Evidence Based Practice in School Education: Some Lessons for Learning in Museums

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This seminar paper will draw the work of the Coalition of Knowledge Building Schools, all members of which draw upon tenets of evidence based practice. The paper will argue for a distinctive form of evidence based practice which contrasts with experiences in other fields of practice such as medicine. It will suggest that the processes which have been successfully developed by the Coalition could be usefully taken up by those interested in learning in museums.

Introduction

The concept of 'evidence' cannot be separated from its purpose and consequences. How much and what kind of evidence is needed to persuade or convince, is evidence being sought to prove or to understand a phenomenon? Recently, for example, in the U.K. there was to be an evidence-based dossier presented to parliament which would be sufficient to justify a declaration of war on Iraq. Little of it fresh, much of it mediated through a number of processes, it was considered by many to be flimsy and inadequate and quite insufficient. Circumstantial evidence is treated by courts with some suspicion – whose testimony is to count when there appears to be an absence of 'hard facts'; and what do those facts mean anyway, when 'expert witnesses' can Internet them quite differently? Throughout this paper I shall work on the premis that 'evidence' is not an innocent term, but nonetheless a useful one.

Knowledge about what happens in schools for Hargreaves, rests on evidence (1999a), albeit a particular kind of evidence generally derived from a model which seeks for irrefutable proof. Hargreaves has not been without his critics. Elliott (1999) believes that the knowledge formation of which Hargreaves writes is founded on a positivistic view of evidence in that his accounts of useful and worthwhile educational research are based upon a *quasi-causal mechanism* (p. 7). Elliott goes on to argue that Hargreaves has given a questionable status to what may be called *indubitable knowledge*; generally knowledge acquired through the experimental method, characterised by treatment and control groups and largely prevalent in such fields of practice as medicine and agriculture. Nonetheless he concedes that the concept of evidence as the basis for practice is a worthwhile ambition, if the effect is seen as producing evidence that is *actionable* by teachers.

How then do we best understand the notion of evidence based practice and the ways in which it contributes to the knowledge building school and practitioner enquiry; and how might it be understood in the context of learning in museums?

Davies (1999) suggests that evidence based practice in education operates at two levels. The first is to *utilise* evidence from world wide research and literature on education; the second is to *establish* sound evidence, by carefully collecting information about particular phenomena. Schools in the Coalition of Knowledge Building Schools, of which I shall speak later, do both. They engage in a research effort which gathers local information, but also includes seeking and evaluating information and theories of practice from a wide variety of sources. Also, as I shall indicate at a later point in this paper, these schools are now collectively moving towards constructing knowledge, from evidence, which may be of use to others in the wider community.

A further issue raised by Davies is to query not only what counts as evidence, but also to consider the question evidence about 'what'? One might be interested, for example, in considering the consequences which result from changing a specific assessment practice, or introducing new technologies. Or, a museum might want to investigate the kinds of meanings students and their teachers and parents attach to the concept of what constitutes engaged learning. In either case they will need to ask themselves 'what counts as valid evidence in relation to the question being posed?'. I would argue that the evidence must be commensurable with that question.

Furthermore, I believe that we can think of the purposes for gathering evidence in three ways. The first of these is to use the evidence in adversarial settings where it is utilised to prove a case. Those seeking for that elusive, indeed I would argue impossible goal 'best practice' would wish to prove that one method is unarguably better than another. Thus, in medicine, using randomised control trials, there are those that seek for the 'best treatment' irrespective of the multitude of variables within any medical condition. Similarly education, whether in schools or museums, has been beset by the 'best practice' holy grail; as if it is possible to identify one best way, for example, to teach reading, or counter bullying in schools, or induct new and beginning education officers in the museum.

The second purpose for gathering evidence is to conceive of it within a discourse of forensic science, where the investigator is seeking above all else to understand a particular phenomenon. Knowledge building organisations clearly wish to achieve a deep understanding of that which happens within them: teaching and learning; managing human and material resources; communication and participation; and so on. Of course, this does not mean that practitioner enquiry should not concern itself with the quality of evidence, but rather the purposes to which that evidence is to be put. Norris & Robinson (2001) quite properly point out that a distinction should be made between weak and strong evidence.

