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**Dancing in the Light - Middle years students' and teachers'
perceptions and perspectives on inquiry leaning**

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*Teachers are perhaps like choreographers.
They can provide the initial inspiration; they can plan the steps.
They can rehearse the skills; they can tell when the performance is ready.
But does a choreographer exist without dancers?
The dancers improvise and change the steps.
They bring their own unique skills and abilities.
They bring their own creativity.
But at some point, when the curtain goes up the dancers are on their own.
They follow their passions; they solve the problems that arise.
And the choreographer stands behind the curtain in the darkness
Watching the dancers in the light.*

(Steven Seidel – Plenary Session, Harvard Project Zero, 2007)

Abstract

This phenomenological study investigated an integrated inquiry learning program in an Australian school from the perspectives of year 8 and year 10 students and their teachers. Inquiry learning features significantly in the recommendations for practice in the middle years of schooling. This research aimed to identify the elements that students and teachers felt were essential for an inquiry learning classroom. Identifying these could have implications for not only implementing inquiry in schools, but also in structuring teacher professional learning. The essential elements identified through this research were respect, importance of discussion as discourse, planning, valuing uncertainty, co-learning and teamwork, and reflection. Students did not criticise inquiry learning, but did express concerns about their preparation for formal examinations in their senior secondary years. Teachers identified the skills in planning around concepts and central ideas and using reflection effectively as challenging to inquiry in practice.

Introduction

Since the 'Turning Point' study in the USA (Carnegie Council, 1989) and 'From Alienation to Engagement' in Australia (Cumming, 1996) there have been studies worldwide describing the decline in student enjoyment in the middle years of schooling starting in the upper primary years and continuing through to the start of senior secondary school (approximate age 16). Many students in these studies described school as boring. The lack of engagement in learning affected not only students' learning progress but many other aspects of the educational experience of young people (Hargreaves, Earl & Ryan, 1996).

Researchers, both in universities and schools responded to these concerns by recommending changes, primarily the need for teachers and schools to develop approaches that were attuned to the characteristics and needs of young adolescents. They recommended constructivist strategies such as student involvement in classroom decision-making including the ways learning was organized, monitored and assessed; integrated learning that was relevant to students' personal and social concerns and their

out-of-school experience and culture; active learning experiences; opportunities for group and independent learning; engagement in complex, higher order thinking and critical discourse to develop deep rather than surface learning (Beane, 1993; Brooks & Brooks, 1999; Chadbourne, 2001; Cumming 1998; Erickson, 2002; Hargreaves et al, 1996; Hill & Russell, 1999; Marks, Newmann & Gamoran, 1996; Wehlage, Newmann, & Secada, 1996).

Constructivism and inquiry learning, although sharing many similarities are not synonymous. Inquiry learning goes beyond students constructing their learning and Vygotsky's zone of proximal development. Inquiry learning supports Dewey's belief that all parties should be transformed, not just the student (Wickersham, 2002). Inquiry blurs the distinction between teacher and student and sets the foundation for co-learning and problem posing required for a postmodern perspective on education. Problem posing as advocated by Dewey (1916) and Freire (1970) acknowledges the power of the individual to seek out unique questions to their unique interests. Rather than making the first aim of education to master facts, postmodernists see that once a '...the web of relevance is more important than mere content. Content is relatively easy to master once it is given a framework (Ferguson, 1980, p. 303).

Research on inquiry learning is timely in that schools in Australia and internationally are now considering the impact of globalisation on curriculum development. Content based education, as measured by standardised testing does not completely meet the needs of a globalised society (Pink, 2006). Inquiry supports the changes to schooling required to address the issues raised by globalisation include relevance, problem solving, utilization of the vast potential of information technology, greater emphasis on formative assessment and the engagement of students in constructing their own learning (Newmann, Marks & Gamoran, 1996).

Research on inquiry in practice is also important given the new information from educators and scientists involved in brain and neurological research. Classroom activities compatible with these findings include students asking critical questions and finding their own answers, encouraging students to reflect on their learning, use of simulations, linking music and the arts in general to specific learning tasks, the use of visuals to challenge thinking, physical challenges, collaborative learning and the use of integrated curriculum (Jensen, 1998, 2000; Slavkin, 2004): all are supported in an inquiry environment.

Overview of inquiry learning in practice

Inquiry learning is often linked with the words interdisciplinary, multidisciplinary or integrated. However, using the word 'disciplines' in any form as a starting point for inquiry does not acknowledge the importance of the learner's voice; this is fundamental to the social-centered constructivist perspective on learning. Integrating curriculum around issues of importance to students can offer an alternate to discipline knowledge and skills for framing an inquiry curriculum (Beane, 1997). A more significant shift is to integrate inquiry around concepts and essential understandings rather than issues. There are no simple definitions of 'understandings'. It means being able to decide what knowledge and skills will be required to resolve a puzzling situation and how to transfer what is learned in one situation to a new and different setting (Wiggins & McTighe, 2006).

