

SCHOOLS AND KNOWLEDGE PRODUCTION: COMMUNITY INFORMATICS FOR A KNOWLEDGE ECONOMY

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ABSTRACT

The widespread deployment of computing and communication technologies (CCTs) has been a key element in the transformation of large sectors of the world's trade and exchange over past decades. As these changes have become more apparent there has been growing disquiet in a number of school systems about the adequacy of current forms of schooling to prepare young people for such a changed world. One outcome of this unease is a heightened concern to increase and improve computer use in the classrooms of the overdeveloped world. In responding this way, schools recognise the importance of CCTs and are anxious to be seen to be responding to the changed circumstances outside schools. Responses in schools however, have tended to be 'more of the same', where the 'same' is thinking about and working with computers in ways not very different from the way they were used and understood in schools during the 1980s and 1990s.

The project described in this paper draws on literatures relating to education, globalization and the knowledge economy, contemporary policies concerning school and curriculum reform, the use of CCTs in classrooms, and literatures concerned with the efficient and effective use of CCTs in fields other than education, to make a case for rethinking aspects of schooling in these new times. It argues that, with some provisos, schools are well positioned to become sites of knowledge production. In particular, it argues that for communities in regional, rural, and remote areas, knowledge-producing schools can play an important role in supporting the community's capacity to deal with changes flowing from global influences. In this way, the knowledge producing school can be an important element in the development of informatics for the local community.

The paper will outline current research projects informed by these ideas and describe some preliminary outcomes.

COMMUNITY INFORMATICS AND SCHOOLS

In some accounts of community informatics, schools, like other community-based organizations, are seen as a potentially-useful source of physical or human resources for community informatics. For their part, schools, at least in Australia, have been an important, early element in the broad take-up of CCTs by the community. Their importance in this regard was recognised by vendors who participated in fierce contests to become preferred providers to school systems (Bigum, Bonser, Evans, Groundwater-Smith, Grundy, Kemmis, McKenzie, McKinnon, O'Connor, Straton, & Willis, 1987). Since that time, schools have remained important in terms of the take-up of CCTs in Australian communities. Apart from the possibility of using school resources to support community access out of school time, and based on what is published in both fields, schools and work in community informatics have tended to operate independently of one another. There are, nonetheless, interesting parallels in these two broad areas of activity which promote the use of

CCTs. This paper outlines a new research agenda in schools and argues that this development may offer interesting opportunities for community informatics.

SCHOOLS AND CCTS

In the late 1970s, schools in Australia began to move computers of various kinds into classrooms and offices to support teaching and administration. The broad rationale, as is the case for the adoption of any new technology (Sproull & Kiesler, 1991), was for improvement – specifically with regards teaching. CCTs were going to improve learning, improve job success post-school and later and, with the advent of the Internet, improve access to information. These rationales have remained largely unchanged over twenty odd years despite an almost total lack of evidence to support them (Bigum, 1998). As Sproull & Kiesler (1991) argue, using CCTs in education or in any other field of human endeavour *changes* things even though they are always justified in terms of improving things. If proponents of CCTs in schools had argued that unpredictable change would be the outcome of

acquiring CCTs, they would have enjoyed little success in securing funds. Thus, rather than necessarily improving an existing set of circumstances, say for example, the teaching of science, we might expect the teaching of science to be changed when CCTs were deployed – and changed in unpredictable ways. The question of whether things have improved becomes a more difficult issue and perhaps one that is less important than understanding how things have changed and what the implications of these changes are for teachers and learners. The paradox is always that to obtain the CCTs in the first place, claims about CCTs improving the teaching of science are essential.

Over the past twenty years, there has been no shortage of research into changes associated with the use of CCTs in classrooms (for example, Becker, 1994; Coley, Cradler, & Engel, 1999; Lankshear, Bigum, Durrant, Green, Morgan, Murray, Snyder, & Wild, 1997). What is apparent in these and earlier studies (e.g. Bigum et al., 1987) is that most often CCTs have been made to conform to the requirements of the curriculum and the classroom. In a sense they have been domesticated, or as Tyack and Cuban (1995, p.26) put it, “computers meet classrooms, classrooms win” (see also, Hodas, 1996). This outcome is consistent with what happened with other, earlier technologies deployed in classrooms. They too were accompanied by similar promises of improved learning but succumbed to the long-established practices and patterns of the classroom (Cuban, 1986).

