The Motivation is the Message: Comparing CSCL in Different Settings

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ABSTRACT

In this paper, we attempt to draw comparisons between our research experiences of Computer Supported Collaborative Learning in the workplace, in schools and in universities. We present an outline description of our activities in each setting. As a possible contribution to foundational theory in CSCL, we focus on the crucial but complex issue of learner motivation. We argue that the dominant issues of motivation may vary from setting to setting but that CSCL can play an important role in engaging learner motivation in all settings. In particular, we consider the inauthenticity of most university education and consider how this might be addressed by CSCL.

Keywords

Learner motivation, workplace learning, school education, university education, situated learning, deschooling, authentic learning.

INTRODUCTION

This paper arose out of the realisation by the first author that he had been involved, in one way or another, with Computer Supported Collaborative Learning (CSCL) in a number of very different settings or domains. We reasoned that on the basis of our CSCL experiences in the workplace, K-12 schools and universities, it must surely be possible to draw some valuable general conclusions about the foundations of CSCL. Although we would confidently describe all our experiences as relating to CSCL, we also realise that because of variations in factors other than setting, it could be said that we are attempting to compare chalk with cheese (or as the Americans say, apples with oranges). The experiences occurred in three different countries: Australia, USA and England, (and we are now working on CSCL research in Ireland). All the countries are, however, predominantly English speaking, and national location seems to have been one of the least significant variables. The predominant technology also varied between the different research settings. In the K-12 schools, our main focus was on synchronous communication using videoconferencing, whereas in the university and workplace our focus was predominantly on asynchronous communication. Of perhaps most significance were variations in the "formality" of the learning perspective. In the workplace, we were exploring clearly informal learning strategies amongst workers, whereas at university level and in the K-12 schools, our perspective was more formal. The order or sequence of the experiences, it seems, has also had a marked influence on our overall conclusions about the value and priorities of CSCL. If the experiences had occurred in a different sequence our final impressions would perhaps have been very different.

This paper is not simply a series of personal CSCL recollections. We have attempted to find some common theme running through the paper connecting all the experiences. Collaboration, of course, was a common factor, but that is a defining characteristic of the field. The central theme that emerged from our reconsideration of CSCL in the different settings was the crucial issue of learner motivation. At first, it was not easy to recognise this common factor because the issues related to motivation where markedly different in the various environments. But slowly we began to realise that many of the principal conclusions we had previously drawn from our research, such as ownership, interest and authenticity, were all facets of learner motivation. We have long believed that motivation, while often overlooked, is perhaps the single most important factor in learning.

In this paper, although we make frequent reference to our practical experiences (including interview extracts from the participants), we focus primarily on the more theoretical issues relating to the value of CSCL in learning and education; and, of course, the crucial importance of motivation. We believe this reflects the foundational spirit of the conference. We do, however, apologise for not discussing in more depth the fine details of CSCL-based educational activities, but we can't help but feel this is like arranging deck chairs on the Titanic. Perhaps the ship of education is not about to sink but it does seem to be going around in circles. We argue for a radical agenda in the application of CSCL. We also apologise for concentrating on learning and educational practices (and particularly undergraduate education) rather than technological design issues. As pointed out by Bannon (1995), in CSCL there is a tendency to focus too much on the features of the technology, and not on the learning activities. In our practical CSCL experiments we have only very occasionally come up against obvious technical limitations.

We need to say something briefly about the language used in this paper. It does seem that educational terms exhibit a higher than average variation between the different versions of English. When we refer to K-12 schools (kindergarten to 12th

grade) we will use the term K-12 school. When we are referring to higher education we will generally use the term university. However, we use the terms students, teaching and schooling generically to refer to all formal education. A module is an individual class at university.

After a brief discussion of our most significant theoretical educational influences we describe our CSCL research experiences in the order in which they occurred. We begin by considering collaborative learning in the workplace; we follow with an outline of our K-12 school CSCL experiences and end the section with a description of our use of CSCL at university level. We attempt to draw some general conclusions from each of the experiences, in particular, relating to the theme of motivation. We then consider the issue of the inauthenticity of university education in more detail, and how CSCL can perhaps challenge this inauthenticity.

THEORETICAL INFLUENCES

Paul Goodman (1971) described schooling as a "mass superstition" which nobody opposes and for which nobody proposes alternatives. Our main theoretical influences are *situated learning* (Lave and Wenger, 1991, see also Brown et al, 1989, and Wenger, 1998) and *deschooling* (Illich, 1973, see also Reimer, 1971). Although at first these two theories may appear to have little in common, we believe, they both offer radical challenges to traditional ideas on learning and education. In addition, all theories based on social models of learning are influenced to some extent by the socio-cognitive theories of Vygotsky (1978).

Lave and Wenger (1991) explain situated learning as "...learners inevitably participate in communities of practitioners and that the mastery of knowledge and skill requires newcomers to move toward full participation in the sociocultural practices of a community" (p. 29). They describe the process by which newcomers become part of a community of practice as legitimate peripheral participation (LPP). They suggest that a "person's intentions to learn are engaged and the meaning of learning is configured through the process of becoming a full participant in a sociocultural practice. This social process includes, indeed it subsumes, the learning of knowledgeable skills" (p. 29). It should be noted that Lave and Wenger do not intend LPP to be an educational form or a pedagogical strategy – "it is an analytical viewpoint on learning, a way of understanding learning" (p. 40). They argue that learning through LPP takes place whatever the educational setting or even if there is no explicit educational setting at all. Consequently we cannot speak about situated learning and non-situated learning, all learning and all activity is situated. Interestingly, they note that in the examples they use to illustrate the concept of LPP there is very little observable teaching; the emphasis is on learning, not teaching, and often the most important and direct contributors to that learning are the peers of the participant.