There are two types of frameworks that support the development of deep understanding through inquiry. The first of these focus on teacher planning and include Teaching for Understanding (TfU-Blythe, 1998, Perkins & Blythe, 1994), Understanding by Design (UbD-Wiggins & McTighe, 2006) and Erickson's (2008) concept based curriculum design. Teachers identify the essential understandings relevant to students as well as the knowledge and skills required to address those understandings. They plan authentic assessment activities that support that development and provide provocation and opportunity for student inquires and primary data collection. I refer to these frameworks as planning for purpose – it is where the 'guiding' of inquiry starts. These frameworks call on the role of teacher as planner with a deep knowledge of their disciplines, their students and local curriculum standards.

The second type of framework builds on Dewey's inquiry cycle, focusing on the generation and development of students' questions (Dewey, 1910; Murdoch, 1998; Phillips & Romaszko, 1994; Short & Harste, 1996; Veermans et al, 2005; Wing Jan & Wilson, 2006). Inquiry varies in complexity depending on the stage in the inquiry cycle, the nature of the questions and the starting point of the student. Inquiry can range from a more structured form where students are provided with data or information to analyse in the initial stages of their investigation, through guided inquiry where teachers present the initial questions but leave the methods, solutions and development of further questions for the students, to open inquiry where students pose all the questions and find the solutions. I refer to these frameworks as planning for possibilities – it requires teachers to be alert to what is happening in the classroom particularly to the emergence of student questions and possible new directions for inquiry.

Under both types of frameworks, activities in an inquiry classroom move beyond entertainment (Brooks & Brooks, 1999; Tomlinson, 1999). They are part of the assessment process of continually informing teachers and students about the development of understanding with its associated knowledge and skills.

Despite wide spread acceptance of the theory and importance of inquiry learning, teaching through inquiry as well as teaching inquiry remain an enigma in most classrooms (Crawford, 1997; Memory et al, 2004; Shore, Aulls & Delcourt, 2008). The academic literature indicated a number of essential concepts or elements that define an inquiry learning environment such as flexibility, use of questions, negotiation, choice, collaboration, authenticity and reflection. However, there was little research into what secondary school students and their teachers perceived as essential elements for inquiry classrooms, particularly in an Australian context.

The present study

This study was situated in a K -10 school of 320 students in a suburb of Melbourne, Victoria. The school has an early learning centre based on the Reggio Emilia approach (Edwards et al, 1993) and is an authorised International Baccalaureate Organisation (IBO) school for the Primary Years Programme (PYP). Inquiry is the required pedagogical approach for the PYP. An integrated inquiry approach was developed for years 7 and 8. Teachers at these year levels worked in teams to develop curriculum around a common central idea. The inquiry approach continued in year 9 and 10 initially with a more single discipline focus, but with integration between disciplines increasing as secondary school teachers became more confident with the inquiry process. This study focussed on year 8 and year 10 students' and their teachers'

understanding of inquiry. These year levels were chosen as both were preparing for exhibitions requiring them to demonstrate their understanding not only of their chosen issues or topics, but of the inquiry process itself.

The purpose of this study was to identify the elements that students and teachers believed were essential for inquiry learning in the secondary years of schooling. This would help identify skills for both teachers and students that must be developed to ensure success. Although this is a single site setting, the findings could offer some inspiration to schools contemplating this path. The study was structured around the following research questions:

- What are year 8 and year 10 students' understandings of inquiry learning?
- What do students consider important elements in an inquiry based classroom?
- Can students in year 10 identify aspects of their experiences with inquiry that have had a lasting impact on their learning?
- What do teachers consider important elements in an inquiry based classroom?
- What aspects of inquiry learning do they find difficult to implement in a classroom?

The data collected for this research on inquiry learning consisted of formal semi-structured interviews of 20 students from year 8 and 33 students from year 10. Five teachers from the Middle School team who had worked with inquiry learning for between 3 and 7 years were also interviewed. To provide more structure for the teacher interviews which lasted from one to one and a quarter hours, teachers were asked to comment on 36 statements on constructivism and inquiry learning synthesised from four sources (Appendix 1):

- elements of inquiry identified from the literature review
- some statements from the Constructivist Learning Environment Survey (CLES – Taylor et al, 1994)
- some statements from the Teacher Pedagogical Philosophy Interview (TPPI – Richardson & Simmons, 1994)
- some statements from Inquiry Teaching Beliefs instrument (ITB – Harwood, Hensen & Lotter, 2006)

The main purpose of the cards was to provoke discussion and to ensure that a wide range of inquiry experiences were addressed.

