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ABSTRACT

This paper explores questions about the ways in which students, teachers, administrators, and parents negotiate new sets of roles and expectations for schooling in the innovative climate of a new middle school. A new school in an Australian city has implemented a coordinated package of approaches including integrated curriculum, portfolio assessment, a team approach to teacher collaboration in curriculum development, and an ethos of caring and responsibility. The study that this paper was based on employs a narrative research methodology in order to understand the interplay of a large number of institutional, social, and personal factors acting in a complex situation. Also included is a discussion of the ways in which the research methodology contributed to the understandings developed by the researcher about his professional practice and that of his colleagues. Contains 20 references. (DDR)

Weaving Narrative Nets to Capture School Science Classrooms

by David Geelan

Weaving Narrative Nets to Capture School Science Classrooms

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Abstract

Reforms and innovations in education frequently meet with unanticipated resistance from students and teachers. A new school in an Australian city has implemented a coordinated package of innovative approaches to middle schooling including integrated curriculum, portfolio assessment, a team approach to teacher collaboration in curriculum development and an ethos of caring and responsibility. During 1996 I was involved in team-teaching science with a number of teachers at the school who were not science specialists. This paper explores questions about the ways in which students, teachers, administrators and parents negotiate new sets of roles and expectations for schooling in such an innovative climate. I chose a narrative research methodology as one way of richly understanding the interplay of the large number of institutional, social and personal factors acting in this very complex situation. My intention in this paper is to explore the ways in which the chosen methodology contributed to the understandings I developed in the course of reflecting on my own professional practice and that of my colleagues, and to communicating these understandings to other teachers involved in similar innovations.

Introduction - Context and Biography

This study explores the constraints and successes encountered in attempting to implement a number of innovative teaching approaches in five middle school classrooms in an Australian city during 1996. The innovations included a constructivist (Taylor, 1996; Taylor & Campbell-Williams, 1993; Glasersfeld, 1993, 1989; Solomon, 1987; Tobin, 1990) epistemological perspective, portfolio assessment (Duschl & Gitomer, 1991) and ethical commitments to caring (Noddings, 1984), courage, fairness, honesty and practical wisdom (Sockett, 1993).

The research grew out of my earlier study (Geelan, 1994, 1996) on my attempts to support my students in becoming 'active learners'. That study found that the innovation was largely unsuccessful, and that students and teachers became frustrated by the challenges to existing roles and expectations. The pressures placed on students by expectations - their own and their parents' - place a low value on greater quality of understandings and the development of transferable learning skills, and a high value on good grades. Their attitude was that, by attempting to change their learning roles from passive to active, and my own teaching role from the dispenser of information to facilitator of learning, I was abdicating from my key responsibility of helping them to memorise the information they would need for success in their examinations.

I continue to value active learning and students' development of attitudes and skills to learning

that will better fit them for a world in which they will need to continue to learn at a rapid rate in order to survive. If such changes to the expectations of students are to occur, however, it will not be because teachers have unilaterally chosen to change their own roles, it will be through a process of negotiation and role redefinition that includes all stakeholders, including parents. The results of my earlier research (Geelan, 1994, 1996) had convinced me that this was the case, and the commitments, approaches and perspectives of those who planned Arcadia High School[1] suggested that such an approach would be attempted at the school.

Arcadia opened in 1995 with 600 students in Years Seven and Eight (about ages 13 and 14). The school is in the rapidly growing western corridor of an Australian state capital, and was needed because a rapidly expanding population meant that the two local secondary (high) schools and five primary (elementary) schools were all over flowing. A visionary team of educators, led by the foundation principal Terry Jenner, chose to make this school something fairly new for Australia - a middle school. In the state where Arcadia was developed, Year Seven is the final year of primary school, and Year Eight the first year of secondary school. The change in culture and approach between the two levels of schooling is quite dramatic: in primary school, students spend their day largely with one teacher, in one classroom, while in secondary school they may have up to six different teachers and move to a new room for each subject. Primary schools are generally smaller, around 300 students, while suburban secondary schools can have up to 2000 students.

It was decided that Arcadia would be a middle school, relieving stresses on both the local primary and secondary schools, but what is more important, easing the transition for students. The programme developed was similar to that in primary schools - students had a home room and a home room teacher, who taught them all learning areas (subjects) except arts, technology, sport and Languages Other Than English (LOTE). It was felt that such a structure had significant potential to support students in developing transferable learning skills as well as a high level of literacy. Other innovations introduced to support this approach included portfolio assessment (Duschl & Gitomer, 1991), intended to de-emphasise grades as a motivator and to value work the students did outside exam conditions, and teacher collaborative planning, intended to support teachers in providing a genuinely integrated curriculum.

