

RATING ELECTRONIC WRITING TECHNOLOGIES INTO CLASSROOM PRACTICES: A
STUDY OF FIVE TEACHERS
TEACHERS, TECHNOLOGY AND CHANGE: A STUDY OF
FIVE TEACHERS

Abstract - This two year study examined how five teachers introduced the use of portable computers into the writing practices of their classrooms in an Australian school. Analysis focused on how the teachers structured and carried out classroom writing practices and on how students participated in writing tasks when they had access to the computers. The findings suggest that computers function in classrooms as part of a complex network of social and pedagogical interactions. The study concludes, however, that the teachers' disposition toward the writing technologies and their structuring of writing sessions had the greatest impact on students' writing practices and the ways computers entered into that writing.

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Introduction

Computers have been heralded as part of a revolution that promised to transform economic practices, redefine literacy and offer a panacea for educational problems. Indeed, early studies investigating the use of computers for writing in school settings suggested that the technology would improve the teaching and learning of writing. Reports of such studies built on a notion of technological determinism (Hawisher, 1989; Kaplan, 1991). The findings suggested that word processors freed students from recopying thereby giving them more time to revise and improve their texts (Daiute, 1983, 1985). More recent discussions of the effects of electronic writing technologies have adopted a similar approach arguing, for example, that computers change the ways in which students learn to write (Cochran-Smith, Paris & Kahn, 1991). Computer writing technologies have also been seen as altering the sociocultural complexion of classrooms, making them more cooperative and collaborative and, at the same time, eliciting more independent and resourceful behaviour from students (Herrmann, 1987; Dickinson, 1986; Snyder, 1993a, 1994a). (See Snyder (1993b) for an overview of the writing and word processing literature, 1978-90.)

In studies which assume a position of technological determinism, the computer is characterised as 'an independent agent of change operating on student writing processes and products and on social contexts like

the classroom' (Greenleaf, 1992, p.2). Papert (1987) has labelled this approach to the investigation of computers in education 'technocentric'. He admonishes researchers who ask questions such as: 'What is the effect of the computer on the quality of students' writing?' Questions framed in this way, argues Papert, ignore the sociocultural context in which the computers are used (Emihovich, 1990). Indeed, experimental designs do seem ill-suited to the task of revealing the multiplicity of factors which affect students' learning when using computers in the classroom. More disposed to highlight the complexities of the cultural context in computer-mediated learning are qualitative approaches: anecdotal stories, single classroom studies and ethnographic research methods (Brodkey, 1987).

Although a number of qualitative studies of computer writing classrooms have been carried out, they also have tended to focus on how computers affect social contexts for writing (Dickinson, 1986; Herrmann, 1987; Snyder, 1994a). Qualitative studies of the ways social contexts can influence computer use are simply not represented in the literature. Yet the teacher's experience with computers, attitudes toward the technology, pedagogical objectives, arrangement of the social structure of the class and the prior experience of the students are some of the more important influences which need to be examined if we are to fathom the complexities of computer-mediated writing classrooms (Greenleaf, 1992).

With these understandings in mind, the central focus of this research is the complex networks of interactions between computers and the social practices of classrooms. The study deliberately attempts to resist a 'unidirectional' (Greenleaf, 1992, p.2) approach. It examines how introducing computer writing technologies into the writing practices of six classrooms both influenced and was influenced by the social environment of the classroom.

In this study, classroom learning is construed as social and communicative (Bruner, 1986; Vygotsky, 1978). Further, the critical role of the teacher in the student's progression toward autonomy is acknowledged (Shulman, 1986, 1987), together with the teacher's responsibility to make pedagogy as transparent as possible so that

students can grasp adult forms of enquiry and thereby learn (Vygotsky, 1962, 1978).

Writing is recognised as a social activity, grounded in the particular meanings and practices of particular writing communities (Bizzell, 1982; Heath, 1983; Freedman, Dyson, Flower & Chafe, 1987). At the same time, writing is also recognised as a cultural activity manifested in the cognitive processes of writers and readers (Brandt, 1992; Flower, 1989). Writing is thus seen to have both social and cognitive dimensions. A sociocognitive view of writing asserts that learning to

write is socially based, that it is an interactive process and that writing practices are influenced by context and affect the meanings that writers produce (Langer, 1987). It follows that the writing practices valued and promoted in classrooms by teachers influence the nature of the lessons students experience and the skills they are likely to acquire. It is important, therefore, to study the social and literacy practices of computer-mediated classroom settings to understand how the use of computers influences students' writing practices and to identify effective ways in which teachers can introduce and ultimately integrate the use of computers into their school writing curricula.

Design

The two year study examined how five teachers introduced portable computers into the writing practices of their classrooms. In the first year, the study centred on one grade 6 classroom. The focus extended in the second year to five year 7 English classrooms into which the 27 grade 6 students had progressed. (One teacher was responsible for both the grade 6 class and one of the year 7 groups so that altogether there were five teachers and six classes involved in the study over the two years.) The research concentrated on how the teachers introduced the use of computers, how they approached classroom writing practices with computers and how the students used the electronic technology for their writing.

