

## **PRESEARCHING A BASELINE: SCIENCE IN VICTORIAN SCHOOLS**

**better known as**

**THE TRUTH IS OUT THERE BUT I CAN'T TALK ABOUT IT:**

**THE S FILES**

**or**

**STORIES FROM THE GARDEN OF GOOD AND EVIL**

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### Introduction

I would like to begin by quoting the abstract for this paper which was submitted to Peter Jeffery on 1 May 1998:

For some time there has been growing concern about the teaching and learning of science in Victorian schools (and elsewhere). In late 1997 a preliminary survey of some high schools undertaken by Deakin University confirmed anecdotal evidence about the negative attitudes of teachers and students to science in Years 7-10, and in April 1998 the Department of Education commissioned a baseline survey of science from P - 10 in government schools to collect data on such issues as teacher' beliefs, attitudes and practices in relation to science teaching, the priority given to science in schools and the nature and extent of support used/needed to enhance science teaching and learning. This paper will discuss both the methodology and findings of the survey in terms of the broader picture of science teaching and learning in schools revealed by other surveys such as the Third International Study in Science and Mathematics, with a particular focus on junior secondary school years, and in the context of other research on student identity construction in the middle school years. The paper will also address the conference theme in terms of how this type of research can count in influencing future directions for science education in Victoria.

When I wrote this abstract I was a member of a group<sup>2</sup> from the Faculty of Education at Deakin who were in the midst of undertaking a Science Baseline Survey for the Victorian Department of Education (DoE). At the time I believed (mistakenly, as it turned out) that, by the time of this AARE conference, I would be able to discuss both the methodology and findings of the study, particularly within the broader picture of science teaching and learning in schools revealed by other surveys, such as the Third International Study in Science and Mathematics (TIMSS). I also intended to address the conference theme - Research in

Education: Does it Count? - in terms of how this type of research can influence future directions for science education in Victoria.

Unfortunately politics has intervened and the focus for this paper has had to change. For this I do apologise, but it is due to circumstances beyond my control. My AARE paper is not the only presentation affected in this way. A subset of the Science Baseline Survey investigators<sup>3</sup> had proposed a session entitled "What Does the Science Baseline Survey tell us about the Teaching of Science in Victoria" for last week's Science Teachers' Association of Victoria's annual conference (see STAVCON '98 Registration Book, Session C13). As soon as the conference program was published we were requested by the Department of Education to withdraw the session. We did as requested. As academics we gain much in terms of both our theory and practice from doing research for the Department, and we were not going to jeopardise that by proceeding with the STAVCON session. However, it should be noted that there was much interest expressed in the session by STAVCON participants, either because they had been participants in the data collection or out of interest in what we found, and disappointment that it was cancelled.

There were eerie resemblances in this experience to The X Files - though in this case The S Files - in that The truth is out there, but we can't talk about it (hence my first sub-title for this paper). Perhaps, in presenting this paper, like Fox Mulder pursuing the X Files, I am jeopardising my own future (in my case for doing further research for the Department); I hope not. I will respect their gag and request that the data remain confidential as they do own the intellectual property rights. In this paper I do not intend to discuss the findings of the Science Baseline Survey beyond what has already been published with the Department's agreement in a more recent research study I have undertaken for them (Multimedia Science Resource Issues Paper, October 1998). But I do intend to focus upon the politics of doing such research, particularly in regard to whether such research counts and how it can count.

Firstly, I will discuss the Science Baseline Survey findings, to the extent to which public documents will allow. I will then discuss the sorts of methodological assumptions made by those who commission such research. Thirdly, I will discuss issues related to doing commissioned research in terms of whether it 'counts', and how we can make it count. Finally, I wish to raise the whole issue of intellectual freedom in academia and having to live with oneself.

Science in Victorian schools: SET for success

A centrefold in the 22 October 1998 issue of School News focussed on "Science in Schools: SET for Success", the Department of Education's Science, Engineering and Technology Strategy for spending \$2.2 million from the 1998-99 Victorian budget (see Appendix A). Here, under the heading of "Research Projects" is the following information about the Science Baseline Survey. I am assuming that I can tell you this much about the Survey because it has already been published in School News

Collection of Baseline Data

Why do science programs need to be expanded?

Data to assist the Department with its future planning has been collected on:

- teaching practices in science
- attitudes to science as a Key Learning Area

- curriculum programs and resources used
- assessment and measurement of science
- science-related professional development
- the degree of priority placed on science by schools
- the use of learning technology

The item ends with "For Inquiries on this project, contact: Phone (03) 9637 2175, Fax (03) 9637 2150 Email [susan.dennett@dse.vic.gov.au](mailto:susan.dennett@dse.vic.gov.au)". I have not pursued this contact for obvious reasons, but I would be most interested to hear what information others are given when they make inquiries about this project.