Results and Discussion: The essential elements for successful inquiry classrooms; implications for practice and teacher professional learning

After separate coding and identification of themes, the interviews of teachers and students were meta-analysed to identify the elements common to both. Elements were also identified that were explicitly perceived as important to teachers but only implicitly referred to by students. The essential elements for inquiry learning identified through this process were:

- Essential elements identified by students and teachers:
 - Respect
 - Importance of discussion as discourse
 - Co-learning and teamwork
- Essential elements explicitly stated by teachers and implicitly by students:
 - Planning and valuing uncertainty
 - Reflection

None of these elements existed independently of each other. It was impossible to isolate them, yet each offered a unique perspective through which to view inquiry.

Respect

Several students included 'respect' in their personal definition of inquiry learning and teachers and students used the word explicitly in many of their interviews. Students interpreted respect as having their individuality and independence recognised.

It think it [inquiry learning] keeps it very like respectful and very understanding about what we as a person want to learn rather than... They don't look at us just as a whole group they look at all of us individually and that's why it works so well here 'cos everybody can learn at their own sort of rate and with what they are better at and what they're not as good at (Year 10).

Individuality included not only learning styles and choice of text types but also issues of personal and social relevance. Students' interpretations of 'relevant' were never trivial. Year 8 students' examples of relevance included, 'how the media uses photographs', 'about the war in Israel,' 'how governments work' and 'how to get along with girls'. The emphasis changed slightly with year 10 students to include not only genocide and poverty, but 'how to do taxes' and 'how to write exams', the latter two certainly of relevance as students took on part time work and started to consider the implications of senior school.

Respect through relevance and independence, requires a power shift from authoritarian structures to one where students have real choices. Surprisingly, one student gave 'no detentions' as her definition of inquiry learning and several others offered it as an example of what they valued most about inquiry based classrooms. This school does not give detentions, but several students who transferred from others schools pointed out the detrimental impact of detentions on respectful relationships.

- *I think it's kind of a good strategy [inquiry] to have in a classroom because we get to take on what we think is more interesting rather than just what they wants us to do (Year 8).*
- *You have a choice. You're not told to do anything, you choose to do it. You're not forced (Year 8).*
- *If the teachers aren't' going to respect the students they can't expect the students to respect them. Just constantly giving out detentions isn't going to do anything. I'm not going to respect someone who does that to me (Year 10).*

Students made the connection between what they saw as an authoritarian and disrespectful environment and a lack of time.

There were a lot of students in a lot of classes and you had to get places quickly, and teachers.. if someone was doing something wrong, or if you couldn't understand what they were explaining, usually they would like, shove it out of the way because there was just so much going on. They just didn't have enough time, and they were a bit more sort of like giving out punishments just to sort of, control them more (Year 10).

Time was the environmental component that was essential for building that respectful basis for inquiry. Many students commented on how much they valued one-on-one time with their teachers and feeling that they were known and understood. Some

considered this a product of small class sizes¹, small school size or longer class times². Others felt that it was also result of teachers working differently - ‘walking around helping’ or ‘sitting and talking’. This translated into feeling ‘relaxed’, a work used or implied in many student interviews.

- *It's [inquiry] more one on one time teachers with the students (Year 8).*
- *All the teachers know you're name and everyone says hello to everyone else. The teachers are way more relaxed about things in class... They don't give out punishments for small things, and like, things still get done, you know, so it's way more relaxed but still everyone learns and stuff.*
- *The positive atmosphere and then you're able to work relaxed. Like all the teachers here have got really relaxed personalities that suit the school. Relaxed is a bad word to use. ...Understanding?(Year 10)*

The importance of respect with its connections to relevance, independence, choice and change in power structures was also echoed in the teachers’ interviews. References to textbooks, as in the quote below, were interesting as both students and teachers considered them unnecessary. They did not include issues of relevance to all students and inferred control. Teachers considered time as a significant challenge to inquiry. The challenge was not so much lack of time as the need to use time differently- to slow down and allow time for questions to develop.

- *I think the fact that I respect the kids so much gives me the chance to say, “I trust you to come up with your own questions, your own decision on this. ...Yeah there is a big degree of trust in this process.*
- *[Inquiry is] allowing the students a bit more time and space to actually wander and investigate things, and allow students to manage that rather than everything being directed from the textbook or teacher.*
- *I don't think that I allow enough time because I want to move on. It's like... you listen for the questions. I haven't quite got, I mean I understand, but I don't do it yet. And I think that's partly from the way I operate, you know, things have got to be moving along, they've got to be progressing, and if you stop and wait for things then you're not progressing, got to go, got to go, you know?*

Respect as an essential element encompasses individual differences including relevance, and learning styles, independence and the environmental component of time.

Implications for Practice

1. Students must have the opportunity to choose inquiries that are relevant to them.
2. Students must be able to use a diversity of ‘texts’ or sign systems to support diverse learning styles.
3. Class textbooks are not useful as they do not address a wide enough range of relevant interests or learning styles.
4. Time is an important component in a respectful learning environment. The advantage of small schools to students was more opportunity for teachers to get to know them. Longer class times and different teaching strategies, not necessarily smaller classes could provide that one-on-one time.
5. Detentions systems should be abolished as students view detentions as authoritarian and detrimental to respectful relationships. They do not support democratic practices.