The domestication of CCTs in schools might be usefully seen in terms of bringing together two things: a resilient and long standing ‘paper and pencil’ curriculum designed and developed to serve the needs of an industrial era; and a view of CCTs as educational or learning technologies. That is, the role of CCTs is to support the existing set of practices and assumptions about curriculum. What results is a focus on ‘the how’ of using CCTs in classrooms to support the existing set of practices. Little attention is paid to ‘the what’ and ‘the why’ (Bigum & Green, 1993), that is, for example, little or no consideration is given to what is now worth knowing given what CCTs can do. Seeing CCTs significant only in terms of how to teach and learn is related to a persistent ‘horseless

carriage’ perspective¹ on CCTs. This view regards the new, even though the new is in many respects now twenty years old, as not much different from the familiar, and continues to see it in those terms. Thus teaching, learning, curriculum, and assessment are supported, aided, or managed with the help of CCTs. There is little consideration of the possibility that existing teaching, learning, curriculum or assessment practices may not be appropriate for a world outside of school, this is being increasingly shaped by the use of CCTs. Domestication produces a kind of reassurance that schools are doing something about CCTs. Such reassurances are implicit in the practices which are given labels like ‘information literacy’ or ‘computer literacy’. They are consistent with an assumption that the new, digital world is really not that different from the world for which schools have become so expert in preparing the young, a world that some argue no longer exists (Lankshear & Knobel, 2000; Lankshear, Peters, & Knobel, 2000).

At the heart of much of what goes on in the name of CCTs in schools is a view of CCTs as a broad kind of educational good. This makes the acquisition of more of these goods something that has become almost not negotiable at the level of resource allocation in schools. The ‘pig principle’, more is better, rules. This principle characterised the thinking about CCTs in a broad range of human activities in the 1980s and 1990s. The case of business is both illustrative and informative in this respect. In previous decades, it was relatively easy to argue that because CCTs were in and of themselves a ‘business good’ that more of them would guarantee greater efficiencies and higher profits. This logic dominated the early take up of CCTs in business and, as with education, little attention was paid to testing the veracity of the relationship between expenditure on CCTs and profits. Recent work by Paul Strassman (1997) and others (see for example, McAteer, 1995) highlights the difficulty of examining this relationship but in the end clearly demonstrates that there is no simple association. As Strassman (1997) puts it,

¹ Horseless carriage was the term first used to describe early motor vehicles which, to the horse-using population of the time, were similar to carriages but did not require horses for movement.

Despite much talk about the cyber economy, information age, or knowledge-based enterprise, as yet there are no generally accepted economic or financial principles to guide executives in spending money on computers. Decision makers find it difficult to reconcile the claims of computer advocates with their staff's ability to prove IT investments are profitable. (p. xv)

This is not an anti-computer argument. On the contrary, Strassman is passionate in his belief in the significance of these technologies for the improvement of human existence. Unlike some proponents of CCTs, he carefully documents the complexity in business of obtaining improvements by using CCTs. Drawing on his analysis, he offers advice for business which shifts the focus from CCTs and their supposed inevitable goodness for business and to a consideration of how investment in IT might be more rigorously assessed:

“Diminish the emphasis on technological decisions and shift attention to the costs of employee training, the effects of organizational disruption, and the causes of workplace resistance” (Strassmann, 1997, p.239), and “Avoid quoting isolated anecdotal cases to substantiate economic gains” (Strassmann, 1997, p.40)

The educational equivalent of these kinds of considerations don't exist. There is no metric that, in education settings, might serve as the equivalent of the bottom line in business. Although the business-education comparison can be taken too far, Strassman's analysis, when applied to education, underlines the importance of moving beyond the hype-driven implementations that have largely characterised the use of CCTs in most areas of educational practice.

Michael Schrage (1998) uses the term *design sensibility* to describe the assumptions, biases, and points of view that are brought to the use of a particular technology. For instance, the assumption that IT is an educational good is a skew, a bias which informs how the technology is understood and used in schools. That these technologies can be seen in terms of earlier technologies – for instance, the word processor as a kind of typewriter or the spreadsheet as a type of calculator – is another design sensibility that shapes practices in classrooms. So if we are to reject the design sensibility that CCTs are in and of themselves an educational good, what might be a better way to think about these technologies? For his part, Schrage's view is that CCTs in education still need to be seen as a relatively poorly understood new medium,

requiring careful and critical experimentation. Using Schrage's notion of design sensibilities it is possible to interrogate further aspects of CCT use in schools.