In the issues paper for the feasibility study for a secondary science multimedia resource for Years 7 - 8 we were allowed to mention the following findings from the Science Baseline Survey (Deakin University: c.1998):

The Science Baseline Survey indicated that the areas of the Science CSF in which teachers would appreciate some support in Years 7-10 were in the strands of Earth and Beyond and Physical World.

The Science Baseline Survey indicated that science classrooms were largely teacher centred and texts and photocopied notes were the chief resources used. There was an indication that teachers would like greater access to resources which would support a more student-centred approach, such as CD-ROMs, data collection, use of the Internet for individual or group research.<sup>4</sup>

The Science Baseline Survey indicated that teachers believed few students saw science as a good prospect for a career. A resource which exposes students to scientists at work and the importance of science in many fields may encourage students to better understand the work of scientists. <sup>5</sup>

The Science Baseline Survey indicated that use of learning technologies was very limited in junior secondary science classrooms. <sup>6</sup>

The Science Baseline Survey indicated that most science teachers use a restricted range of teaching methodologies.

The Science Baseline Survey indicated that one of the areas in which teachers showed lower confidence was in investigative skills.

Even though this data is very limited and provides only generalised findings, it does not paint a happy picture of what is going on in Victorian science classrooms in terms of the teachers believing that few students see science as a good prospect for a career, and the classrooms being largely teacher centred with texts and photocopied notes as the chief resources. The projects that are part of the Science in Schools strategy are intended to address many of these concerns. And it is possible to argue that the findings of studies such as the Science Baseline Survey can be seen as counting, in terms of their influence on policy initiatives.

On being a flâneur

As I was planning this paper, at the same time as being in the process of conducting research for the feasibility study, I came across a commentary on John Berendt's *Midnight in the Garden of Good and Evil* (Dale 1998)<sup>7</sup>. Dale's description of Berendt's narrator resonated with the approach I felt I was having to adopt in the research I was doing for the Department of Education:

Berendt's narrator, a New York journalist, begins as an outsider, what German philosopher Walter Benjamin called a *flâneur*, or idler, observing the physiognomy of a strange city and its inhabitants. He stumbles upon the scene of the crime - the grandest mansion in Savannah - and during his search among the traces, clues and secrets, is transformed into a detective.

In the Science Baseline Survey, and the other projects, the assumption and expectation of the funding agency has been that the researchers are in the position of outsiders, *flâneurs*, observing the physiognomy of the strange city (the science classroom) and its inhabitants (teacher and students). Yet we stumble upon the scene of the crime (the teaching of science) and are transformed (I'm not sure into what, but I wish to explore the possibilities in the next few sentences).

It may have been accidental, but I am reasonably confident that a contributing factor in our successful tender for the Baseline Survey was that the majority of us were former science teachers engaged in science teacher education. We knew the territory, which helped us gain the contract, but we were then expected to be outsiders. Yet we were not outsiders in science classrooms, we had all been there before and we had tacit knowledge of the situation. We had our own social and cognitive constructions of science classrooms, and our observations were contextualised by our own experiences (which is one reason why we try to undertake all interviews and observations in pairs). We are not, and never will be, *flâneurs* in science classrooms. Indeed, it probably added to our credibility with those we interviewed that we were 'one of them'.

So why is there the expectation of objectivity at the same time as an expectation of prior knowledge? Perhaps the myth of the objective researcher still abounds.

How and where does it count? It counts inside me

Although the findings of the research studies are the property of the funding agency, this does not stop the data affecting my thinking and my teaching. I do not live in an objectivist vacuum. Even though I cannot speak the findings the ideas are still in my head and influence my subjectivities. The research counts inside me.

For example, having the data that science classrooms are currently largely teacher centred, and texts and photocopied notes are the chief resources used, means that I will endeavour to encourage my science teacher education students to be student centred and to use a wide range of resources, and to practice what I preach to them. And having the data that most science teachers use a restricted range of teaching methodologies means that I will model and encourage the use of a wider range of teaching methodologies in my science teacher education classes. The research findings certainly count for me.

The research findings appear to count for the funding agency as there are correspondences between our research findings and the new initiatives in science for schools. They tell us that they count too.

The one place this type of research does not seem to count as much is within the university. As it is client driven rather than 'basic' research it does not seem to have the same status.

Yet in many ways the likelihood of success with a competitively tendered study (as long as it is appropriately targeted) is far greater than with an ARC Grant, and both bring in research dollars. So how can we make such research count more in a university context? Perhaps this is an issue for AARE.

### Intellectual freedom and property rights

I am currently in the process of completing my fourth competitively tendered research project in eighteen months. Each has been won through public tender from State government departments. Prior to these four projects I had not engaged in such research for some years (I had been rather preoccupied with completing my doctoral studies instead, and the opportunities had not arisen). However, my engagement in these projects has raised some significant questions about intellectual freedom and intellectual property rights.

