

**GRO06091**

**What Counts as Evidence: Mixed Methods in a Single Case**

Paper presented at the AARE Annual Conference  
Adelaide, 26<sup>th</sup> – 30<sup>th</sup> November 2006

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This paper reports upon a complex formative evaluation of a comprehensive Year 9 innovation in a large independent girls' school. The paper will contextualise the innovation in terms of continuous school reform in what may be identified as an 'activist' school. Its main purpose will be to report upon the forms of evidence that are being assembled to inform the evaluation<sup>1</sup>. A wide range of both quantitative and qualitative procedures have been adopted and their complementarities are considered within a discussion regarding the use of mixed methods in a single case. The paper will consider some of the practical issues relevant to the process along the lines of barriers and facilitators to good, effective mixed methods research. It will embody practitioner researcher and academic researcher perspectives.

**The context for the study:**

MLC School, Sydney<sup>2</sup>, has been one that has valued and enacted evidence based practice for almost ten years (Groundwater-Smith & Mockler, 2003; Groundwater-Smith 2006). As a foundation member of the Coalition of Knowledge Building Schools (CKBS) it is committed to:

- develop and enhance the notion of evidence based practice<sup>3</sup>;
- develop an interactive community of practice using appropriate technologies;
- make a contribution to a broader professional knowledge base with respect to educational practice;
- build research capability within their own and each other's schools by engaging both teachers and students in the research processes; and
- share methodologies which are appropriate to practitioner inquiry as a means of transforming teacher professional learning. (Groundwater-Smith & Mockler, 2003, p. 1)

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<sup>1</sup> The purpose of the paper is not to report upon results, but upon the ways in which the evaluation has been constructed.

<sup>2</sup> The school has not been anonymised. The identity of the school is clear from the contributors to this paper who are entitled to be recognised in the same manner as the academic partners.

<sup>3</sup> This term is one that the Coalition has embraced in its broadest sense, believing it to mean evidence that is gathered in a forensic rather than adversarial sense (Groundwater-Smith & Dadds, 2004)

The Coalition is comprised of thirteen schools representing all sectors: Government, Catholic Systemic and Independent and includes a rural and remote school, several regional schools, with the remainder located in Metropolitan Sydney.

MLC School continues to advance the notion of an activist school – that is one which not only responds to a contemporary milieu, remarkable for the nature and rate of social, economic and technological change, but also one that builds its own future. Along with ongoing developments and reforms in the Junior School and Middle School it is concerned with forging a focus on new ways of learning in that important entry year to the Senior School, Year 9.

The School is intent upon capitalising on the range of learning outcomes as a result of the “City Experience”, engaged with towards the end of Year 8 in which students are located in the Central Business District of Sydney for a program spanning several weeks. There is also a well-established learning program where students live in residence in the Broken Hill area in Year 9. This critical school year, then, is seen as one where students can develop the kind of emotional, social and cognitive resilience that will enable them to be confident and courageous learners. It is perceived as one where some risks can be taken in that there are currently no high stakes assessments required by either State or Commonwealth authorities. Furthermore, the school itself is seeking to establish a culture where students build personal autonomy and academic responsibility.

In her address to the staff of the school regarding the 2008 – 2013 Master Plan<sup>4</sup>, the Principal spoke of the development of the “learning village”, building upon a sense of community and coherence. She drew upon Headley Beare’s construct of the Emerging School with its rich variety of alliances and interactions (Beare, 2001). As well, she focused upon the fundamentals of the Reggio Emilia program in early childhood education, paying particular attention to the notion of the environment as the “third teacher” (Harrison, 2000). She suggested that the new learning project for Year 9 would act as a “test bed” for the school in initiating and documenting new practices that could inform both physical developments for the school as well as raise fresh challenges for teacher professional learning.

In essence the *Year 9 Laboratory*, as it has become known, is guided by the statement **“We shape our environment and our environment shapes us”**. The environment, in this sense, is physical, virtual and socio-emotional. As well as the Broken Hill experience the learning environment embodies flexible learning spaces, extended blocks of learning time (100 minutes), opportunities to engage in on-line learning and exploring and analysing one’s own learning preferences and beliefs through a year-long independent investigation.

