience of the one doing the research. Perhaps this moment includes and transcends the others and a key to it is the taking of the researcher on a transformational journey that is particular to them and their soul needs. The research method then is appropriate to who the researcher is and needs to grow reflexively with them. If the aim of research is *praxis* (creating change in the world) then to transform the world, transform self.

And with that she rotates her shoulders. Smiles and thinks about a shower. Yes, is that the time? I have to plan my journalism class tomorrow. It is going to start with a visualisation… a deep experience of their sense of place in the world and cosmos and then when they are fully in their quiet inner space I am going to ask the students the following questions. Who are you? What is your deep passion? What do you like to be? What are your questions? What vision do you have for yourself?

And we will see what happens next.