The Web has become a major focus for many schools. The design sensibility that appears to characterise much of what schools do is one based on information and its delivery. On the surface this seems to be a design sensibility that is more or less obvious and useful in the current circumstances. There is, after all, a large industry that has grown up around the design and development of Web pages as sites for information delivery and retrieval. But, as Schrage (2000) argues, basing one's understanding of the Internet on information misreads things: “To say that the Internet is about ‘information’ is a bit like saying that ‘cooking’ is about oven temperatures; it's technically accurate but fundamentally untrue.”

The biggest impact that digital technologies are having and will continue to have, argues Schrage, are on the *relationships* between people and between people and organizations. This is not a new idea that CCTs or indeed any technology can be seen in terms of the relationships they affect or mediate, the new relationships they support, and the relationships they terminate. What is important here is the *emphasis* or design sensibility that is placed on relationships rather than on information.

There is also a second consideration that needs to be made. A consequence of schools operating with an information sensibility regarding the Web, means that the design sensibility is actually one of information *consumption*, that is the Web, for schools, is just another, albeit very large and disorganised, source of information from which schools can draw to support their curriculum work. Schools have always been, in one way or another consumers and redistributors of information for the support of student learning. The broadly held view of schools as places where students go to learn things underpins the way school is thought about. This too seems obvious and educationally sound until this position is compared with that which operates beyond school, that of the so-called knowledge economy in which information *production* is paramount.

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also produce data for the school system's central monitoring and reporting facilities. But little of this kind of information is, at least in the current scheme of the knowledge economy, likely to be of much interest beyond management and system planning requirements. Potentially, there is another possible source of knowledge that some have argued is important to consider in terms of knowledge production, that of the professional knowledge of teachers. Hargreaves (1999) argues that there is an urgent need for improved professional knowledge and makes a case that schools could emulate the practices of some high-technology firms and produce and disseminate the professional knowledge of their teachers. There has been a long tradition for the production of professional knowledge among some groups of teachers and schools – particularly in the tradition of conducting action research².

Clearly, there is some potential for knowledge or information production in schools, but if this new work was to develop within an information design sensibility the capacity of schools to articulate to the changed world beyond schools would be limited. An information design sensibility draws attention to the technology and not to the question of new kinds of relationships. Working with a relationship design sensibility shifts the focus from CCTs to questions about the relationships which a school might have. In effect, it provides a way to move beyond the practices which derive from the symbolic role of CCTs (we have computers so we are a high-technology school) and beyond the use of CCTs for the sake of CCTs (what educational work can we find for this technology to do?). Thinking about CCTs in schools in terms of relationships shifts the focus from the technology *per se* and problems of how best to integrate CCTs into the curriculum, towards schools as social organizations – encompassing their internal relationships and those with the local community, government, and other schools. In effect, the focus shifts from the question 'What on earth do we do with this new technology?' to 'What kinds of relationships do we want to have with the world beyond our boundaries?'

In other words, the key questions to be considered are to do with new articulations beyond school. That is not to suggest that the existing relationships many schools currently

have with their local communities and beyond are not significant, nor that they need to be re-appraised. Graham (2001) argues that "community is about integrative social relationships, not locality". Schools, to some extent, provide a kind of integrative role for their locality but what I am interested in here is examining new, additional relationships for schools which means, in effect, examining the possibility of new purposes or roles for schools.

NEW RELATIONSHIPS

Schools are physically located in a 'community', a label that can be confusing as it is also used to talk about those who work and attend school, as in a school community. In geographic terms, however, schools are located in or adjacent to clusters of homes, businesses and, often, industries. In rural and remote locations in Australia, the school often operates as a kind of focus or centre for community activity. In general though, the school remains positioned in a design sensibility of teaching, learning, and physical community resource – a safe place for the young to learn. Unlike schools, communities, however they are defined, have been less than safe in terms of the influences of global flows of money, information, and culture. The sudden movement of capital can make or break local businesses or industries. The flood of entertainment and information from other countries has been seen as something of a threat to local culture and identity. Making sense of the myriad messages that are now available via the mass media: the Internet, print, video and film, is no simple matter. Making sense of global flows of information, money, and content though, becomes increasingly important as these flows impinge on and have local effects. As Paul Saffo (1994) argues, the scarce resource in an era of large amounts of information will be an ability to make sense of the plethora of material to hand. In other words, what will matter is expertise, point of view, a place to stand from which to make decisions:

'Point of view' is that quintessentially human solution to information overload, an intuitive process of reducing things to an essential relevant and manageable minimum. Point of view is what successful media have trafficked in for centuries. Books are merely the congealed point of view of their authors, and we buy newspapers for the editorial point of view that shapes their content. We watch particular TV anchors for their point of view, and we take or ignore movie advice from our friends based on their point of view.