In imagining, designing and implementing the *Year 9 Laboratory* the school has embarked on a significant reform. It has therefore seen that there has been a corporate and professional responsibility to engage in a systematic and ongoing evaluation of its

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<sup>4</sup> 11<sup>th</sup> May, 2005

development. This paper will focus its attention on that evaluation using a variety of methods and a range of research expertise. The evaluation's primary purpose has been to provide ongoing evidence that will permit the school to continuously shape and re-shape the processes that it is employing. Normally, one might consider this to be a formative evaluation; we would prefer to see it as an *informative* evaluation in that there is continuous feedback from the various phases of the study, thus the phenomena being examined are themselves in a state of continuous flux and change.

### **Using mixed methods in an 'informing' evaluation:**

Before setting out the details of the inquiry and its various participants we believe that a case should be made for the employment of mixed methods in the gathering and interpretation of evidence. As Marsh, Martin & Hau (2005) point out in their discussion of construct validity in psychological research "multiple outcome measures allow for tests of unintended consequences" (p. 442). While, this informing evaluation is not seeking exclusively for psychological outcomes the value of examining data arising from different research methodologies is clear; we were interested in this study in the complementarity (or otherwise) of the various strategies that were employed in the interest of advising key stakeholders of the costs and benefits of the enterprise. We have been particularly mindful of employing both quantitative and qualitative methods. The former can give us insight into the extent of the existence of a particular outcome; the latter enables us to explore why this may be so. Thus it is possible through the use of mixed methods to do what Mehanna (2006) suggests is the "pulling of two poles, inductive and deductive approaches, in an unorthodox marriage" (p.1).

Creswell (2003) has argued for the employment of mixed methods as a process where the researcher collects, analyses and integrates both qualitative and quantitative data in a single study in ways that may be concurrent, sequential, conversion or parallel. Merten (2003) has proposed that mixed methods have a significant potential for informing emancipatory and transformative practices. For our purposes we saw that the various components of the study were both concurrent and interactive. In effect we established what Katerndahl & Crabtree (2006) have termed a "methodological think-tank" (p. 443):

An approach that uses team-building concepts to develop quickly a shared common space for identifying innovative ways of integrating quantitative and qualitative methods to study important but challenging research questions. (p. 444).

The team comprised both insider and external researchers. The external team comprised of academic practitioners: an educational psychologist who would explore the psychological impacts using motivation and engagement measures; a practitioner researcher who would examine student and teacher perceptions of ongoing developments using focus group inquiry, observation and shadowing and would act as the research coordinator; a technology media researcher who would investigate student and staff employment of information and communication technologies; and a mathematics educator who would advise upon innovative practices in mathematics education. The

internal research group comprised: Head of Senior School; Director of Studies; Director of Studies Senior Curriculum; Coordinator of the Year 9 program and a Year 9 Mentor and Science Teacher. The in-house team monitored the ongoing findings of the external group and engaged in their own inquiry “Making Learning Visible” that will be spelled out later in this paper. Supporting the team was a student advisory group and a parent reference group. The motivation was to explore the implementation of the impact of the *Year 9 Laboratory* upon students and their teachers at MLC School, Sydney.

The interaction between the teams, their various perspectives and expertise, and the methods that they employed enabled the emergence of a rich and innovative research design, the detail of which is spelled out below.

### **Investigating the impact of the *Year 9 Laboratory* on students and their teachers:**

In this section of our paper we shall look at the various questions being addressed and the methods used in the relevant investigations.

#### ***Student motivation and engagement:***

What is the level of motivation and engagement amongst the students under focus? How do they compare with national norms? How do different year levels perform on key dimensions of motivation and engagement? What change occurs over the course of a school year? What change occurs for students participating in the Year 9 Laboratory relative to those who do not? What aspects of the Year 9 Laboratory are relatively more effective in bringing about meaningful change at the student and school level? Should ‘intervention’ be targeted at students’ academic life generally or at school subjects more specifically? These (and more) questions are effectively addressed through: (a) good instrumentation, (b) robust methodology, and (c) targeted analyses.