The context for the study was a private school (P-12) located in Melbourne, Australia. The school prospectus describes the outer suburban campus as 'a modern, well-appointed, co-educational school situated on a panoramic 20 hectare property'. The pursuit of academic excellence is the school credo, but students are also involved in activities 'which enhance their personal, spiritual and social development'. The curriculum is described as 'traditional and academic', but the potential clients are assured that the teaching methods take advantage of 'the very best in modern technologies'. The prohibitive fees ensure that most of the students come from homes of higher socio-economic status. The school's commitment to integrating computer technology into curriculum practice is evidenced by the aim to provide the students with access to computers in all curriculum areas, a goal which is being realised rapidly.

In the first year of the study, Tom and his grade 6 class provided the focus. Tom had been teaching for 11 years when the study began. He was an enthusiastic and committed teacher, interested in research and the application of research to classroom teaching. He was particularly interested in the possibilities offered by computers for students' learning. He had completed half a postgraduate degree in educational administration and was promoted to Deputy Head of the primary school at the study's end. Tom was self-taught with computers and had assumed the role of resident computer expert in the primary division. It is of

interest to note that although 85 percent of the teachers in the primary division of the school were female, it was a male who

spearheaded the drive toward computerisation.

There were two grade six classes with 28 students in each. The classes were not streamed or grouped according to any specific criteria. Tom's class was not particularly notable for behaviour, achievement or attitude. At the outset of the study, 90 percent had home computers (mostly MS DOS) which they used primarily for games and only occasionally for writing.

The school was designed in clusters of classrooms. The grades 5 and 6 cluster comprised four classrooms around a central open area. There were also two teachers' work rooms and two storage rooms which housed the computers and sets of books. At the beginning of the school year, 15 Sharp 4741 XT laptop computers with 40 Mb hard drives were made available to Tom's class for the six weekly language lessons - scheduled as three double lessons. Two laser printers were accessible for students' use in an adjacent area. For two of the six lessons, the students went to the library, where they spread out in a large, bright, open area. Half of the students used Type to Learn (1988) for the first ten minutes of each computer writing lesson and then worked on their current writing task for the rest of the time. They used Forte (1988) word processing program. At the end of the first lesson of the double period, Tom told the students to swap and the second group had use of the computers, first for the development of keyboarding skills and then for writing.

In the second year of the study, the focus shifted to the year 7 English teachers and their classes among which the grade 6 students were dispersed. Four of the five year 7 English teachers were females whose average age was late 30s, all with at least 10 years of teaching experience. Miranda was a confident, regular user of computers. Jane, Diana and Kate approached computers in the classroom with caution, if not trepidation. The fifth year 7 teacher was Tom.

Tom's job description changed in the second year: he continued with a grade 6 class but for Maths only, and was deployed half-time to the secondary school. His brief was to assist the years 7, 8 and 9 Humanities and Social Science teachers with the integration of computers into their curriculum activities. He had one year 7 English class and was timetabled to assist the other year 7 English teachers once a week for the first term. As the school had only two grade 6 classes but five year 7 groups, no assumptions could be made about the year 7 students' computer competence, so Tom aimed to introduce the students to basic computer and word processing functions. For the rest of the year, the teachers had responsibility for those lessons, although Tom was available to help if requested.

There were five year 7 classes with 25 students in each. Like the grade 6 classes, they were not streamed nor grouped according to particular criteria. Classes were scheduled in a number of different buildings and there were no English rooms as such. Thirty-five Toshiba T1000 laptop computers with 40 Mb hard drives were available for one English lesson per week. Two laser printers were located in the central space of the classroom cluster.

As researcher, I was interested in how teachers set about introducing computers into their writing programs. I limited my role to that of regular visitor, recording what I observed on my notebook computer, sometimes moving around the room talking to groups of students. Elna, the research assistant, observed the classes I was unable to attend, jotting down her responses on a writing pad. She also placed tape recorders strategically near groups of students to record their conversations as they wrote with the computers.

The study did not represent a collaborative partnership between a university researcher and a group of teachers (compare Snyder, 1992). There was some sense of collegiality and openness between myself and Tom, but very little with the other year 7 teachers. All of the teachers, including Tom, went about their business of teaching independently of me. Although Tom was particularly helpful, offering information about school organisation and policy, curriculum and his views on the computer integration processes, we did not plan a program together aimed at initiating change. The more formal relationships with the year 7 teachers can be explained primarily as a result of their less frequent contact with the researchers. They were, therefore, less familiar with the aims of the research project than Tom.

I did not have any direct input into the writing program (compare Snyder, 1992). To the students, I was a researcher from the university, not concerned with issues of authority and discipline, but clearly interested in computers and their writing. Elna and I were welcomed by the students and responses to our questions and requests for copies of their texts and their journals were forthcoming.

Either Elna or myself attended all lessons when the students were scheduled to use the computers for writing. We recorded classroom events and teacher and student interactions, collected texts written by the students and their writing journals, and taped interviews with Tom at the end of each year, and with the year 7 teachers at the beginning of the year and again at the end of the study. Elna also recorded and transcribed audiotapes of students' talk as they wrote with the computers.

The findings

The portraits of the five teachers and their classrooms presented in

this section derive from all the sources of data gathered in the study: observation notes, journals, interviews and transcriptions of talk associated with computer writing. Texts produced by students were also collected, however, the analysis of the students' writing is reserved for a forthcoming article. The aim in these portraits is to capture the nature of the classroom experience for the participants, in particular, for the teachers. The portion devoted to Tom is substantially longer as both Elna and I spent considerably more time in his classroom.