There is a third conceptualisation of evidence which has been largely unexplored in the context of practitioner enquiry.[1] This is the notion of re-examining and re-interpreting evidence as an historian would. Evidence from past events can be re-

[1] I would like here to acknowledge and thank Nicole Mockler who raised this concept at the BERA symposium where an earlier version of this paper was presented.

thought and re-told in the light of new knowledge. For example, Davis (2001) developed an argument that late nineteenth century policies with respect to famines in the Indian subcontinent, Africa and China, were based upon precepts which argued that the indigenous people were indolent and unsatisfactory land managers and did not deserve support because they brought about the famines themselves. By re-examining the data on climate through an understanding of El Nino he has argued that the policies were morally unsustainable. Knowledge building organisations need to not only think about present events, but also to reflect on the organisation's past history and how this affects and influences what is happening today.

I shall turn now to school settings, before returning to consider evidence based practice in relation to learning in museums.

The Nature of the Knowledge Building School

How, then, do schools, as learning communities, acquire knowledge which will assist them in the improvement of practice in relation to pedagogy, curriculum, assessment, school organisation, leadership and management? For many the knowledge is tacit and seen merely as common sense which well may be based upon untested assumptions. For these schools, improvements which may come about, are more likely to be the result of good luck rather than good management. For some schools the process is one of identifying legitimated knowledge, through publications, conferences, professional associations, academic sources and the like. Finally, for a small number of schools, knowledge is acquired both through these public sources and through local knowledge, constructed by the school itself, in recognition of particular contextual features. It is with schools such as those in third category that this paper now concerns itself.

The notion of the school as a knowledge building organisation, founded upon evidence based practice, has now been widely discussed (Hargreaves, 1999b; Groundwater-Smith & Hunter, 2000). Practitioner enquiry, in this context, moves beyond the individual to the collective and sees as its objective that the whole school can be engaged in systematic enquiry as a normal part of its practice and a means of contributing to school improvement. The norms of individuality and privacy are transcended by norms of collaboration and collective deliberation.

The knowledge creating school, according to Hargreaves (1999b), is likely to be one in which the following factors and conditions, *inter-alia*, prevail:

- a culture of, and an enthusiasm for, continual improvement;
- a strong awareness of the external environment;
- high sensitivity to the preferences of key stakeholders
- coherent, but flexible planning
- recognition of expert knowledge held by teachers;
- professional knowledge creation as a whole school process;
- a readiness to innovate, treating mistakes as opportunities for learning (pp. 126-127)

Professional knowledge creation, from Hargreaves' perspective, is knowledge which is derived from the systematic accumulation of evidence. In effect it is developed from systematic forms of practitioner enquiry.

For me, evidence gathered by practitioner enquirers needs to stand a number of tests:

- *Is it ethical?* This test requires that the evidence is collected with informed consent from all participants in the research enterprise. Thus it does not set out to deceive or to coerce. Furthermore, there is a determination to minimise harm or damage. Of course, it is not possible to claim that no harm will be done simply because there may be unanticipated and harmful consequences.

- *Has it been triangulated?* The gathering of evidence from only one source, for example, a survey may produce a distorted picture of the phenomenon. It is essential that several data sources are explored and the subsequent results examined and explained.

- *Has it been intersubjectively verified?* The interpretation of evidence cannot rest only upon one investigator, it is important that it is explored from a number of angles, by a variety of stakeholders.

As well as these basic tests I would also add some further desiderata. I would argue that for the quality of the evidence to meet such standards the enquiry should be allowed sufficient time. A criticism of practitioner research undertaken within the context of a project is that the time frames lead to a 'speeded-up' game of enquiry and action (Heatley & Stronach, 2000, p. 415). Too often the school based practitioners are meeting the needs and deadlines of funding agencies who want to advise policy makers working within highly constrained timeframes. Also, as Ponte (2002) working in a Dutch context, points out, teachers need quite a long and continuous period of time to master practitioner enquiry. Not only does it involve them in developing a new skills base, but also in the formation of new and different attitudes to research. This cannot occur overnight. The Coalition of Knowledge Building Schools is, as yet, an embryo organisation; the members have been together for some eighteen months and are still working on their views and attitudes towards the evidence they are collecting and how it might best inform their practice. It is to the formation of the Coalition that I now turn.