In terms of *good instrumentation*, Martin (2001, 2003, in press) has developed a multidimensional model of motivation and engagement, the Motivation and Engagement Wheel, that reflects the thoughts and behaviours underpinning academic motivation and engagement at school. The model separates motivation into factors that reflect enhanced motivation, those that reflect impeded motivation, and those that reflect reduced motivation. In the model, these are referred to as adaptive cognitions and behaviours, impeding/maladaptive cognitions, and maladaptive behaviours. The accompanying Motivation and Engagement Scale (MES; Martin, 2001, 2003, 2006, in press) formally ‘measures’ these dimensions. Specifically, it assesses adaptive cognitions through measures of self-efficacy, mastery orientation, and valuing. It assesses adaptive behaviours through persistence, task management, and planning. Impeding/maladaptive cognitions are assessed through anxiety, failure avoidance (or fear of failure), and uncertain control. Maladaptive behaviours are assessed through self-handicapping and disengagement. Norms for the MES now comprise over 20,000 Australian students and so is a very solid measure to assess motivation and engagement. Data based on Australian school students has demonstrated the MES to possess a strong factor structure, to comprise reliable subscales, and to significantly predict a variety of educational outcomes (Martin, 2001, 2003, in press, Martin & Marsh, 2005).

The strength of a model along these lines is that it can be easily communicated by educators to students and following from this, is readily understandable by students. The educator and student can easily separate the ‘helpful’ (adaptive dimensions) motivation and engagement from the ‘unhelpful’ (impeding and maladaptive dimensions). Thus, this model is an easy way for students to understand their motivation and an easy way for educators to explain it to them. When students understand motivation and engagement and the dimensions that comprise them, intervention is more meaningful to them, and as a consequence, is likely to be more successful.

In terms of *robust methodology*, the motivation and engagement measures were administered at key points in the school year in order to collect pre- and post-test data to directly assess the impact of the Year 9 Laboratory. Also, students in other year groups were assessed to yield a better understanding of change as a result of the Year 9 Laboratory relative to students in other years who did not participate in the program. The fact that multidimensional motivation and engagement was assessed allowed the team to understand in greater detail what particular aspects of motivation were subject to change across the course of the year and what were not. A better understanding of the specific dimensions subject to change (and those that were not) allows for more useful interpretations as to why change was effected and as a result what aspects of the Year 9 Laboratory need to be sustained. The *robust methodology* also required measurement in different domains. In the context of the present study, domain general motivation and engagement were assessed (to understand students’ academic lives more broadly) along with motivation and engagement in the mathematics domain. Such an approach provides guidance as to what level ‘intervention’ is best targeted – at students’ academic lives generally or at specific school subjects.

The joint operation of good instrumentation and robust methodology laid the foundation for effective and *targeted analyses*. Because the MES is normed on many thousands of Australian students, direct comparisons between norms and MLC were possible – and also a very sound basis upon which to contextualise the school as a whole. The availability of such strong norms also represented something of a ‘control’ group for the study. Because other year groups were also assessed on the same measures, analyses could be targeted to test for effects of the Laboratory relative to other programs being carried out at the school. The pre-/post-test design also allowed analyses to examine change across time and also as a function of year group. The availability of parallel general school and specific mathematics motivation measures allowed analyses to test the domain generality vs domain specificity of the Laboratory.

Taken together, the good instrumentation, robust methodology, and targeted analyses were an important contribution to the broader mixed methods approach in this program of research. Not only did they directly answer vital questions in their own right, but provided a very important context in which to understand the qualitative findings and progress theorising about the program and its success more generally.

### ***Student and staff perceptions and experiences:***

#### *Student focus groups and shadowing:*

Using focus group inquiry methodology and following consultation with the Student Advisory Group two rounds of discussions were conducted with samples of students from each mentor group<sup>5</sup> in March and August.

*March Meetings: The discussion was designed as discursive to permit students to express themselves broadly about key elements of their experience.*

1. *Independent project* – Students were requested to describe the Independent Project and the ways in which it related to the Year 9 Laboratory key question. Was there concern regarding the openness of the project? Were students worried about the extent to which they might reveal themselves? Had they identified the audience for the project?
2. *The blog* – What were the communications opportunities offered by the blog? Strengths and weaknesses?
3. *Blocks of learning time* – How were students coping with the longer blocks of learning time? How might teaching and learning be improved within the time frameworks?
4. *Spaces for learning* – How were the assigned spaces for learning working? Were they appropriate? How could they be improved?