I recognise that as the writer of this article, I was responsible for deciding the structure, what to include and what to omit. If at times the narrative appears seamless, representing just one voice - mine - readers should remind themselves that it has been constructed from the multiple perceptions evident in the data sources. The overriding aim was to tell the story or rather the stories of the classrooms: what happened and how well things worked (Bridwell-Bowles, 1989). The final narrative is potentially educative as it is more than merely an anecdote: the research represents a case study of something which stands as an instance of a larger category. In other words, the stories of these six classrooms aim to give readers more than just insight into the case itself (Shulman, 1986).

The grade 6 classroom

Tom's classroom had a welcoming feel. The walls were covered with examples of students' work. A piece of string straddled the diameter of the room and hanging from it were samples of students' most recent projects. Tom's desk was covered in books and pens. The blackboard had the week's schedule on it. There was a poster with a list of books recommended by students. Maps of Australia and the world, charts of

endangered Australian species, Prime Ministers and a merit points list decorated the walls. An abandoned fishtank sat despondently on a bench.

The tables and chairs allowed flexibility in arrangement and were moved around every few months, usually in response to perceived behavioural needs rather than to facilitate either collaborative or individual work. However, this was not always the case. At the beginning of the third term, the tables were arranged in a way to minimise the glare from the Spring sun interfering with the visibility of the computer screens. When the students were in the library, they often sat on the floor or on cushions with the computers resting in their laps. The comfortable library context fostered a more casual atmosphere.

Tom was convinced that it was important for the students to acquire keyboard skills so the first 10 minutes of each lesson were devoted to the use of an online keyboarding program, Type to Learn (1988). He told the students they didn't have to become touch typists, but that using their fingers correctly would be to their advantage. For Tom, learning

about the technology by exploration was not only a challenge but also enjoyable. He took computers home and played with a variety of applications. He conveyed his interest in computer developments to the students: when a computer company lent him a 286 Notebook for a few weeks, he showed them the ways in which it was more compact than the school laptops. He also demonstrated how Lap Link connects the Notebook to a PC for transferring programs and data. He used computer language freely with the students, but was careful to explain terminology. When the threat of the Michaelangelo virus swept educational institutions in Melbourne at the beginning of the 1992 academic year, Tom talked to the students about the dangers of 'infection'. After completing a procedure at a computer, Tom looked up and announced: 'I amaze myself! I just remembered a batch file off by heart. I didn't have to go and read it up again.' Richard responded: 'You're fantastic Mr Reynolds!' Tom replied: 'No, I'm just learning like you are.'

At the beginning of each school term, Tom explained to the students their writing requirements for assessment: for example, in the first term - a poem, a report and a narrative. They were to select pieces from all those completed over the three months for submission in a writing folder. The first common task in second term was a story about the Olympics. For some of the assignments, the students could work collaboratively. This was not compulsory and only half of the class chose to. A further requirement for the third term was to redraft a piece from the first.

When setting up writing tasks, Tom used terms such as plan, draft, edit, proofread and print. He instructed the students to check their work. As the grade 6 curriculum operated on an integrated model, the computers were not used exclusively for English. Social Studies and Science reports and research assignments were completed on the computers if they were available. If notes had been prepared at home, they were often transcribed onto the computer so that a 'good copy' could be produced. As Kate said, she enjoyed using computers because 'they made projects look better'.

When the computers were being used, Tom's energies were predominantly directed toward technical matters: he began the lessons, in particular, those early in the first term, with a reminder to the students of how to load a file from their personal disk. He would then spend approximately 15 minutes checking that the students had opened files correctly and were managing basic functions. From time to time he called for the attention of all the students to remind them, for example, that they should not move the computers while they were on. He

told me that his aim was to encourage the students to become as independent as possible with the technology.

Occasionally, he taught the whole group a new word processing function

using a Datashow, which projected the computer display onto a screen. As he demonstrated the procedure, Tom broke it down into steps. The students then tried the function on their own computers. His preferred style, however, was to show small groups of students procedures as the need arose. He also encouraged students to teach each other different functions. In his journal, he emphasised the difficulties of juggling the technical needs of his own class with the demands placed on him by other teachers in the primary division who requested his assistance.

As the term proceeded, the presence of the computers became accepted as if they were simply notebooks which happened to operate electronically. Indeed, this was Tom's aim, that the computers not be seen as something special. At the same time, however, he was also aware that the students could become off-hand with the computers and treat them with insufficient care. The picture of the class on the last day of the term suggested the degree to which the computers had become an accepted part of the classroom context: not all the computers were being used; some students were reading, some writing. Tom spent most of the lesson trying to save and print a graph that one of the students had completed for a maths assignment. He looked up the procedure in the Forte manual and solved the problem. He regularly modelled independence, perseverance and patience to solve computer-related problems for the students in his class.