My role within the school during its inaugural year, 1995, was as a teacher educator, involved in some professional development courses with some teachers in the school. Because there were several teachers who were interested, the university course was run on the school site, rather than at a university campus. This gave me a strong feeling for both the exhilarating successes and the frustrating challenges of attempting to bring together a mixed community of primary and

[1] A pseudonym, as are all names in this paper.

secondary teachers (since there were no middle schools in the area, there were no trained and experienced middle school teachers), and to blend and balance the two cultures in ways that would best support students' learning and personal growth. At one point it became so bad that it appeared the school community might just fly apart from the centrifugal force of conflicting expectations, but by the end of 1995 a synthesis had been reached that had many teachers raving over the new freedom they felt to teach in innovative and creative ways.

In 1996, the school added Year Nine (that is, the previous year's Year Eight students moved into the new grade), which meant that the student population increased by a third, to more than 900 students. This meant that the teaching staff also increased by a third, from thirty-five to almost fifty. I chose to conduct my doctoral research in the school because I felt that what was happening there was exciting, and that it related strongly to my own educational commitments and values. I saw the research as an opportunity to put into practice the new understandings gained from the earlier research. I also felt that it was important that I give to the school at least as much as I took - ethically, it would not be fair for me to gain many benefits (my PhD, publications, a reputation) from conducting research in the school, to take the teachers' and students' time and energies and stories and offer nothing in return. I also wanted to take advantage of the fact that I had a PhD scholarship to conduct some long-term, close-up, intensive study of teaching and learning in classrooms - I knew that in the full life of an academic I may never have such an opportunity again.

For this reason, I volunteered to team teach at Arcadia for 2 ½ days each week throughout the 1996 school year. The teachers had been either primary or secondary teachers, and most of the secondary teachers had specialised in areas such as English and Social Science. For this reason, many of the teachers felt very uneasy about teaching science. As an experienced science educator, I offered to help out in this area. While teaching, I would observe my own teaching practices and those of my colleagues, and the reactions and interactions of the students. I would attempt to record the happenings, emotions and implications of the classrooms through the writing of 'impressionistic tales' and would check the plausibility of these tales through interviews, surveys and other forms of evidence. I taught in five different classrooms, with five very different teachers. Only one had been at the school in 1995, so in their various ways, each had to experience for him or herself the process of a dramatic change of educational culture and expectations.

The current study focuses on my own experience in working as a team teacher, supporting nonspecialists (elementary teachers and secondary teachers from other learning areas) attempting to teach science for the first time. My own teaching practice was intended to embody a critical constructivist (Taylor, 1996; Taylor & Campbell-Williams, 1993) perspective, and to introduce new teaching strategies and epistemological perspectives through negotiation (Corbett & Wilson, 1995).

A narrative methodology, (Connelly & Clandinin, 1996) incorporating impressionistic tales of the field (Van Maanen, 1988) was chosen for the study, as I felt that it was most able to capture the full richness, complexity and human quality of school life. Theories, however complex, must simplify life by abstracting some facets and ignoring others. Stories, too, highlight some facets and hide others - a process of selection is involved. I believe, however, that stories, through allusion and shading and other fictional techniques, can capture facets, faces and voices in classrooms that are missed by theories and the practices of theory-building. I will argue that stories and impressionistic tales are valuable as planks of a research methodology for what they show us, but that their use must be accompanied by a critical consciousness of what it is they hide.

This research is intended to speak richly to other teachers and educational researchers - possibly engaged in the introduction or evaluation of similar constructivist innovations in science education - of the struggles, critical reflections and triumphs involved in attempting to improve the equity, relevance and power of science education for our students.

If educational innovations are to succeed, they must take a more realistic view of the realities of classroom life than have some past curricular projects. The three key areas identified by this study - **complexity** and interrelatedness, **teacher beliefs** and **student expectations** - are essential, complementary facets which must be addressed in any educational innovation if it is to be successful.

Theoretical Framework

The central theoretical perspective underpinning the study is a critical constructivist (Taylor, 1996; Taylor & Campbell-Williams, 1993) epistemology, which combines personal constructivist emphases on the constructed and idiosyncratic nature of knowledge (Glasersfeld, 1993, 1989) with social constructivist understandings of the collaborative and intersubjective nature of learning (Solomon, 1987; Tobin, 1990).