Forming the Coalition of Knowledge Building Schools

Early in 2001, in Sydney, New South Wales, teachers from a small number of schools, three from the government sector and three independent schools, sat together and discussed the possible formation of a Coalition of Knowledge Building Schools. They saw themselves contributing to the ongoing improvement of the work of their schools through the systematic and public collection and discussion of evidence regarding teaching and learning within the lived life of the school. They had a view that evidence was best considered in the forensic rather than adversarial environment;

that is to say that it should be constructed and examined in ways which illuminate understanding rather than as a means of proving a particular case.

The participants in the discussion saw themselves having as their purposes:

- developing and enhancing the notion of evidence based practice;
- developing an interactive community of practice using appropriate technologies;
- making a contribution to a broader professional knowledge base with respect to educational practice;
- building research capability within their own and each other's schools by engaging both teachers and students in the research processes; and
- sharing methodologies which are appropriate to practitioner enquiry as a means of transforming teacher professional learning.

The processes which they wish to adopt are:

- developing new practitioner research methods;
- sharing methodologies which are appropriate to practitioner enquiry;
- engaging in cross researching in member schools;
- considering forms of documentation;
- reporting and critiquing research;
- engaging in collaborative writing and reflection;
- planning professional development to support practitioner research; and,
- considering ethics in practitioner research.

Since its inception a number of schools have indicated an interest in joining. A fourth government school is now a member. The group meets four times per year with different schools presenting brief research papers to their colleagues. A web based Authorised Users' Community has been established where further discussions can take place. Although this resource has been rarely used.

The embryo coalition believed that by embedding enquiry practices into the daily work of the schools it would be possible to evolve an authentic workplace learning culture. They recognised that professional learning is not an exclusively individualistic enterprise but that learning and growth can take place at the organisational, or corporate level. What is of particular note is that the Coalition did not form in response to external initiatives such as a funded program or university partnership, but because the schools themselves had an expressed desire to work in a particular way. Having said that it was also critical that the Centre for Practitioner Research, situated at the University of Sydney was able to and indeed desirous of, supporting the Coalition and providing it with some sort of institutional base.

Ebbutt (2002) makes a distinction between school engaged in: (1) no culture of research, (2) emergent research culture; (3) established research culture and (4) established-embedded research culture. Of the seven schools now in the Coalition, two would be in the second category, three in the third and two in the fourth. This mix makes for very generative interaction between the schools as they share and discuss their various enquiries. This is best demonstrated by a specific case study.

IGS – An established-embedded research culture

IGS is a large denominational comprehensive girls' school catering for students from Kindergarten to Year 12. It has been established in its current site for over 100 years and is well regarded in the community

As an independent school it has the capacity to make appointments which would not be possible, or certainly would be difficult, within the more regulated Government or Catholic sectors[2]. Just such an appointment is that of Researcher in Residence, a position which I have held at IGS for five years. Just as schools may appoint Artists or Writers in Residence, as people with particular skills which may enhance the creative work of the school, so it has been seen as desirable by IGS to have a person familiar with practitioner enquiry affiliated with the school on a long term basis. All the same, the position is one which stands outside rather than within the school itself.

As Researcher in Residence I am supported by a core of teachers who themselves have developed considerable research skills over the years. School based inquiries are subject to the approval of the Research Advisory Committee (RAC). This is an important component of the work. The RAC is comprised of the School Principal, the Head of the Junior School, the Directors of Learning and Curriculum, the Researcher in Residence, the School Chaplain[3], five students (who wrote expressions of interest) and three parents.

Research references come to the committee in a number of ways. The Principal or Head of the Junior School may have concerns which they believe deserve research, similarly teachers, students and parents may raise issues and they do. In the case reported here the reference for the research came from the Principal and the Director of Teaching and Learning; both of whom were concerned about the teaching of science.