In the first half of the year, Tom spent minimal time teaching the students writing strategies. The writing tasks were explained briefly: purpose, audience, genre, resources, time, length, assessment. How students might realise these rhetorical features effectively was rarely pursued. If there was any direct teaching it focused on word processing and MS DOS functions. When Tom talked to individual students about their writing, the emphasis was on mechanics. When a piece was approaching submission date, he usually sat at his desk and conferred with the students one at a time. However, he most often 'proofread' the texts rather than engaged in discussion about meaning or generic appropriateness.

Tom's approach to the teaching of writing with computers is perhaps exemplified in the words of James, one of the brightest and most diligent boys in the class. James was highly motivated to learn how to touchtype and was adroit in his use of the various software applications to which he had access on the computer. He explained to me that he liked word processors: 'I don't really do things differently. It looks good. I can check the spelling. I don't usually change much anyway and I don't change much with the computer either.'

In third term, when students were quite comfortable with the computers and were using Logo and databases as well as word processing, Tom was also more at ease. With fewer technological requests to attend to, Tom devoted more time to developing the students' writing skills. The first task for the term was to create the journal of an early Australian

settler. Before the students started to write, he spoke to a group of 15 about their choice of vocabulary. He stressed the value of avoiding overused words and of the power of similes and metaphors in their writing. He also said that it was important that they put more time and effort into planning. He emphasised that they should be linking the information about convicts they had gleaned from the convict database to their journals. He suggested that they integrate work from a number of computer applications, and that they 'jump' from one to the other.

Tom recommended that they try to imitate the language of the convicts from the database in their journals. In that lesson, he included ideas on approach, style, content and resources. He made the connections clearly and reinforced each point about writing. These included the importance of thinking and planning; attention to expression in an effort to make their writing more interesting; and using facts from the database. He was promoting imaginative writing with a strong research foundation.

On this occasion, Tom moved around the room, however, he didn't just talk computers with the students, but also history, ideas and research techniques. This was one of the most exciting classes I witnessed. In conversation at the end of the lesson, Tom explained that the notion had occurred to him as a rich way in which to use the computers. It was clear that discovering for himself an effective technique to integrate a number of computer applications was a particularly powerful experience for him as a teacher.

At the beginning of the third term, two new students entered the class. Tom quickly assessed their computer expertise and confidence which were limited. For the next month, he spent at least five minutes each lesson with them to encourage their use of the keyboarding program and to teach them some simple computer functions.

The atmosphere was electric the day in term 3 when the students' assignments on parliament were due. Those using the computers were busily keying in texts, some copying from notes, some composing directly to the screen. Tom spurred them on by pointing out that the groups had to change in 25 minutes. Tom was the computer consultant, moving to students as they requested help with a procedure. He told the students that he had solved the mystery of the recurring lost files: students were removing the disks from the drive while the light was still on. On that day, the class resembled a newsroom (Boiarsky, 1990). Students were sitting at desks with looks of intense concentration on their faces. They screwed up their eyes as they focused on the screens. Those who moved around the room did so with a clear purpose: to print, to collect another component of the assignment, to consult with Tom or a friend. Talk was entirely focused: 'How do you get this off the screen?' 'D E P U T Y, that's how you spell it!' 'Go away, I'm working!' 'Just take away that sentence and see how much better it is.'

Tom's principal concern that persisted throughout the year was the maintenance of the technology. As the batteries for the computers had to be recharged, he was always on the lookout for low batteries. A further headache for Tom was students who saved over existing files and consequently lost texts despite repeated instructions of how to avoid this problem. Further, Tom was regularly asked to solve computer problems for other classes. For example, while Tom was helping four of his own students overcome a glitch with the printer, a grade 3 student interrupted to tell him that one of the old Commodores wasn't working. Without hesitation, Tom said that he'd be there in a minute to fix it. Indeed, Tom indicated in his journal that it was difficult to meet the needs of his own group as well as helping other classes in the primary division.

Tom was a skilled and confident organiser of students, activities and technology. Indeed, the taped lessons, which represented 60 hours of talk, confirmed Tom's role as computer organiser and classroom manager. The talk about writing was, in the main, limited to setting up the task and responding to students' requests about spelling. His classes most often involved a number of concurrent activities. This can be explained at least partially by the fact that there had to be at least two

activities as there were only 15 computers for 28 students. However, there were usually more than two different activities going on at any one time. Moreover, his help was often required for outside problems. His role became more clearly defined as the year progressed: overseer and coordinator. He marshalled all the different streams of activities and kept students on task. He was also a computer troubleshooter. He moved around the room like the manager of an organisation. He took in all that was happening and checked that students were focused on their current assignment. When the noise level rose, he sometimes quietened the students with: 'Sh. We're doing computers now.' He answered questions quickly, briefly and with authority. He reprimanded students who were not doing what they were supposed to be doing.

He was always thinking up ways to make the handling of the computers more efficient. This became part of his agenda when visiting other schools. He observed and asked questions about their organisation of the technologies and the curriculum. He was always looking for new packages which might enhance the students' capacities to produce goodlooking, complexly conceived documents. For example, he told me that he was examining graphics programs which would enable the students to play with font size, difficult in Forte. Servicing of the existing hardware and the purchase of new products were also part of his responsibility. Tom was in effect performing at least three jobs: classroom teacher, computer maintenance person and computer coordinator. His energy and enthusiasm combined to make this possible, but it was easy to see that he'd be difficult to replace.