¹ Year 8 class sizes were 22 students. Year 10 class sizes were 22 students in core classes and 15 in elective classes.

² Most classes were of 80 minutes duration. On one day each week, there were only two classes of 140 minutes duration each.

Importance of discussion as discourse

'Talking with their teachers' was the most common coding in the student interviews. 'Discussion' was also the most common code in the teacher interviews. It was described as the most important method not only to find starting points for inquiry but to help students develop their own inquiries and to assess their learning. The meanings of 'talking' and 'discussion' and 'helping' were complex. Sometimes these referred to teacher with a single student, sometimes with a whole class, sometimes with small groups of students. Sometimes discussion revolved around artefacts such as mind maps, scrapbooks and text. This purpose of discussion for developing understanding redefines it as 'discourse' (Gee, 1990).

Students identified three roles of teachers associated with discourse: supporting, guiding and co-learning. In a support role, teachers encouraged students to follow inquiries of relevance, talked with them to clarify ideas or helped find resources. Sometimes, 'support' meant teachers became a resource themselves, providing a moment of explicit teaching or a definition—the 'teacher thing' so that the conversations kept flowing.

I think we get our best work and put our best ideas when we're actually discussing as a group, you know what I mean? And we have the teacher thing and they explain to us. Because people don't understand like some political terms and world issue terms and we have discussion on that and it's really kind of useful to know that (Year 10).

Discourse as 'guiding' had four nuances for students –guiding to develop skills, guiding to integrate across disciplines, guiding with curriculum accountability in mind, and guiding through questions. When students were asked to identify the most important lasting impacts of inquiry learning, they always mentioned skills before specific content: organisation skills, skills to find different perspectives through reading, communicating ideas through writing, art and computer skills and skills to 'get along' with each other. Inquiring into interests of relevance provided the basis for that skill development. 'So it's not so much you've got to do this, this and this, but it's more, 'We want you to learn these skills but how do you want to do that (Year 10)? However, 'guiding' also recognised the importance of teachers helping students develop discipline knowledge and connections between disciplines in context of authentic inquiries. Guiding inquiry provided continuity and connectedness rather than constraint.

And this year we connect and I find that I am not bored because I keep connecting across each subject. And like we had that project where we researched what we wanted to do about bacterial diseases and stuff like that which led on to something else – AIDS and African poverty (Year 8).

Students accepted that teachers had accountability demands but they also recognised that there was room within that accountability for their voice as well.

My understanding of it [inquiry] was that teachers would have guidelines that they kind of let you go off and learn what you want to learn about within... you know...guides (Year 10).

The fourth nuance - discourse as questions – resolved the issue of how teachers guided whilst still respecting student independence and relevance. Making curriculum transparent and empowering students to develop their own questions blurred the teacher / student distinction, allowing both parties to participate in guiding the direction of the learning. Hearing students articulate this provided a humbling insight into the wisdom of adolescents. 'Yeah, choosing what [we] want to learn along guided paths.

So not only just finding answers to the questions but developing questions ourselves (Year 10).'

Teachers also recognised the importance of guiding to develop understanding as more than just 'talking'. As this science teacher described an inquiry with one of her students, it was apparent that discourse also required time and respect.

With the genetic side of the task we've just done, I wanted them to give a visual representation and relate it back [to real life]. Lucy was doing IVF [and childbirth] and asked "How do I do that?" "and then we discussed what she was talking about and from there we worked out how she could represent it visually and so she ended up giving stages of birth but also talking about the IVF laws and how they related to different stages of birth and abortion and different stages of birth. I think she got a lot more out of it because she did what she wanted to learn about and was able to incorporate [knowledge and skills I wanted].

Discourse is a skill that may need to be developed by teachers. This was particularly evident in year 10 where students experienced with inquiry were meeting teachers who were new to the school or just coming to terms with it.

If you've got a teacher that.. like tells you more than guides you, it's hard, because that's what I've got, like someone who'll tell my what to do but won't guide me, and I have to do what they say, and that annoys me (Year 10).

As co-learning was used in reference to various groupings of learners, it is considered later as a separate essential element of inquiry.

Implications for practice

6. Discourse – talking for the purposes of developing deep understanding is essential as it underpins the teachers' roles as supporters and guides. Quiet classrooms don't work for inquiry!
7. Inquiry classrooms must be transparent – students need to be aware of accountability demands of local curriculum.
8. Good discourse requires time, reinforcing the need for longer contact time with teachers.
9. Students must develop their own questions for inquiry as this forms the link between teacher guidance and student independence.