Experiencing Science at IGS

When we match the learning needs of adolescents and teaching practices, as espoused through productive pedagogies (Hayes, Lingard & Mills, 2000) we have a picture of the interactive classroom where teachers and students work together to scaffold and construct learning. The Victorian Science in Schools (SIS) Project (Campbell & Campbell, 2001) which aims to improve the teaching and learning of science in order to encourage more students to participate in the Victorian Certificate of Education science subjects and pursue science related careers, has sought to delineate effective classroom practices for science learning for young people. These being:

- Science is linked with students' lives and interests;

[2] This is not an implied criticism of the committed and professional work of the teachers in those sectors, but rather a reflection of the constraints placed upon the schools by inadequate funding of education at both the State and Federal levels.

[3] While all members of the RAC have the responsibility to observe ethical concerns the Chaplain, who is skilled in matters of ethics and human research, keeps a special watching brief on this area.

- Students' individual learning needs and preferences are catered for;
- The classroom is linked with the broader community;
- Learning technologies are exploited for their learning potential;
- The learning environment encourages active engagement with ideas and evidence;
- Students are challenged to develop meaningful understandings;
- Assessment is embedded within the science learning strategy; and
- Science is represented in its many facets. (Campbell & Campbell, p.2)

Science teachers, working with adolescent learners in New South Wales Schools, face a very particular challenge. Their subject matter is often removed from the learner's ways of experiencing and knowing the world; and the curriculum itself is one which is acknowledged as overcrowded[4]. All Year 10 students are required to study chemistry, physics and biology in the expectation that such studies will enable them to make informed choices for their senior years where science is not compulsory. As well they are required to take part in a public examination. Thus there is considerable pressure upon both teachers and students, to complete the syllabus and to achieve well in the examination.

The study which has been undertaken at IGS recognises these pressures and constraints. Nonetheless, it was considered important to gather together teachers' and students' perspectives on science learning in Year 10 in order to develop some benchmarks of good practice which would support ongoing improvement in conditions for teaching and learning.

Methodology

A meeting was conducted with all available science teachers. Using the SiS components teachers were asked to indicate along a continuum how fully developed they believed these components to be in ISG science classrooms. Altogether 12 teachers completed the continua.

Seven students were randomly selected from each of the seven Year 10 science classes. They engaged in a focus group discussion with the Researcher in Residence, all but two of these sessions were witnessed by the Director of Curriculum or the Director of Teaching and Learning who were then able to provide a membership check in relation to the subsequent portrayals.

Students examined a range of images which they related to science and considered four of the eight SiS components, namely: The learning environment encourages active engagement with ideas and evidence; science is linked with students' lives and interests; assessment is embedded within the science learning strategy; and, learning technologies are exploited for their learning potential. Students completed a questionnaire which indicated their engagement within the focus group discussion. They were able to then

[4] In an address to the AIS (NSW) a senior member of the Board of Studies made clear that the current science syllabus 7 - 10 is one which includes too much content.

address two further matters: questions that they would have liked to have been asked and messages which they would like to give to their teachers.

Results were presented to the science staff, the Director of Curriculum, the Director of Teaching and Learning and the School Principal. Participants discussed those matters which surprised and concerned them and were asked to indicate up to five "messages" and the ways in which they would like to address them.

While it is not possible to discuss the whole study here, I have selected a sample of results which give a flavour of issues which were raised.

Results

Each focus group was given the name of a scientist and the discussion presented as a mini- portrayal to the science staff. Below we have the presentation of one such group, "Bronowski".

Which of these images represents for you learning science at ISG

The Barcode (6) When you look at the barcode it looks complicated and confusing. "Like in science there's a whole bunch of information, and they don't explain it". Students need to be able to crack the code. Some things <u>are</u> understandable, but it changes so much. "If you look carefully enough you can work it out." (referring to the hidden message in the bar code).

The Speeding Cars (1) The cars are driving around in a spiral, "that's what it's like, science takes you round and round."

The learning environment encourages active engagement with ideas and evidence.

Students perceived that it varies according to the teacher. Generally they saw that the classes were not active but places where they were expected to "sit up and write notes". They believed that you do not learn as well when just note taking as when you are doing it for yourself – but saw that this may not be appropriate for all forms of science, such as learning chemistry formulae. Often when the teachers are explaining they pace their explanations too quickly "it goes in one ear and out of the other, you end up thinking about something else and kind of give up." They saw that in Year 7 they had a lot of practical hands on activities and now they were moving more to theory "We have to grow up so fast!" The students believed that some people are just good at science; but some topics are harder than others and "you just don't get it"; it then depends upon the teacher as to whether they are assisted.