The demands of his role perhaps explain why he did not actually teach writing very often: he responded to requests, so that if a student initiated an interaction about a writing problem, he answered, just as he would a computer problem. This approach to the teaching of writing was confirmed by the comments Tom made in his written evaluation of the second term: that he wanted to improve the students' keyboard skills, their use of the hardware and software and to think further of developing the school computer program. He did not include the development of the students' writing skills as a discrete objective.

The year 7 classrooms

Unlike the inviting homeroom and comfortable library situation Tom's grade 6 class enjoyed weekly, the year 7 students were scheduled for their computer lesson in rooms used mainly for maths. The tables and chairs could be moved but usually remained in the configuration in which they were found: tables around three sides of the perimeter of the room and two rows across the middle facing the whiteboard. In the first term, Tom took control of these lessons: he introduced the students to basic word processing commands for the first 10 minutes, gave them a summary sheet, then took them through some fundamental disk management techniques - naming and saving files - which they performed as a class. He then instructed them to continue with the writing their teacher had assigned. Tom suggested that the students record his explanations at the back of their folders for later reference. He encouraged them to key in the text before worrying about mistakes and formatting. He followed this formula with all five groups, including his own.

Of the five year 7 English teachers, Miranda was the only one who actually used a computer herself in the classroom. In the first weeks of the term, when Tom was teaching word processing procedures, she wrote with the students. Miranda appeared competent with the computers, and spoke to the students with authority about computer matters. She assigned writing tasks and explained to the students what she expected.

When Tom did not attend one lesson, Miranda set up the printer and the students went about their writing as usual. At the end of the lesson she reminded the students to save their work, close the files and switch off the machines. In second term, when Tom no longer attended, she managed confidently. She told the students to compose directly to the computer. On a number of occasions, Miranda set the students keyboard exercises: she read out a string of letters and they had to type. When asked when she would use words rather than letters, she replied: 'You have to learn the scales before you can play the music.' Miranda was doing a professional writing course at a Technical and Further Education (TAFE) College which she believed would improve her teaching. She had also learned how to use a desktop publishing program.

Another of the year 7 teachers, Jane, was not entirely comfortable with computers. However, she did not hand over to Tom totally in the first term when they were in the class together. She began lessons by outlining the writing task with which the students were to proceed, reminding them to 'type' their journal entries correctly, using the word processing procedures that Tom had demonstrated. She most often moved around the room, interacting with a student if invited. In contrast to Tom, she advised the students to correct 'mistakes' as they went. There was little talking, the students went on with their work. Tom said early in term 2 that he did not feel it was necessary to stay with Jane as she was competent and confident with the computers.

After a month, Jane decided that she wanted the students to use a keyboarding program to improve their typing skills. When Jane heard that student teachers would be in her classes for 3 weeks, she decided to give them responsibility for the class while she withdrew small groups of students to teach them typing in the way that she had been taught at a traditional shorthand and typing academy 15 years earlier.

Jane gave the students specific writing features to consider when revising their work: editing, 'captivating' beginnings and endings and effective adjectives. She gave the students some instructions about the purpose of an opening paragraph: 'make a strong statement, give it a framework, say something unusual'. She also suggested that the students ask friends to respond to their writing.

In a typical lesson in third term, one student helped another to block mark a title. Those with completed texts moved out of the classroom to the printer which was located in the adjacent room, one student walked around the room armed with her printed story and read those of others. Jane noted to Elna, the research assistant, that the presence of computers seemed to change the dynamics of the class. She said that things were good at that stage of the year but that she would have liked more assistance earlier on and she was convinced that good keyboard skills are essential for successful use of computers. Jane felt that she concentrated on the computers more than on writing issues. She emphasised the importance of Tom's support and leadership in the effort with the technology and claimed that if left alone she would not or could not have managed. The only real personal success she felt she had for the year was in the special training of students with keyboarding in small groups. She felt that by the end of the year the computers were more or less integrated into the English program and added that when the senior students left in November after the completion of their final examinations she took advantage of the opportunity to give the year 7 students more access to the computers.

She reflected that the group was mixed in computer competence at the beginning of the year and this was difficult to cope with. But she pointed out that the more skilled students, most often males, were

willing to help others. Jane didn't feel that a support person was needed after the initial period of learning and acquiring skills. She was happy to work without Tom.

In her final analysis, she observed that she couldn't imagine teaching English without computers as they offer the students editing advantages and remove the tedium from writing. She felt that computers are 'breeding a new generation of writers in year 7, students who compose totally at the screen and who are not duped by a good-looking printed product as perhaps less experienced people are'. She emphasised the importance of training English teachers in their use.

Diana was less confident than Jane with computers. As did Jane, she introduced the lessons then handed over to Tom. She asked the students to show her their work before they printed so that she could 'check it for mistakes'. Diana required the students for their first computer task to transcribe entries they'd already written by hand. Just before the end of the lesson, Diana called out: 'If you've finished, I'll come and check your English and we'll edit on the screen.' When she read students' texts on the screen, her comments were most often about incorrect spelling. She noticed that some students were not using all their fingers for typing and announced to the class that they would need to spend time with a keyboard program to remedy this practice. A month after Jane began the typing lessons with small groups, Diana also set up a similar program with her group; she did this with more confidence than any other computer connected activity.