Planning and valuing uncertainty

I need lots of time to think, and then sometimes even before I put the unit together I talk to students about what I'd be really interested in exploring, get their opinions, then go back and think some more and then even come back again and it may not be until next term that I turn up with it, but then it's been a lot of thought from both me and the students.

Teachers in this research emphasised planning as an essential element for inquiry, but as the quote above indicates, planning also depended on respect and discourse! At the same time as identifying the importance of planning, teachers somewhat paradoxically stressed the essentialness of accepting uncertainty and spontaneity. *'It's only because I'm planning that I can be spontaneous. Planning is like All Bran. If you have it, you don't need it. If everything's certain, then there's no questions to ask.'*

Teachers used both types of frameworks – planning for purpose and planning for possibilities. Planning for purpose identified clear starting points based on conceptual

understandings. Planning for possibilities identified the stage in the inquiry where students could make choices and diverge.

- *If you don't know what your concepts are then there's no point even bothering to do it [inquiry] because the concepts form everything.*
- *[Students] know where they're at in that cycle and they're actually starting to use the words themselves. They know what I mean when I say we're wandering and wondering, and they know that that means that they've got freedom to read or look.*

For example, the teachers at year 8 combined the students' concern about terrorism and the wars in the Middle East with the concepts of 'perspective' and 'causation'. The essential understanding was, 'Poverty shapes terrorism'. Their entry point questions included "What makes a terrorist?" and "How do you know the difference between a terrorist and a freedom fighter?" These teacher questions were provocations to start data collection and generate student questions. This inquiry provided a real life context to apply skills and knowledge from Geography, History and Economics as well as graphing and statistics from Mathematics. Together, the two planning frameworks guided the emergence and development, and eventually, the answering of students' questions.

One of the best ones [inquiries at year 8] is about terrorism depending on who you are as to what your perspective is. And they then start to realise that some people - for Anglo Saxons they're terrorists, for other people they're freedom fighters, and after a while they're very good at interpreting from different points of view and it's almost different hats, but it really does make it powerful when you have a discussion along those lines. And then [student questions], "What would such and such think? Why have they acted that way?"

Planning for possibilities in particular, required accepting uncertainty in following an inquiry in a direction that perhaps was not anticipated. This could be an area outside of a teacher's expertise. Teachers in this study believed an acceptance that they didn't have to be experts modelled to students that knowledge was transient and that there were no absolute answers. However, they also admitted this was not always easy. *'To go into somewhere I don't know, I'm really uncomfortable, because I suppose I believe that as a teacher I should have some knowledge. But earlier on in my career things were a lot more structured, and [now] it's that letting go of knowing everything.'*

Nothing is certain: even the essential understanding or central idea changed if it proved to be limiting the inquiry. *'You suddenly find that the essential understanding sometimes does not cater for what can happen and then it's your job to go back and sometimes change your essential understanding because the students lead the way'*. Primary data collection, which every teacher agreed was important for inquiry, also contributed to uncertainty. It could be planned for at the beginning of an inquiry, but was more effective when it responded to student inquiries. Teachers gave examples of parents, grandparents, mathematicians, a walk in the forest and an unexpected encounter with an interesting person as sources of primary data that require them to react spontaneously when the opportunity to collect data arose.

Assessment for inquiry connected planning for purpose and planning for possibilities. Teachers planned summative tasks to assess the understanding of the central idea and targeted skills as well as formative tasks to provide feedback on the development of those understandings and skills. The contexts, the methods of presentation and even the nature of the tasks themselves could be negotiated depending on the nature of the students' inquiries. This required assessment of the products and the inquiry processes:

*“it is the final product I'm assessing **and** the steps that they're actually going through’.* Teachers and students had common views on assessment. ‘Talking’ was the most important assessment tool. Other acceptable forms of assessment described were tasks that offered a range of literacies and provided students with choices such as projects, exhibitions and portfolios. Both teachers and students agreed that rubrics were important for assessment. *I suppose the [assessment] tools that we use is- getting the work done, which is our criteria rubric, and monitoring knowledge and skill development is very much the developmental rubric, and again, very powerful.* One student referred to rubrics as *‘the right guiding stuff’.*

Homework, tests and examinations were offered as examples by teachers and students of assessment that was not always supportive of inquiry. Teachers tried to make these tasks as meaningful as possible but they were seen as placating either parents or outside testing authorities.

- *Homework is something that parents require so therefore I try to relate it to what we're doing in class. What I set for homework is [deep sigh] stuff that I'm not really assessing (Teacher).*
- *Like exams, yes they are important and teachers do take that as a reference later on, [reference to senior school and university entrance exams] but just doing work and handing it in I think is more valuable than an exam. What if people don't like exams and are terrible in the exams? They might have failed but they might be excellent at English (Year 10 student).*

Although students were clear that tests and examinations did not demonstrate what they really knew, they were concerned that inquiry learning would not prepare them for the inevitable examinations in their senior years of schooling. More practice with tests was mentioned by many year 10 students as a suggestion for improvement. *Preparing you for the exams because it comes as quite a shock to you later... like, well what's expected of me? This is a different type of learning again.* It was not a criticism of inquiry, just an acknowledgment that in the future, they would be faced with assessment tasks that required different skills.