Science is linked with students' lives and interests.

Generally the students thought not. However, it depended upon the topic as to whether something was seen as relevant or not. They believed that biology was a good example of a topic which could be linked to their lives and interests. They believed that it would be better if they had more choice. When they sought to make links and ask questions they were admonished "Why don't you know"; this dissuaded them from asking again. Or, at other times, the explanation made the phenomenon even more complicated for them because some new information was inserted into the answer. In chemistry they felt that there was too much reliance on note taking and that many students failed in the tests.

Assessment is embedded within science learning strategies.

Students named practical tests, oral tests and written tests as forming the basis for assessment. They made particular reference to the Year 10 project which was to be undertaken during the holidays. They were not able to conference with their teachers at this time and would get stuck and then be less motivated to continue.

They believed that some of their teachers were alert to "who is not getting it", But generally they assumed that students were making the necessary connections and would just move on. They were critical of the yearly tests which covered 3 topics, some of which they had only dealt with some time before. Success in assignments was seen to be dependent on the student – some liked learning in this way, others did not. There was a view that many just cut and pasted information rather than trying to understand it and therefore did not learn much from doing the assignment. Assignments spread over time were done at the last minute and rushed.

Learning technologies are used in a variety of ways.

The assumption was that learning technologies, meant learning with computers. There was a strong consensus that they were not used in a variety of ways and that they did not assist learning.

Pen and paper was seen as best. "You don't have to scroll about to find something, in a book you can scan a page and flick about between the book and your notes and handouts." It was thought that if there was a CD version of the textbook then students might be more attracted to using their laptops "then we wouldn't have to carry both about."

They saw that they enjoyed their computers in Year 7 when they were still a novelty and teachers used them a lot. However, they argued that the technology is not dependable, "especially at that time when you are desperate!"

Each focus group completed a follow up questionnaire which tested the efficacy of the group and allowed for further matters to be raised:

Follow up Questionnaire (N=48)

1. *How did you feel during the focus group discussion? You can tick more than one of the points:*

• I felt comfortable.	77%
• It was fun.	35%
• I didn't get to say much.	10%
• Some students did all the talking.	12.5%
• I had a good chance to say what I thought.	81%
• If I had the chance I'd do this again.	67%

2. *What other questions would you like to have been asked about learning Science at IGS?*

Eighteen question related to teachers and their teaching styles. Below is a sample of the range of questions:

- How do you feel about the teachers, do you like the way they teach us?
- How comfortable do you feel with the teachers?
- Are there certain teacher flaws (without mentioning any names) that you would like to point out?
- Do you feel that your teacher listens and responds to questions adequately?
- Do you think that your learning/results is affected by the teacher you have, why do you think this?
- To understand the unit is outside tutoring necessary?
- Do the teachers pay more interest to the students who get the work and leave the ones who don't?
- Do your teachers know that you are suffering in a topic?
- Are there particular teaching styles we like a lot?

Fourteen questions related to the enjoyment of science learning and the ways in which it can be learned:

- Do we enjoy our science lessons and why?
- Is science fun for you?
- What might be improved so that student can learn and actually have fun learning?
- How do we feel about subject selection, being forced to do things unnecessary to us and therefore uninteresting?

- What other ways would you like to learn science?
- At what pace is your science class moving, is this a good pace for you?
- Are there other ways to learn besides copy notes every lesson?
- How does learning in science compare to other subjects?
- Do you really participate, do you like to drift off and why?
- (I'd like) questions concerning the topics/subject matter we are taught, how it can come into conflict with your own beliefs/understanding of the world, eg. evolution, and how we should deal with these conflicts.

Four questions looked at assessment and testing:

- What skills are tested when we do the assessment?
- How do you feel your marks reflect the effort you put in?

Two questions addressed homework and projects:

- How much homework do you receive and does it help you to understand the subject further?
- Do our teachers understand the project themselves?