She reprimanded the students for undisciplined, loud behaviour before they entered the room and again at the end of the lesson: she seemed uncomfortable with the noise and movement that accompanied the introduction of the laptops. Perhaps it was because she was not in control; it was no longer her class. She told Elna that she did not like computers and commented that this was probably obvious.

Often lessons took as long as 15 minutes for students to actually start writing. Diana moved around to read students' work. Queries about computer issues were redirected to Tom. Unlike Jane, Diana was worried at the beginning of the second term as she didn't feel comfortable enough to take control. She welcomed Elna as a support person. She watched. She did not seem to be motivated to acquire basic skills herself and was quick to identify competent students who could sort out problems: James, a bright, highly motivated and computer confident student, often assumed this function. When she could not answer a student's computer question, she referred it to James. When Diana called on a maths teacher to help a student retrieve a 'lost' file, she watched impassively.

Diana became more relaxed as the year progressed. When a new girl

arrived in third term, she sat with her to explain what they were doing with the computers. But later in that lesson she commented to Elna that it would take years to become competent with the computers. However, in interview at the end of the year, Diana claimed that she felt more confident than at the outset of the program. She believed she had the classic English teacher's attitude to computers: wary, and convinced that they inhibit creativity. She also described this attitude as a 'generational thing'. However, she claimed that the students' ability to create directly to the computer had begun to convince her otherwise. She complained about the inferior, unreliable machines they had used and the frustration of students who regularly lost work because they hadn't heeded warnings that the batteries were low. She felt that the school's system of recharging and maintenance could improve. Indeed, Tom was most sympathetic to this complaint about the 'failing'

equipment and was determined that the school's emerging computer policy would remove it as an issue.

Despite her personal discomfort with the technology, Diana believed that the students concentrated better on their writing with the computers. She thought that the students feel 'special' having computers, but that a lot of time was wasted doing useless tasks such as transcribing journal entries (even though she initiated them). She also felt that the students hadn't acquired enough computer and keyboarding skills. She stressed that teachers had to catch up with the students, but said that she hated Forte, the program used. She argued that the students' writing would be even better with a more friendly program. But she was sceptical of spellcheckers believing that students don't learn how to spell with them.

For Diana, the acquisition of computer skills and confidence related to the pressure of time and motivation. Even though the school was running courses in the evenings, as a mother with family responsibilities, she argued that the times were unsuitable for her. She believed that labs would somehow be more reliable than portables, but she appreciated the convenience of the laptops. She also acknowledged the political problems of agreement among the departments within the school to make decisions about computer management, and saw the advantage of having Tom, an English teacher, as a prime mover in the school for computer policy.

When Tom took Kate's class during first term, she often did not attend. While the students were lined up outside the room, Tom reminded them how to load Forte and how to print. Kate arrived to tell the students to write about their favourite relative, then left. She returned halfway through the lesson and when two students told her that they didn't have a favourite relative, they were instructed not to talk. No discussion, no sharing. Kate sat at the back of the room and watched. She gave the lesson over to Tom. One day neither she nor Tom arrived

on time and 10 minutes at the beginning were lost. Tom had been installing a network; Kate had probably assumed that Tom would begin the lesson. Unlike with the other three teachers, Tom continued to attend her lessons in second term. Although he was very busy and in demand he felt that it was necessary as he believed that if he didn't attend, the students would not have access to the computers at all. In third term, when Tom did not regularly come to the class, Kate told the students that she didn't think it was worth using the computers unless Tom was there. But when the students all indicated that they wanted to continue writing with the computers, she agreed, at least for that particular lesson, to get the key to the storage room.

When the students were working on an acrostic poem, she asked them if there were any words they couldn't spell. After helping a few students with words, she told them that she didn't believe in spellcheckers because they didn't teach students to spell. Kate had been involved in a computer program at the school eleven years earlier: Commodores at years 7 and 8. It had been an entirely negative experience for her: tiring and too much responsibility, 'an absolute nightmare'. She said there were technical problems and inconveniences. She felt 'inadequate' and hadn't learned any computer skills even though she now had a PC at home. She praised Tom for 'taking' her year 7 class. She said that she did not teach any differently because the students had access to the computers. She preferred a lab setup where everything was fixed and structured and there was total order. She admitted to having been 'a little neglectful', but then complained about the class as 'difficult'.

Tom's year 7 class functioned similarly to his grade 6 group. By the

third week, most of the students in Tom's class were performing basic functions competently. The atmosphere was less formal than in the other year 7 classes: students moved around the room, engaged in conversations about their writing and about other matters. Ten minutes of the lesson were spent collecting and setting up the computers and then packing them up and returning them to the storeroom. When a student complained that she couldn't open a computer, Tom smiled and said: 'Don't tell me that's number 5!' He then helped her to open it.

As in his grade 6 class, Tom assigned a number of writing tasks for each term and then interacted minimally about writing matters except to advise about due dates and the importance of completing all assignments. When he sat to work with individuals, he tended to concentrate on mechanics. As Tom moved around the room, he commented on the 'interesting spelling' he was seeing. Tom was sometimes late as he had been tied up with computer matters in other parts of the school. He was also sometimes out of the room, if not with other classes, with his own students helping them with the printer. One day it took 13 minutes till all the students had Forte loaded. He then spent more time explaining printing and saving procedures.