Not surprisingly, planning and uncertainty were words used only by teachers. Students didn't use the word ‘planning’ but they did refer often to components of planning: the concepts, questions and assessments. Like their teachers, they understood the importance of concepts as the way to develop their own questions and deep understanding. Interestingly, although teachers referred to the inquiry cycle, students didn't. They spoke often of ‘asking good questions’ and ‘finding your own answers’ but didn't differentiate steps in between.

- *So, instead of just doing text book, -“this happened that happened” -you go into it “this person did that, because of this, that. It might of happened because of, and so on... Cause and effect (Year 10).*
- *Just loved the history wars, cause, effect, repercussion (Year 8).*
- *Integrating math into inquiry helps you a lot with your problem solving as well because you're not just looking at it [an issue] from the one perspective (Year 10).*

Similarly, students never used the word ‘uncertainty’ or ‘spontaneity’ but often referred to ‘independence’. Adolescents’ growing need and capability for independence required the adults in their lives to relinquish control and accept uncertainty. Valuing uncertainty, with its characteristics of flexibility and spontaneity were about the formation of a different style of teacher in response to ‘independence’ as characterising a different style of student.

Implications for practice

10. Planning for inquiry is essential. It is part of the role and responsibilities of teachers.
11. Teachers need to consider planning as a two part process – planning for purpose and planning for possibilities, each of which require different types of frameworks.
12. Planning for purpose requires professional skills in addition to discipline based knowledge and skills. These skills include using discussion to ascertain student interests, designing authentic assessment, developing good questions to start the inquiry and designing rubrics.
13. Planning for possibilities requires teacher to accept that they will not be ‘in control’. They need to value uncertainty as students move into areas that may be outside their expertise. Opportunities for new directions may require a spontaneous response.
14. Although examination content can be addressed through inquiry, upper secondary students benefit from practice in writing formal exams as it improves their confidence in managing that process. This is not authentic assessment and does not replace other strategies for developing and assessing deep understanding or inquiry processes.
15. There is a clear need to communicate the purposes and processes of inquiry to parents so that they understand that the nature of homework and assessment changes.

Co-learning and teamwork

Co-learning was the third implication of ‘discourse’ in the role of teachers after ‘supporting’ and ‘guiding’. Students viewed themselves as powerful learners with something to offer their teachers. They also valued teachers as learners.

- *You get like an adult's perspective and they bring in their information from what they know and we kind of add to it. You learn a lot and tell the teachers a lot and the teachers tell you (Year 8).*
- *She's [the teacher] learning it as well. I guess that's kind of good 'cause then they [teacher and student] can both ask the questions together. They can find the answers together (Year 8).*
- *Well they're not just 'evil teachers' [with a smile!] anymore. They're sort of like your friends. You can talk to them and they understand you and you give points to them and have fun and just research (Year 10).*

Co learning was not restricted to only teacher / student interactions. It was also important between student peer groups. Group work was frequently identified by teachers and students as a powerful instructional strategy, particularly because peers are so important to adolescents. Group work went beyond students just sharing knowledge and ideas: they worked together to develop a deep understanding – getting beyond the surface. Co learning is social constructivism at its most powerful.

- *You have to go further than just the surface of the topic and ... it's pretty good in that sense with using inquiry ... using your friends who are also doing the same thing so then you get lots of different opinions and that's different information ... Yeah. It's really about getting beyond the surface and what you see first up (Year 10).*

The individual’s acquisition of understanding through individual inquiries was still important, but even when students pursued a unique idea, their peers were aware of their direction and shared skills as well as knowledge. Again, rubrics were considered essential so that teachers and students could still assess an individual’s understanding even in a group context. Again, the importance of planning and valuing uncertainty are voiced in the second quote.

- *Sometimes [inquiry is] independent, sometimes paired, sometimes groups, sometimes whole class. It is significant because they learn so much from each other. “What are you doing? Look at this web site. This is a great resource, eh?” And they're calling out across the room. So it's independent and*

individual inquiry, but it's not done in isolation. They, you know, they learn more from each other than from me (Teacher).

- *It's a bit of work for you to set up the structure but once the structure is working and a bit of manipulation here and there, it's great to hear the buzz as they're talking and working together and like, moving, because they often share information and share how to do things (Teacher).*
- *Today when they started their research they said, "Well, where's our rubric?" So I had it. And they know which column we are working on and they look for it and that's great, because it's that open assessment... they know how they're being assessed (Teacher).*

The importance of co-learning made developing social skills important so that students could learn from each other, not just the teacher. As with other skills, teachers guided students to learn those self-management and interpersonal learning skills. By being transparent and talking about their concerns and giving the opportunities to work with as many people as possible, they set the parameters so that students could make wise choices about who they worked best with – friendship groups or common interest groups - or whether sometimes, they would rather work alone.