² See for example, <http://www.scu.edu.au/schools/gcm/ar/arp/guide.html>

Education institutions like schools offer experiences designed to teach students particular points of view. We call them subjects. Increasingly however, the utility of the traditional school subjects to make sense of the world is being questioned (for example, Moore & Young, 2001). A more difficult issue arises for a community. Communities might be said to have points of view, particularly when they are polled – as occurs in elections for political office. However, it is useful to think about the kinds of knowledge and information that communities have more generally. Some knowledge and expertises reside in a community that can be seen as a kind of aggregate of the individual skills and knowledge of the members of that community. There is other knowledge that is more collective in nature, specifically, knowledge about the community as a whole. This range is from the stories about community that informally circulate to more formal collections like local histories and neighbourhood or local government surveys.

If we apply Saffo's argument about point of view to a community, then the one thing that a community can and will need to have more expertise in is knowledge about itself. In a world which appears destined to be increasingly shaped by financial and information forces which operate globally, having a rich source of knowledge about itself will provide a local community with a strong basis from which to read and act on the global influences that it encounters. In other words, the production, accumulation, and dissemination of local knowledge will become increasingly more valuable to communities. At present, in Australia, any formal production of such knowledge is often dependent on funding from government. When it occurs it tends to be part of larger, often national or state research whose priorities may or may not coincide with local interests and needs. What I want to argue is that it is useful to ask what role schools might play in respect of a community producing knowledge about itself.

What follows is a preliminary account of the early exploration of some of these ideas by schools. The focus of the work is exploring new kinds of relationships beyond the school. To achieve this, schools have to move from the relatively safe, 'pretend' space of conventional curriculum to doing work that is judged by local community as useful and valuable.

NEW RELATIONSHIPS WITH COMMUNITY: SCHOOLS AS KNOWLEDGE PROVIDERS

At this point it is important to underline that this avenue of enquiry is exploratory but is strongly informed by a design sensibility that does not accept CCTs as educational good in and of themselves. It reads the external world as much changed because of the deployment of CCTs. It sees these changes in terms of changed relationships which flow from new, additional modes of communication. It acknowledges that schools need to examine new kinds of relationships with the world outside and that this examination can have implications for community informatics.

There are a small number of schools, primary and secondary, with whom I am working and which have various levels of interest in this agenda. I give an account here of some of the explorations of one such school.

This primary school invested in CCTs to support the digital recording of visual images, both still and video. It has a modest number of CCT devices by school standards, two to three per class, with a small central facility that allows easy editing of video and still images. What is interesting is the routine way in which all students at the school currently employ digital and video cameras to do their work. For story telling occasions, students regularly opt to make a 'claymation' movie³. The move to use CCTs to support writing with cameras is recent for the school. In less than a year a broad base of expertise has developed among the staff and students that allows preparation of audiovisual presentations typically stored on CD-ROM.

The school has begun to examine the implications of having students produce knowledge products that are directed at audiences beyond the school. When the Principal was invited to talk about developments at the school to a state conference of primary school principals, she commissioned a group of year-seven students to document the use of CCTs in the school on video and to produce a CD-Rom. The students completed the project

³ Claymation or clay animation is the process by which animated film can be produced by taking a sequence of digital still pictures of clay figures which are slightly altered from frame to frame to give the appearance of animation when assembled into a movie. See for example, <http://library.thinkquest.org/22316/home.html?tskip=1>

and presented it to an audience of over two hundred principals at the conference.

In another instance, in response to a class incident, a group of year-six students designed and produced a PowerPoint-based CD-Rom to offer advice to students about bullying. They scripted and filmed six scenarios, each with three alternative outcomes, to illustrate the consequences of what they labelled 'weak', 'aggressive', and 'cool' responses to a bully. They launched the interactive CD-Rom at a public meeting at the school and have marketed it to other schools.