Toward the end of the second term, Tom told the students that they would have to complete their writing at home as they simply wouldn't have enough access at school. He reminded them of the importance of drafting, telling them that just because it looked good did not mean that it was good. Tom spent some time teaching the students punctuation conventions for dialogue.

By third term the students were settled into using the computers and there was considerable interaction as they wrote. Tom said that the teachers had the opportunity to learn the programs in courses that he was running at the school. He was impatient with teachers who didn't appear to be making the effort to gain computer skills especially if they were critical of the use of computers.

When interviewed at the end of the year about the program, Tom described his main achievement as 'getting most of the school up and running with a number of different computer applications'. He talked about the inadequacy of having access to the computers for only one lesson a week and said that it would be better next year: 'more machines and better software'. He thought that the portables were inefficient and that labs might be more effective. Actually what the school seemed to be opting for was a blend. Tom spoke positively about the English teachers and their cooperation and acceptance of him in their classes. His emphasis was on computer policy, introduction of the staff and students to the range of applications, and the purchase of hardware and software rather than on teaching and learning. Indeed, a school computer policy for all three of the school's campuses was adopted at the end of the study. Tom pointed out that it compelled all staff to undertake word processing courses. It also stipulated that software be 'industry' standard or as close as possible. All departments within the school were obliged to integrate computer-based units of work into their curriculum within six months. The question for the future is how teachers like Jane and Diana, but particularly like Kate, will manage.

Discussion

The study presents a detailed view of how five teachers introduced computers into their writing classrooms. The portraits of the teachers and their classrooms serve to highlight the complex interactions between the introduction of the technology and the social practices of

the classrooms. The portraits support the understanding that introducing computer writing technology both influences and is influenced by the social environment of the classroom. Of course, the ways in which these classrooms were affected as a result of this 'mutually influential' (Greenleaf, 1992, p.2) interplay are not necessarily generalisable to other classroom contexts. However, the

patterns observed are instructive: they suggest that the teachers' computer experience and expertise, the nature and extent of the support they receive, how they introduce and approach the use of computers for writing, and the social context of the classroom as it is constructed by the participants, in particular, the teacher, are all critical to our understanding of the ways in which computers influence students' writing practices.

The descriptions of the six classrooms reveal that there were some notable differences in the ways in which the computers were initially introduced and computer-mediated writing practices established. In his grade 6 and year 7 classroom, Tom integrated the technology into his writing activities with confidence and enthusiasm. It was his initiative and he did it without assistance. In contrast, the four female year 7 teachers did not actually introduce the technology. Tom assumed the role of computer expert. He introduced the computers into the other year 7 classes, trained the students in the use of the word processing software and remained the technical support person throughout the year.

Perhaps, not surprisingly, this approach to the introduction of the technology did not assist at least three of the four other year 7 teachers in the process of incorporating the computers into writing activities. Although Tom's intent (as revealed in interview and informal conversations) was to work with the year 7 English teachers in active partnership in the introduction of the computers, this is not what happened.

There are a number of possible explanations of why a partnership did not occur. In the first instance, not only were the demands on Tom too great, but also we know that such collaborative partnerships do not happen instantaneously (Lytle & Fecho, 1991; Snyder, 1992). They require mutual confidence, openness and reflexivity, qualities which develop only over time. It could also be argued that the year 7 teachers, accustomed to autonomy behind closed doors, felt somewhat displaced by Tom's presence. It maybe that they perceived Tom, not as offering support, but as the expert taking over their classes. This may explain why Jane, Diana and Kate assumed more peripheral roles when Tom was present and the computers were being used.

Another explanation of why Jane, Diana and Kate appeared hesitant, if not reluctant, to take an active role in the introduction of the use of computers into their writing classrooms is that a gender issue was at play. We know that in most contexts men see themselves and are regarded as experts and authorities. Control over the understanding of technology represents a notable facet of this expertise. It follows that males and females do not communicate as equals about technology: the information flow is onesided. Men may explain a technological matter to women, but they don't discuss it with them (Benston, 1988). This may reflect the ways in which these three female teachers

perceived their exchanges with Tom about the technology, particularly in the first term. It may also throw light on why they appeared diffident about exploring the teaching and learning opportunities offered by the introduction of computers into their English classrooms.

There is a further element to the gender issue. We understand that the computer itself has no inherent gender bias, but that computer culture is not equally neutral. The computer has been constructed as a male domain (Turkle, 1988). There are many things about computer culture - domination by images of competition, sports and violence - that have kept women fearful and away from the machine. Indeed, there is much talk about women as 'computerphobic'. It would be an exaggeration to describe Jane and Diana as computerphobic; perhaps computer reticent would be more accurate. Kate, however, displayed a fear of computers; she seemed threatened by their very presence and, whenever possible, avoided sharing the same space with them. Turkle's research suggests that 'women's phobic reactions to the machine are a transitional phenomenon' (p.41). It would be of interest to return to the school in a year or so to see whether these three teachers have shifted in their attitudes and to what degree they have integrated computers into their writing programs.