It further adds a critical theory (Habermas, 1978, 1971) perspective on the nature of education as a socio-political process, drawing attention to such 'oppressive myths' of classroom epistemology and practice as 'hard control' and 'cold reason' (Taylor, 1996). Habermas (1971) identifies three forms of 'human interests', with their accompanying epistemologies. The *technical* interest has been the dominant paradigm in Western culture. It is concerned with understanding for control, with predictability and uniformity. It is the rationality of the physical sciences. The *practical* interest embodies a concern for understanding and relationship, and for communication. It is a hermeneutic rather than a strictly empirical rationality, which values the development of rich communicative relations with others. The *emancipatory* interest is concerned with power - with challenging reified structures of power and institutional control.

Critical constructivism draws the attention of educators to the social and political forces that surround and shape education. Rather than simply a technical rationality concerned with cultural reproduction - training students into an existing social position and set of knowledge and values - a critical perspective renders those values open to challenge. The combination of the practical interest with social constructivist epistemology is particularly powerful in developing an understanding of the ways in which knowledge is socially constructed, negotiated and organised.

Both the teaching innovations I attempted and my interpretive research methodology were underpinned by critical constructivist epistemological perspectives. This meant realising that, like those of my students, *my own* knowledge and understandings were constructed. Steier (1995) refers to this understanding as 'reflexivity', and to constructivist perspectives that do not include it as 'naive constructivism'. From a reflexive perspective, it is no longer possible (if it ever was) for the researcher to stand off from the life in classrooms and 'objectively' observe. The researcher, too, is involved in life, in learning, in understanding. Steier suggests that if a concern for reflexivity is taken seriously, teaching, learning and research merge to become 'collaborative social learning'. This was my experience - I was both teacher and researcher, teacher and learner, learner and researcher. I, like my students and my colleagues, was seeking to understand, and to shape my behaviour and practices on the basis of my new understandings, in an iterative process that never ceases while we breathe. I felt that my research would be much more relevant to classroom teachers if I were able to experience and represent the life of a classroom teacher in an authentic way, rather than in the way that an external university researcher might. Stories seemed to me an especially powerful way of capturing and sharing such experience.

Methodology

The research took an *interpretive* (Erickson, 1986) form, in which I attempted to reflect actively and critically on my own educational practices and commitments, as embodied in my teaching practices and the science curricula[2] that I developed for my students. A concern for reflexivity (Steier, 1995) that led me to see my activities in the school as collaborative social learning, along with a critical constructivist (Taylor, 1996) approach to learning and reflection meant that I was crucially involved in the research. Far from being a detached, notionally absent observer of classroom life, I was myself a part of the life in the classroom, often a focal part. Further, I unavoidably brought my own perspectives, ideas, biography and biases along with me into all my activities, including the research. It would have been possible, by the use of formal, distancing, passive language to pretend that this wasn't the case, but that would have been dangerously false: it is safer to acknowledge that my biases exist, and to try to identify them so that the reader can

[2]I am using 'curriculum' in its broadest sense here - to include not only the learning objectives and the planned experiences I designed for the students, but also the values and ideas that underlay them.

discount them, than to pretend the data just gathered itself.

The key form of evidence used in the study is the collection of *impressionistic tales* (Van Maanen, 1988) that I wrote immediately after each 'critical incident' in my teaching or in the school. These consist of short narrative pieces in a variety of literary genres - journalistic reportage, reflective analyses, fictionalised incidents or pieces of fiction. They are intended to capture not only the incidents that occurred, but - by analogy with impressionist paintings - the feelings and ideas which these incidents aroused in me, and the ways in which they affected my construction and understanding of my teaching and my students' learning.

Other evidence collected included transcripts of audio-taped conversations with the five teachers and data from the Constructivist Learning Environment Survey (CLES) (Taylor, Fraser & Fisher, in press). This data both supported and challenged the ways I had construed events, contexts and motives, leading to a deeper appreciation of the school context, and the constraints and freedoms of classroom teachers. The three assertions that form the results of the research grew out of the process of living and working as a team teacher within the school. I do not mean this statement in a grounded theory (Strauss, 1990) sense - that perspective takes a much more *tabula rasa* approach to the role of the researcher. It was David Geelan, with his own concerns, ideas and history, who taught, discussed, observed and collated the experiences that together provided the evidence for the assertions. In that sense, this is not hypothesis testing but hypothesis generating research: it has not proved its results, but has generated a number of intriguing hypotheses, for which further confirming and disconfirming evidence will need to be marshalled, both in my own ongoing reflections on my teaching practice and by others who may take up these concerns for exploration in their own teaching.