These represent some of the first small steps of the school towards a fuller engagement with local community needs and interests and towards having students do work that is beyond the submit-and-tick style of assignment students commonly undertake in schools. They should not be read as examples of the community-based research envisaged as an end point of this agenda. What matters, however, is that the school is moving in this direction, informed by a design sensibility that is different from that typically found in many schools. It has adopted an approach which considers any request from outside the school in terms of the possibility of students doing the work. On one occasion a group of local principals visited the school to inspect the approach the school was employing in its use of CCTs. While teachers structured the day and spoke on some occasions to the group, there were three workshops for principals which were presented by students. One of these, how to make claymation movies, was taught by a group of year-four students. The students were exemplary teachers. They offered encouragement and advice, and gave instructions without taking over or doing it for the principals. The men and women sat on the floor in their suits and negotiated a plot with pieces of coloured plasticene, and recorded over fifty images using a digital camera. The students then taught them how to convert the stills into movie format. Although this event may not be hugely significant, it illustrates the commitment by the school to examine every opportunity of having their students work on tasks that matter to those beyond the school.

Other examples include year-six students and teachers working with the local cattle saleyards to produce a documentary of the history of the saleyards for a beef expo in 2003. In another instance, year four-students made movies as a part of their study of the local community, a fairly typical activity for students of this age.

They filmed and edited a video of the community, and local services copied it to a CD-Rom. The CD-Rom is now being considered by local council as a promotional device for potential new employees of a large industrial development.

Knowledge production in schools is not something new. What is different in the case of this school is that the tasks derive from local needs or interests and are tested by an external audience. From this basis, the school is beginning to examine other forms of knowledge production that will further develop it as a site where knowledge is produced and disseminated.

Thinking about schools and the students in them as producers of knowledge, particularly knowledge that is valuable to the local community, is not a new idea. A number of agencies have from time to time made use of the labour of school students to support national and international research projects of one kind or another. Other agencies have made use of the labour of school children to do such things as counting vehicles on nearby roads, conducting surveys of community attitudes on environmental issues, monitoring local environmental indicators, and contributing to national mappings of locally-famous identities.

This work is some way from a school being understood in terms of its research capacities, but the small investigations around student capabilities and community engagement are promising. A key question is, is it possible to move from a fragmented involvement in knowledge production of these kinds – which are still largely within the ambit of what many schools do from time to time to – research activities which produce knowledge about the local community to support local needs and interests? Is it possible to move to a point where schools see research as one of the things they are good at and through which they can contribute to their local community? Two broad design sensibilities about the new learnings in a research-functional school come together here: learning should be as authentic (in the sense of fidelity to mature or insider forms of social practice) as possible, and that learning to research is crucial preparation for success in the new economies. It is important to be clear about learning to do research. Take the example of researching local histories. Oral histories should not be confused with recording conversations on tape. There are techniques and standards for doing good interviews. And if an oral history is to be genuine (as distinct from an oral

memorising out loud or whatever) it's got to have some kind of historical method associated with it. Which means teachers and students will need support in developing these skills.

Under these conditions, schools could become a key location for the production, accumulation and dissemination of information about the local community, a hub for community informatics. Many teachers already do all kinds of interesting and potentially useful data collection with their students but in a 'fridge door' design sensibility; the data is rarely kept, the analyses are not shared beyond the classroom (except on a family's fridge door), and it is unusual for the data to be stored and added to over time. With not much more effort, and judicious use of CCTs, this could be changed. But importantly, simply doing research, collecting data, and doing analyses will matter little if the local community does not value the work. And this is the hard part. Schools would have to be at least partially remade in the minds of the local community. It would not require a wholesale change, but project by project it would be possible to build up a repertoire of research skills and products in consultation with the local community regarding needs and interests. Here, there is an opportunity to develop links between community groups and informatics projects.

The other elements of this research agenda are directed at finding out the kinds of research the can be sustained by different age cohorts, the professional support necessary for teachers to work in this way, and strategies to support and encourage these new kinds of school-community partnerships.

Having students participate in such work requires much more than simply employing them as inexpensive labour. The rigorous and systematic study of the local community is a worthwhile educational activity. Such work can be done, and, what's more, done well. If taken seriously it could provide the basis of new kinds of relationships with the local community.

In this context, CCTs have a role in supporting and sustaining new relationships. The collection, analysis, and dissemination of information is work that computers can support well. In this way, schools don't do computers for computers' sake. Schools can begin to play a different kind of role in support of community informatics and at the same time better prepare their students for a world in which research skills, knowledge production, and partnerships are increasingly important.

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