The last time I had been successful in tendering for this type of research project was back in 1992 when I conducted an "Evaluation of Language Level of Australian National Parks and Wildlife Service Educational Information Leaflets Project" for the Australian National Parks and Wildlife Service (ANPWS) (Greenall Gough 1992). The findings of this study were not flattering to ANPWS, but they were still willing to hold a seminar focussed on the research findings and gave me permission to write a journal article around the results (see Gough 1997; the five year gap between the study and this publication resulted from internal procrastinations at the Journal of Environmental Education, not from my tardiness!).

My recent experiences have been with agencies who have not been so open-minded about releasing the findings of the research study. The evaluation of the Forest Education Project (Gough, Marshall, Matthews & Milne 1997) became an 'internal working document only' for the Department of Natural Resources and Environment (though it was interesting to note that tenders were recently called for the delivery of education programs at the Toolangi Forest Discovery Centre: but I can't say if this was related to our findings or not - it is more likely to have been part of the privatising of the functions of DNRE). In some ways, because this was a program evaluation it was not so difficult to think of it as a piece of commissioned research where the intellectual property was owned by the commissioning agency. However, when the foci of the research are schools, teachers, students and the teaching of science, which can be seen as being closely related to my own theorising and practice, then it is harder to disassociate myself from the research findings.

For example, in the exploratory study of science in Years 7 - 10 (Gough, Matthews & Milne 1998), which was commissioned by the Science and Technology Task Force of the Department of Education, many of the issues which were the focus of, and which emerged from, this study can be seen as being consistent with the recently announced Science in Schools: SET for Success projects described in Appendix A. However, the study was an 'internal working document' and nothing has been published related to the findings.

The third research project of this kind was the Science Baseline Survey (Gough et al 1998) which is the focus of this paper. As already discussed, this report is to be an internal working document for the Department of Education.

The fourth study is one which I am just completing (Gough & Marshall in press). This is a feasibility study for a science multimedia resource for Years 7 - 8, which is one of the Science in Schools projects. Again, this is to be an internal working document and the findings will help frame the content and format of the multimedia resource.

While it is understandable that the one who pays is in control, by having the final product of a research project as 'an internal working document' emphasises the service role academics

are now providing for government agencies. Nevertheless, the tenders for these types of research projects are quite competitive and coveted, so only the foolish are likely to engage in acts which may lessen their chances of being successful - as Ian Lowe (1998: 24) recently argued, "It is now a brave (or foolhardy) young academic who will antagonise powerful interest groups". Lowe (1998: 24) also reported that "A well-known television journalist recently lamented to me the reluctance of academics to appear in public discussion on the important issues of our time" as "only the most senior, the most secure or the most insensitive [are willing] to take the risk of upsetting potential sources of research support". Thus it is unlikely that the high moral ground will be taken by anyone, except those who do not want to do funded research.

It would seem that the days are gone when academics had intellectual freedom and the luxury of advancing knowledge by basic research, unless it is the sort of research that does not need external funds, and it must be admitted that at least in education there are still some who pursue these endeavours. However, if you need research funds, these are now very much sourced from client servicing, unless you are in the lucky 20 per cent who are successful with ARC applications. This is a huge change to educational research in a very short time, and are we ready for it? Do we really want to surrender our intellectual freedom? I think not, but it is getting more and more difficult to get funding for basic research, and where there are significant theoretical (and practical) findings emerging from the commissioned research we are unable to publish because of the intellectual property rights. Our intellectual freedom is getting more and more limited.

## Conclusion

In current educational and political climates - and particularly with the imminent restructuring of the ARC grants schemes - if we want to do funded research then our only alternative could well be to undertake commissioned research which has its intellectual property rights vested in the commissioning agency. We can attempt to negotiate publishing options, but we will not always be successful, particularly if the data is likely to be sensitive.

Even if we are not able to publish from such research the commissioning agency cannot stop the findings influencing our own theorising and practice, so the research counts inside our heads. But if we do not publish then it seems not to count with the University Research Office, as the 'confidential' report to the commissioning agency is not a peer reviewed publication for DETYA points. For some this may not matter, but in other ways it makes the research seem less 'legitimate', even if we do get recognition for winning the competitive research project in the first place. The research 'counts' for the commissioning agency (especially as the data is often quantitative, but also often has an influence on their future planning), but the challenge is to make it count more for us, particularly within our institutions.

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1 221 Burwood Highway Burwood Vic 3215, 2 The survey was undertaken by Annette Gough, Alan Marshall, Robin Matthews, Gillian Milne, Russell Tytler and Geoff White (see Gough et al 1998) 3 Annette Gough, Alan Marshall, Russell Tytler and Geoff White 4 This finding relates very closely to the brief for feasibility study for the secondary science multimedia resource for Years 7 - 8. 5 This finding relates very closely to the brief for feasibility study for the secondary science multimedia resource for Years 7 - 8. 6 This finding relates very closely to the brief for feasibility study for the secondary science multimedia resource for Years 7 - 8. 7 The date of this article is 14 November 1998 - despite Peter Jeffery's urgings, my paper was not written months ago! GOU98232 Researching a baseline: Science in Victorian schools

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