Nine students noted that the range of questions had been sufficient for them:

- All the questions covered everything I wanted to say.
- The questions were actually spot on and practically covered the whole science thing.

Four students left this section blank.

3. *If you could give a message to your science teacher (s) what would it be?*

Again, only a sample of responses is presented here:

Teaching:

- I like learning science when the teacher appears to enjoy and likes teaching their subject, rather than simply teaching like they are "going through the motion". It makes it easier to approach teachers for assistance and feel more comfortable (when they like teaching science).
- To give us time and just appreciate that we are learning. I know they do try, but it's just that they can get impatient and demanding sometimes. It's understandable, but they can be hard to approach and get advice for asking a question.
- Everyone has their own way of learning. Some people are smart and could learn very fast and some learn slow and need encouragement. I know that teachers have a lot to teach during a short period of time, but I think when students ask questions, they should explain. And encouragement from

teachers is really important. No one would like their teachers to say things they do and rubbish and bad things about what they do.

- To recognise that not all students learn things the first time around. Acknowledge those who have tried their best rather than "rewarding" them with a negative comment or attitude.

Reflection as a Collegial Communicative Exercise

The notable feature regarding this work is not only the detail of what was done and the ways in which it was accomplished, but also the ways in which it enables the teachers to reflect together. Much of the work on teacher thinking has focused upon reflection as an individual act, rather than one which is a collegial communicative exercise.

As well, it has been a dialogic exercise which has engaged the school based practitioners and the external research adviser. Kemmis (2000) speaks of connecting the *lifeworlds of educational research*. Academic researchers and practitioner researchers operate in different realms with different mores and rewards. Nonetheless, the problems and processes on one side are interconnected with problems and processes on the other. Real dialogue between the two can contribute to a more inclusive critique of educational practices as well as informed, well judged actions.

I have argued that the kind of practitioner research, in which the given school has an interest, is becoming part of the culture of that school. School based research is not the one-off project, but is deeply embedded in each participants' consciousness

Making a Wider Contribution

What is now emerging from the Coalition is its enthusiasm to make a wider contribution to the knowledge of others. Currently it is exploring the possibility of working with the Australian Museum to look at ways in which students learn when they use the museum as a facility. The schools feel that they will both enhance their own corporate learning and that of the Museum also.

As well, the Coalition has been approached to take part in an international study examining what it is to grow up in a specific city, time and place. These are early days, but the possibilities are bounded only by the enthusiasm, energy and creativity of the schools themselves.

Conclusion – Implications for Learning in Museums

This brief paper can only capture a small part of the energy and dynamism of these knowledge creating schools who have undertaken to systematically collect and reflect upon evidence. There can be no question that issues of trust and risk are at stake when such work is undertaken (Groundwater-Smith & Mockler, 2001). As well, there can be no question that schooling is an uncertain environment and that schools are increasingly being placed into a competitive context. Given these two features the exercise of trust between those within the Coalition of Knowledge Building Schools is all the more

remarkable. The strength of the Coalition is that it is just that, a loose coalition governed by agreed principles rather than regulation and fiat. The great challenge facing the Coalition will be not only the establishment of trust but its maintenance. Indeed, for all of the schools involved the sustainability of evidence based practice will be a considerable and ongoing venture.

Clearly, museums are organisations where research and inquiry take place as a part of institutional practice. What may be a different trajectory would be where museums work together in a practitioner inquiry mode where fresh and innovative methods for capturing the voice of those using the museums' services are employed; and where there are opportunities to reflect, collegially, upon the nature of the evidence which has been gathered. How exciting it would be to find a sister coalition to the one which we have already founded – A Coalition of Knowledge Building Museums – where the knowledge is about professional practice and learning.

In terms of the wider discourse related to evidence based practice there is still much work to be done. The processes, problems and prospects have only been touched upon here. As a future strategy a joint roundtable focussing upon professional practice and which has been an ongoing enterprise between the Centre for Independent Journalism (UTS) and the Centre for Practitioner Research (UoS) intends during 2003 to make the object of its discussion Evidence and the Professions. It promises to be a fruitful year.

Keywords and Phrases: Evidence based practice, teacher professional learning, students as researchers.

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