The narratives were woven together with the other evidence to develop a richer variety of 'school stories' and 'teacher stories' (Clandinin & Connelly, 1996). Much of the interest of the overall study was in the ways that the stories told by individual teachers contrasted with the 'sacred stories' on which the school was founded. One of the five teachers with whom I taught, for example, was violent and verbally abusive towards students, in spite of the school's foundational ethic of caring. The ways in which the school administration and the school community dealt with this situation were illuminating of the conflicting value perspectives and value judgements made, and the tale of this teacher also helped me to reflect on my own propensities for aggression. Each tale on its own is powerful, and tells us something new, or affirms something we already knew, about life in schools. But it is the rich and complex braid made of a hundred individual stories and incidents that becomes a far more powerful tool for understanding school life.

Results and Discussion

The results of this research project have been represented in two complementary ways, each of

which reflects on and aids in the understanding of the other. One of these is a 'novel' that will form the first half of my PhD thesis. This 30,000 word volume weaves together in chronological order the many different stories of students, teachers, ideas and conflicts that were gathered in the course of my year in the school, along with the events in my own life (including a badly broken leg that put me on crutches for three months) that surrounded my life in the school. The novel also relates the development across the year of my own understandings and tentative theories. This rich story should not be seen as 'the data' for the study - it also represents, although in a non-traditional way, the results and conclusions drawn from the research.

The second half of the study, however, is reported in a more traditional, although still interpretive, mode of representation. The results are presented as a number of tentative 'assertions', for each of which confirming and disconfirming evidence is presented.

1. **Schools are enormously complex environments:** attempts at curriculum innovation, particularly those which involve changing teachers' and students' *roles* and *expectations* (as opposed to simply changing the 'content' taught), must take seriously this complexity.

Although most educators would assent to this proposition, I would suggest that the richness of narrative accounts has the potential to give readers a stronger feeling for the complexity of school contexts - not only the numerous stakeholders and their complex interactions, but also the beliefs and assumptions which underlie such interactions - than more traditional research approaches. Oversimplifying the school context can lead to oversimplifying what must be addressed if curricular innovations are to succeed, which, in turn, can lead to the failure of such innovations

2. **Many of the constraints faced by teachers in attempting curricular innovations are based in 'conceptual inertia'** on their own part or that of their colleagues, rather than in systemic problems.

Teachers and researchers often describe resistance to change as resulting from pressures of external examinations and State prescriptions. These are important sources which must be addressed, however in the context of the present study, my own and others' key difficulty was in reimagining what it meant to be a teacher within the new commitments we were attempting to embody in our teaching, and to escape from the patterns imposed by our personal biographies, first as learners and then as teachers.

In saying this, my intention is definitely not to lay blame on the teachers: my own inertia was probably as great as or greater than that of my colleagues. Instead, I intend to identify the power of critical reflection by teachers on their own assumptions and practices as a key influence for curricular change. Such reflection calls into question teachers' taken-for-granted assumptions about what is natural and necessary in education. It requires them to ask questions about the degree and source of constraint acting on their classroom practices, to determine whether it is really as great as they believe (it often is not), and to find creative, educationally defensible ways

of addressing the constraints placed on teaching and learning. It is ultimately empowering.

3. **Changing teachers' beliefs and practices is necessary but not sufficient: students' roles, expectations and epistemological perspectives must be explicitly addressed.**

In my own teaching life (Geelan, 1994, 1996) I have several times fallen into the trap of attempting to change what happens in my classroom by changing myself as a teacher. Such changes have consistently failed, simply because, while I had changed my expectations of myself and of the students, they continued in traditional expectations of me and of themselves. This led to significant frustration on the part of everyone involved.

Rather than simply changing teachers and expecting students to automatically change in response, a more powerful approach is to explicitly negotiate with students, in an authentic, non-coercive way, the new constellation of expectations required by the proposed innovation. Corbett and Wilson (1995) have suggested that teachers and reformers 'make a difference with, not for, students' - the research project reported here has led me to believe that such an approach is crucial.

This need not and should not mean walking into class on the first day of the year and saying 'Let's negotiate' - that can lead to chaos and inequity, since the students have no negotiation skills in the school context: they have been told what to do for their entire school lives. Instead, it involves a conscious, planned programme of activities and approaches intended to *teach* the skills of negotiation, followed by and complemented by an authentic willingness to allow students to participate in decisions affecting their own education (and also an awareness of which decisions can and cannot appropriately be made by students).