*August Meetings: Questions were more precise, in line with students having had more experience of the Year 9 Laboratory, in particular in relation to being a self-directed learner.*

1. How independent do you think you are as a student in Year 9?
2. How independent would you like to be?
3. How can your teachers support you in being independent learners?
4. How does the independent investigation assist you in being an independent learner?
5. Name three major opportunities that this year has offered you?
6. What are the biggest challenges?
7. To what extent are you encouraged to participate in the life of the school beyond the classroom?
8. To whom do you turn when you need to negotiate something that may be difficult for you?
9. What are three key words that you would use to describe a Year 9 student at MLC?

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<sup>5</sup> All Year 9 students are placed in 'mentor' groups which focus upon their academic care and development.

In order to illuminate the student experience one student was ‘shadowed’ for two days. This element of the study provided a narrative of the two days, and was portrayed as a discussion of engagement in learning in terms of Csikszentmihalyi’s (1990) conception of flow.

### *The Broken Hill Experience*

The Broken Hill experience was seen to be central to the Year 9 Laboratory and to informing the organising statement “We shape our environment and our environment shapes us”. It was considered as essential that data should be collected by the Year 9 Coordinator from students, teachers and parents.

A number of checklists were completed including: learning planning, self reflection, peer reflection, whole person curriculum achievements and website activities. Parents were asked to complete a review of their expectations and there was an overall evaluation of the various activities with which students engaged. All of these were systematically collected, documented and analysed.

### *Mentor Focus Groups:*

As well as student focus group discussions a round of focus group interviews was conducted with mentor teachers. The key questions addressed by the interviews were:

1. What do you understand to be the *purpose* of the independent investigation?
2. What do you see to be the *value* of the independent investigation?
3. What do you understand the organising statement regarding the interaction between the individual and the environment to mean?
4. How do you see this as “The big idea” in terms of Wiggins and Tighe *Understanding by Design (UBD)*?
5. What have been the challenges so far in facilitating students undertaking the independent investigation?
6. What have been the surprises?
7. What have been the frustrations?
8. How have you avoided appropriating the students’ ideas while still maintaining their momentum? What kinds of signposts and milestones do they need?
9. How have students responded to the notion of having a “passion”, that is a deep personal interest in something?
10. What phases or stages have you noticed the students moving through as they undertake the investigation?
11. What kinds of support and resources do you need?
12. What other questions would you liked to have been asked regarding the independent investigation?

### *Employing information and communication technologies:*

This component of the study was designed to answer the following questions:

1. How is ICT being utilised as part of the ‘places and spaces’ for learning in Year 9?
2. To what extent is there a virtual learning environment in operation?
3. What is/are the nature, range and purposes of ICT use, management, selections, locations and timing?
4. What enables or constrains the use of ICT?
5. How does the use of ICT on/line resources support existing learning intentions?
6. What new aims and agendas are coming into play?
7. To what extent are students shaping the use of ICT?
8. How are students able to influence the choice, nature and opportunities for the use of ICT?
9. What are the constraints?

The investigation involved collecting data from the following sources: school intranet; student work, including the independent investigation and blogs; interviews with key teachers; and focus interviews with students.

***“Making Learning Visible”:***

The purpose of this research activity was to examine closely a small, stratified random sample of students to document their learning development in holistic terms. Students were selected from a range of ability levels and a variety of strategies were used to examine and monitor their growth taking into account the students’ own understandings and perspectives on their experiences. The key question to be addressed was **“What are we learning about student learning in Year 9?”**

Seven members of staff were involved in the process. Two different kinds of evidence were collected and collated; data from various student records and interviews and discussions with students themselves, thus giving them some agency in this phase of the project. Data was collected from:

- Teacher mapping of students’ achievement on the course performance descriptors at the ends of Semester 1 and Semester 2;
- Semesters 1 and 2 academic reports;
- Broken Hill report;
- Independent investigation blogs; and
- Student work samples.