We talk about groups, and we also sometimes say that your friendship group is often not the best group to work in. Why is that? What are the pluses and the minuses? We actually talk about groups and what a good [group] structure is (Teacher).

Two students identified teacher to teacher co-learning as important to inquiry. The teachers in this study had developed an ease about being in each others' classes. They often taught together and tried to observe other teachers' classes so that they knew what directions the students' inquiries were taking. The following quote was a student's recommendation for schools considering inquiry:

Like I don't see how they couldn't [introduce inquiry learning] because as long as the teachers have a really good relationship they're actually able to get them [different 'subjects'] in together. All the teachers are like really close from what we see and they get to have talks and then they interact with each other. And they come into the class and they find out what you're doing in English and then they relate it back to Science (Year 8).

Teachers referred to this as 'teamwork' rather than 'co-learning'. This may have reflected their organisation in year level 'teams' rather than faculties. The feeling of growing professional confidence and personal satisfaction came through in all of their interviews. Teamwork was a way for teachers to managing uncertainty in inquiry. Teacher teamwork was also essential for modelling social learning skills to students in an authentic situation.

- *I would have said probably 10 years ago I never ever had anyone come into my classroom, whereas now I don't care and that took a while to break down. There was always that fear that I'd be found wanting. Whereas now I think because we discuss things so often together it's great to have people come in and look at what you're doing, help out, throw in a comment.*
- *And it helps me [working with an English teacher] because I'm not confident in English but I now have that backup to go to. I've learned more but I've also got someone to go to for help.*
- *The kids need to see us working as a team because again, how can you get kids to work in groups and teams across disciplines if they don't see us modeling the process? I think it's very important.*

Every teacher identified time for teams to work together on the planning processes as crucial to the success of integrated inquiry.

Oh look, I think that inquiry's working much better in Year 8 than I've ever seen it before, because of our discussions and our meetings once a week or whatever. We understand what each other are doing, that depends on the teachers working together as a team and we have to have time to work together as a team.

Implications for practice

16. Group work is to be encouraged because peers are an important part of the adolescent learning environment. Groups can still impact on an individual's unique inquiries through sharing resources and skills.
17. Clear criteria are necessary so that individual learning can still be assessed in a group context.
18. Social skills are as important to develop as discipline skills because inquiry depends on effective team learning.
19. Effective teacher teams are necessary to support teachers in changing practice, manage uncertainty and to model social learning to students.
20. Effective teacher teams require regular time for planning and discourse.

Reflection

When comparing this study to the vast literature on inquiry, the most puzzling element in this study was reflection. Every teacher placed reflection as central to inquiry, and all admitted that it needed improvement. It was only coded in the teacher interviews in association with assessment or evaluation as formal writing at the end of an inquiry. Students did not use the word at all.

Teachers seem to be confusing reflection with assessment and evaluation.

I'm not saying anecdotal evidence or reflection and observation is, I'm not saying that's not important, but I don't record it, I don't write it down.... I mean I reflect on what I have in my head about kids in terms of where we go next and acquiring skills and what they need to do next and those sorts of things but as I say I don't have it written down and that's something I really should do, or do more of.

Dewey (1929) placed reflection at the center of learning in an uncertain world. Reflection connects uncertainty with knowledge through action and inquiry. He defined reflection as '*active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends*' (Dewey, 1933, p.118). This definition encompasses reflection-in-action and reflection-on-action. The teacher's comment above was one of the many excellent examples teachers gave for reflection but did not recognise it as such themselves. This is teacher as inquirer demonstrating reflection as an essential element.

This confusion between reflection and assessment may also be the reason why students didn't use that word. They are also actively and persistently inquiring and like their teachers, they can't take time to write all their thoughts down, nor is it necessary. Looking deeper, many of their comments on the importance of discussion as 'talking about what happened' could be interpreted as reflection. This connects back to the importance of discourse: clarifying ideas, giving explanations, analysing, and reconsidering perspectives can become an internalised process and part of reflective thinking.

Although the ‘planning for possibility’ frameworks included ‘action’ as part of the inquiry cycle, neither teachers nor students used that word. Many gave examples of how one set of questions led to another, but didn’t refer to this as ‘action’. Dewey’s ‘further conclusions’ are often invisible or in the future. Knowing the school, this was an omission in the research question design, not a fault with inquiry. Students from the school have initiated many projects that have resulted from their inquiries ranging from fund raising for social service causes, community service initiatives and environmental care groups. Many students apply for leadership positions both in and out of school because of political interests that they have developed. There is also strong anecdotal evidence emerging that many students continue these initiatives into their secondary and post-secondary lives. However, this requires more formal research.