As the year progressed, differences also emerged in the ways in which the computers were used for writing. In Tom's grade 6 and year 7 classes, writing was an inherently social activity. The same could be said of Miranda's year 7 class in which student collaboration and interaction in the production of computer-generated texts were regular events. Jane also encouraged some collaboration between students but significantly less frequently than Tom and Miranda. In Tom and Miranda's classes, the computer technology, which makes the developing of texts visible and accessible to potential collaborators, served to augment this pedagogical aim. Tom and Miranda also favoured a process pedagogy more overtly than the other three teachers. The use of computers in their classes made possible more collaboration among writers, more access to help for students and more fluid writing processes. In the other three year 7 English classes, however, the teachers promoted different forms of social activity. Jane, Diana and Kate expected the students to work individually. Students sought each other's advice about topics, content and mechanical errors and intervened to offer help only when these social and writing practices were sanctioned by their teachers and this was not often.

In all six classrooms, the students appropriated the writing practices established by the individual teachers. Each of the five teachers emphasised the importance of correctness in writing and the publishing capabilities of the technology so that it was used primarily for transcription and printing a 'good copy'. None of the teachers ever really examined the potential of the technology to make a greater

impact on students' writing. None explored how the technology could be used effectively as an integral part of a computer-mediated writing pedagogy. The focus in all six classrooms was primarily on operationalising the technology, not on exploring its capacities to develop students' writing (Snyder, 1994b, 1994c). The teachers were reluctant to consider the technology's possibilities, particularly in actualising writing as a recursive, fluid metamorphic process (Balestri, 1988). As a result, the computers were used in minimal ways.

What is so interesting in this study is that all the teachers were 'free' to use the technology to develop students' understanding of writing processes (Balestri, 1988) and to improve the quality of the students' texts (Snyder, 1993a). They were also 'free' to restructure, even reconceptualise their writing programs, in response to the changes presented by the new writing medium. But, in the main, they did not. Moreover, it seems unlikely that Diana and Kate and possibly Jane will continue to use the computers independently in their writing classrooms, at least for the short term.

This raises some important questions. Perhaps if the teachers had had greater understanding of how the use of the technology can enhance students' writing processes and the texts they produce, the outcomes at least for Jane, Diana and Kate and their year 7 classes may have been different. Interviews with the teachers both at the study's outset and its conclusion suggest that they made little, if any, modifications to their approaches to the teaching of writing when the computers were introduced. This was confirmed when I attended writing classes in which the computers were not being used: these teachers, but Jane, Diana and Kate in particular, established similar kinds of environments, emphasising individualistic, product-oriented writing practices. They rarely engaged in the explicit teaching of writing strategies both when the computers were present and when they were not. The closest they came to direct teaching was in consultations with individual students.

It is probably unrealistic to expect teachers who rarely teach writing to suddenly do so when a new writing tool becomes available. It is probably even less realistic to expect teachers to maximise a technology which has the capability to enrich students' writing practices unless they have had time to learn about its potential through practical, personal experience. The findings suggest, therefore, that if we want language and literacy teachers to explore how the use of computers may enhance students' writing (Balestri, 1988), careful attention must be given to the ways in which they are introduced to computers and their own computer-mediated writing practices established. It seems that unless the teachers are well prepared, for example, through professional development opportunities or pre-service and post-graduate teacher education courses, they are unlikely to accomplish any changes to their teaching approaches and to students' writing practices.

Tom continues to use the computers, Miranda and Jane may, but it seems unlikely that Diana and Kate will, at least for the immediate future. The implications of the study's findings for the English teaching profession seem clear. To help teachers through what can, but need not, be a confronting and difficult transition, they require initial familiarisation with the technology to achieve basic confidence, ongoing technical support and opportunities to consider the technology's potential to assume a central position within a strong writing pedagogy.

Conclusion

This study amplifies the understanding that all technologies are embedded in social practices. In contrast to the technological determinism, which has dominated the reports of many previous computer writing studies, the research demonstrates that the use of computer writing technologies influences teaching and learning environments at the same time as the environments created by classroom teachers influence the effects of computer writing technologies on students' writing practices. In other words, the findings support the understanding that the classroom environment and the writing technologies used in that environment are 'mutually constituted' (Greenleaf, 1992, p. 33). The study concludes, however, that the teachers' disposition toward the writing technologies and their structuring of writing sessions had the greatest impact on students' writing practices and the ways computers entered into that writing.

To move teachers and researchers away from technological determinism and the belief that computers alone will transform classrooms and students' writing, we require further studies that are longitudinal and observational. We need studies that focus not only on the technologies

but also on the ways in which teachers structure the social context of classrooms and the ways in which they integrate technologies into this web of interactions. We need to think further about computer-mediated writing itself so as to articulate a new writing pedagogy, an approach to the teaching and learning of writing in which the use of the electronic technologies is intrinsic. We need to examine different models of initial training and ongoing support for teachers. We need to explore further how the ratio of computers to students influences the choices and decisions teachers have to make and how these decisions influence the students. If we believe that classrooms are interactive and communicative cultural environments in which teachers and students together construct and reconstruct understandings, then studies of computer-mediated writing classrooms must examine both the influences of the technologies and of the people involved.

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TEACHERS, TECHNOLOGY AND CHANGE: A STUDY OF FIVE TEACHERS

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