Conclusions and Future Research Directions

The conclusions of this research fall naturally into two areas. One is that represented by the three assertions presented above. This may be summarised by saying that the path to school reform is far more complex and difficult than it may at first appear. Perhaps this does not qualify as new knowledge - the last two decades of much hyped and rapidly discarded curricular and social reforms in schools provides plenty of evidence of the difficulty of innovation. I would suggest, however, that the original contribution of this research is in offering a richer, less abstract and theoretical, more 'teacherly' appreciation of the particular kinds and areas of complexity and resistance, as a first step toward addressing them in reforms. The research also points to the necessity for innovations to be introduced through ongoing collaboration and negotiation between all stakeholders - teachers, administrators, parents and particularly students. Such negotiation must explicitly focus on the nexus between the social forces of school culture and the roles - the sets of interrelated expectations - that each individual brings to the school situation.

The second area of interest is the methodology employed. While considerable space will need to be devoted in my thesis to a scholarly justification of the legitimacy of narrative methodologies and impressionistic tales as research, I wish to leave those questions aside here, and simply suggest that 'the proof of the pudding is in the eating'. I believe that I have been enabled, through participating in these classes and writing these tales, to strengthen and deepen and elaborate my understandings of the processes and antecedents of school education in ways that no other research methodology would have supported. I also believe, based on experience at local conferences and on discussions with teachers, that these stories allow me to communicate my newly developed understandings *to teachers* in ways that would otherwise be impossible. Much research into science teaching is written in language and couched in ideas that make it either inaccessible or plain irrelevant to classroom teachers. I believe the narratives of experience that form the 'product' of this research project will empower teachers to enact positive changes in their own teaching practice and their own educative communities.

References

Clandinin, D.J. & Connelly, F.M. (1996). Teachers' professional knowledge landscapes: teacher stories - stories of teachers - school stories - stories of schools. *Educational Researcher 25*(3): 24-30.

Corbett, D. & Wilson, B. (1995). Make a difference with, not for, students. *Educational Researcher 24*(5): 12-17.

Duschl, R.A. & Gitomer, D.H. (1991). Epistemological perspectives on conceptual change: implications for educational practice, *Journal of Research in Science Teaching 28*(9): 839-858.

Erickson, F. (1986). Qualitative Methods in Research on Teaching. In Wittrock, M.C. (Ed.) *Handbook of Research on Teaching* (3rd Ed.): 119-161. New York: Macmillan.

Geelan, D.R. (1994). Learning to communicate: perspective transformations of a developing science teacher. Unpublished M.Ed. thesis, University of Melbourne.

Geelan, D.R. (1996). Learning to communicate: developing as a science teacher. *Australian Science Teachers Journal 42*(1): 30-34.

Glasersfeld, E. (1993). Questions and answers about radical constructivism. In K. Tobin (Ed.), *The practice of constructivism in science education.* Washington, DC: American Association for the Advancement of Science Press.

Glasersfeld, E. (1989). Cognition, construction of knowledge and teaching. *Synthese, 80*: 121-140.

Habermas, J. (1978). *Legitimation crisis.* Translated by T. McCarthy. Boston: Beacon Press.

Habermas, J. (1971). *Knowledge and human interests.* Translated by J.J. Shapiro. Boston: Beacon

Press.
Noddings, N. (1984). *Caring: a feminine approach to ethics and moral education.* Berkeley: University of California Press.

Sockett, H. (1993). *The moral base for teacher professionalism.* New York: Teachers College Press.

Solomon, J. (1987). Social influences on the construction of pupils' understanding of science. *Studies in Science Education, 14*: 63-82.

Steier, F. (1995). From universing to conversing: An ecological constructivist approach to learning and multiple description. In L.P. Steffe & J. Gale (Eds.) *Constructivism in education.* Hillsdale, NJ: Lawrence Erlbaum.

Strauss, A.L. (1990). *Basics of qualitative research: grounded theory procedures and techniques.* Newbury Park, CA: Sage Publications.

Taylor, P.C. (1996). Mythmaking and mythbreaking in the mathematics classroom. *Educational Studies in Mathematics 31*: 151-173.

Taylor, P.C., Fraser, B.J. & Fisher, D.L. (in press). Monitoring constructivist classroom learning environments. *International Journal of Education.*

Taylor, P.C.S. & Campbell-Williams, M. (1993). Critical constructivism: Towards a balanced rationality in the high school mathematics classroom. Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA.

Tobin. K. (1990). Social constructivist perspectives on the reform of science education. *Australian Science Teachers Journal. 36*(4): 29-35.

Van Maanen, J. (1988). *Tales of the field: On writing ethnography.* Chicago: The University of Chicago Press.

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