Implications for practice

21. Reflection is more than just answering the question, “What did you learn?” with its summative emphasis. In practice, reflection should be considered throughout an inquiry by asking, “Why did you want to know this? What knowledge, skills, perspectives or resources did you have to consider? What impact did this research have on you?”
22. Reflection can be in many forms including discussion, photos or collections of students work. It does not have to be ‘in writing’ to be valid and significant.
23. Reflection must not be confused with assessment or evaluation which should be against a rubric.

Conclusion

Many of the elements identified in this research as essential for inquiry would also be used by teachers in more traditional classrooms. But to be an inquiry classroom, they most all be present and there is no hierarchy of importance. Respect, discourse, planning for purpose and possibilities, valuing uncertainty, co-learning and reflective practice transforms students and teachers. Just as the dance itself blends the knowledge, skills and creativity of choreographer and dancers, inquiry learning blends the knowledge, skills and creativity of teacher and students. These elements provide the music, the stage and the time for each participant to contribute democratically to the performance.

Inquiry, through these elements, leads to real differentiation. It offers a way for schools to not just meet the needs of diverse range of learners but motivate students to be the best they can be. The school has a large percentage of students with diagnosed needs, yet after nine years of basing our teaching and learning on inquiry methods, our results on the National Assessment Program – Literacy and Numeracy (NAPLAN) are sound. Over the years of developing skills in inquiry practice, the teaching team, which included individual needs teachers, moved away from discussions of differentiation in terms of ability. They expected a deep understanding of the central idea from every student, but were prepared to negotiate on the context and on the nature of the performance tasks to accommodate individual interests and learning styles. Differentiation was no longer seen as a problem or an extra responsibility; it had become part of practice. It had been years since anyone had been removed from class for either remedial or extension work. Differentiation was a product of good inquiry.

Further research is required into why students didn’t articulate the processes in the inquiry cycle. Students talked about ‘asking questions’ and ‘finding their own answers’ but didn’t mention steps in between. Was this a result of not using a specific

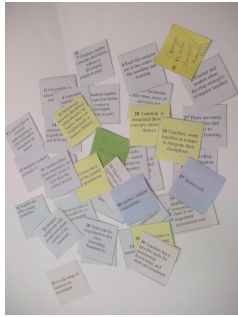
inquiry process or just not articulating it? Are planning for purpose and learning how to ask good questions the more significant skills for teachers and students? There are more questions around reflection and action that need to be explored. Do students also confuse reflection with assessment? How would they define reflection and action if asked directly? As so many students and teachers associated inquiry with ‘relaxed’, ‘less stress’ and ‘respect’, another focus for future research could be the connection between inquiry pedagogy and student wellbeing.

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Appendix 1



The table below is a list of card statements given to teachers. These were printed on 5 cm square cards. Teachers were asked to place them in proximity to a 'class' card based on how important they felt that statement was to inquiry learning in practice. The photo to the left is from one of the teacher interviews. The dark central card is the 'class card'. The statements were used to promote discussion, not for any quantitative analysis.

Card Numbers	Card Version 4
1	Ideas to be explored often arises from student / teacher collaboration
2	Teacher and student often develop strategies of inquiry together
3	The classroom has many areas of activities for discovery and exploration
4	Real life contexts are at the center of the teaching and learning
5	Students determine their pathway of inquiry through student questions.
6	Important learning often occurs through discussions of different perspectives
7	Students explore concepts first before content is developed. (whole to part)
8	A central idea or essential understanding is often referred to throughout an inquiry
9	Students often gather information through direct experience and stories
10	Students see that the purpose of their learning is to produce something meaningful
11	Teacher's place more importance on students' point of view than the correct answer
12	Learning builds on what students already know (pre-assessment is part of the classroom routine)
13	Learners' questions are valued
14	Ongoing assessment is used to guide knowledge and skill acquisition
15	Students worked primarily in groups
16	Students have a clear model to use to direct inquiry
17	Uncertainty is valued by teachers and students
18	Some inquiries are 'spur of the moment' – started in response to opportunities
19	The learners in this class use and develop deep knowledge
20	Tasks can be negotiated in this class (Including Summative)
21	Boundaries between disciplines often dissolve e.g. inquiry draws on English/math or Science /History.
22	Students collaborate with people and places outside of the classroom
25	Classes are a mix of the planned and spontaneous
26	Teachers work together as a team to integrate their disciplines
27	There are many opportunities and many ways to reflect on learning.
28	Learning is integrated through concepts rather than themes
30	Teachers have a clear model to use for inquiry
31	Students are often primary researchers
32	Teachers explore concepts first before content is developed. (whole to part)
33	There is significant time to let questions develop
34	Students displaying their processes around class is an important assessment tool
35	A wide range of literacies are encouraged
36	Teachers have specific tools for monitoring knowledge and skills development