Students were oriented to the purpose and processes of the study in an initial interview. They were invited to write a letter to the person following their progress including a photograph of themselves taken at a moment that mattered to them and showing something about them as a young person. The letter would explain the photograph and discuss how the student likes to learn, what she enjoys learning and what sometimes makes learning difficult for her.

A second interview discussed the letter and gave the student an opportunity to indicate where she registered on a “happiness with learning” meter and why she positioned herself thus.

A third interview was undertaken wherein the student brought two work samples from contrasting curriculum areas for discussion. The final interview was to be one where the student shares a narrative of her learning – that is an episode that was important for her. She will again register on the “happiness with learning meter” and be provided with an opportunity to compare and contrast her three entries.

The seven staff involved met on at least four occasions to discuss the key question, “**What are we learning about student learning?**” and to consider such issues as:

- Student engagement – what helps, what hinders?
- Places and spaces for learning - how is the learning environment acting as “the third teacher”?
- Student wellbeing – what makes students resilient, what makes them anxious?
- What evidence do we have of growth and development?

These professional conversations were diarised – this could be undertaken electronically with each member of the team undertaking to document a particular part of the meeting that would then be reformulated as one coherent account.

### **Barriers and facilitators in terms of the employment of mixed methods:**

By any measure this project was a complex and ambitious one. It was also organic in that features and facets of the innovation changed and modified as the research team provided feedback. Following any data collection phase the internal research team met to consider what had been discovered and uncovered and to develop responsive policies. Similarly, the external research team also met, regularly, to discuss the ever-changing context.

The logistics alone were challenging in terms of convening meetings with a number of players operating in very different environments. As well, each brought to the meetings their own beliefs about research and the conventions that should be adopted. It was clear, for example, that the exigencies of school life had to be met. Laboratory-style testing regimes were simply not possible and procedures were required to align with the school’s routines and practices rather than the opposite. The most effective procedure would have been to have gathered baseline test data prior to pre-testing and the follow-up testing. But this was not feasible. Finding appropriate instruments that were a perfect match for the innovation also proved to be difficult; although, in the case of the qualitative evidence the procedures that were used were clearly tailored to address emerging issues.

Expectations regarding change, especially in relation to the motivation and engagement measures could have been, but were not, problematic; in that the school is a high performing one and it may well have been that there would be no measurable change.

In spite of these challenges there was agreement that the dynamics of the teams were such that accommodation was made as much as possible with respect to the various methods being employed. Indeed, this can be seen as a benefit of the project in that those unfamiliar with some methods came to see their merit and value. Generally it was agreed that the methods were commensurable with each other in that they acted in complementary ways.

A critical feature of the project was the transparent and encouraging leadership offered by the school Principal. No impediments were put in the way of making information readily available as it emerged. The parent reference group, for example, met on four occasions to examine evidence and to comment upon it. Notes supplied to the parent group were then made available on the school's intranet. Indeed, the school culture itself could be seen to be a facilitating factor with members of staff coordinating their efforts to ensure that appropriate paper-work and organisation was undertaken.<sup>6</sup>

### **Conclusions:**

This paper has not been offered as a celebratory account of an innovation. Not all of the results are yet available or their implications discussed. Rather, it has been written in order to demonstrate the ways in which a single complex case study can embrace the use of mixed methods and employ, as researchers, both academic and school based practitioners. Katerndahl & Crabtree (2006) proposed that the following criteria are critical to the success of what they nominated as “think-tank” proposals for research using mixed methods (see above):

1. Methodological expertise based on the records of the researchers around particular methods;
2. Successful research expertise;
3. Flexibility and open-mindedness (thinking outside the box);
4. Collaborativeness (play well with others) p. 445

We believe, furthermore, that by additionally working with practitioner researchers we have enriched and enlivened the “think-tank” format. We have created a space where Mehanna's “unorthodox marriage” (2006) has proved to be a union that is not only a powerful one, but also has assisted in bringing forth a very lusty progeny in the form of the *Year 9 Laboratory*.

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<sup>6</sup> For example the distribution and time-tabling of surveys was a considerable impost on the school. As well, whenever student focus groups met, or a student was observed, it was important that informed consent from parents was obtained. All of these steps required time and energy.

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