In situated learning, and particularly in studies of communities of practice, motivation is rarely explicitly mentioned. Learner motivation is integral to the culture and expectations of the community and is expressed in terms of changes in social participation and cultural identity. However, it should be remembered that an important act of commitment takes place when the newcomer enters the community of practice and commits to eventually becoming a full participant.

From a situated learning perspective, we can see that in formal education the principal thing learned is schooling itself. It is the game itself that gets into the blood. Perhaps the most inauthentic aspect of formal education is the practice of grading. Illich (1973) suggests that "the institutionalized values school instils are quantified ones. School initiates young people into a world where everything can be measured, including their imaginations, and, indeed, man himself" (p. 45). Illich proposed *Learning Webs* as an alternative to schools. He outlined the kinds of resources required if one considered not what people ought to learn, but instead what kinds of things and people learners might need to be in contact with. He identified four kinds of learning resources: *Things* (educational objects), *Models* (skilled people), *Peers* (other learners), and *Elders* (educators-at-large). Illich also suggested that technology could be harnessed to provide a reference service for these resources.

Illich warned that education tends to become unworldly and the world becomes non-educational. For him, and for us, deschooling society means far more than just breaking out of schools; it means overcoming the schooling mentality throughout the whole of society. We cannot emphasize this point too much. Our experiences have shown that it is possible to escape the physical classroom only to find that you have taken the mentality of schooling with you.

CSCL EXPERIENCES

Workplace

We carried out "ethnographic" investigations into the *informal* learning strategies used by administrative workers to develop their computer-related skills (see Eales, 1994, 1995, in press). The setting was the administrative sector of the University of Queensland, Brisbane, Australia. The University, at the time, employed some 5,000 staff, had 25,000 students and an annual budget of over AUS$330 million. The administrative section of the university was divided into a number of departments using a wide range of software on several different hardware platforms. Our ultimate aim was to use our findings to inform the design of a computer-based collaborative support system. An important part of our research was to

find an acceptable technical medium that allowed users to easily create or capture representations of their practice. To this end, we performed a number of experiments using recorded demonstrations as a means of sharing expertise between users.

Our investigations indicated that formal training played only a small part in workers' computer-related skill development but that informal collaborative learning was ubiquitous and important.

> Beverley: ... *there are people who have got more experience than others. But we all know each other and are helpful to each other. People will lend a hand. Well I don't know whether the boss would appreciate it going outside of the room but we do, you're not going to turn anybody down if they need any help. I don't anyway*.

Owned dilemmas related to computer-based skills were often referred to and appeared to represent important windows for learning, but although "communities of assistance" existed, expertise was often in short supply. Two of the departments had experimented with the appointment of semi-formal support persons in an attempt to supplement informal expertise. These support persons were expected to assist with the development of computer skills within a department. It was evident from our research, that any formalization of the support person role may well lead to a change in the fundamental relationship between the people with problems and the person providing support, often accompanied by a certain amount of tension. Narelle, a semi-formal support person, articulates the development of this dependency relationship.

> Narelle: *It's easier to run in and say "Narelle, is there a problem with this?" or "Narelle, do you know something about this?" than it is to try and do some trouble-shooting of your own.*

A sense of ownership of the problem or dilemma appears to be a vital motivating force in learning. When support is completely informal, the problem is owned by the learner and any assistance from other workers is based on mutual support. When the support role is formalized users may be encouraged to take a more passive attitude to their learning, becoming more dependent on the support person. Our research focused on how the levels of mastery or expertise in communities of assistance could be increased and how the problems could be resolved collectively without diminishing the all-important motivating sense of ownership?

In this particular workplace, there appeared to be a real need for some kind of technical augmentation to the existing collaborative support network. Ownership of the (learning) problems was manifest, collaborative relationships with other workers (learners) were strong, but learners appeared to be isolated from more expert practice. The expertise the workers had, they shared, but they needed ways to extend or develop their practice that did not violate the subtle rules of informal commitment and assistance. We believed that some kind of CSCL system, rather than individualised content delivery (e-learning), could make a positive contribution to the development of more expert practice amongst these workers. In summary, while commitment and motivation to learn were evident in this workplace, demonstrated by a clear collective ownership of skill-related problems, this motivation was nevertheless extremely fragile and could easily be lost.

K-12 Schools

The context for our investigation into K-12 school-based collaborative learning was a project group from Virginia Tech, Blacksburg, USA and the Montgomery County Public Schools (Virginia) supported by a major award from the U. S. National Science Foundation (see Eales & Byrd, 1997, Eales et al., 1999). The Learning in Networked Communities (LiNC) project sought to utilise the network infrastructure brought to the County by the Blacksburg Electronic Village (BEV) (Carroll & Rosson, 1996). Our particular interest was the support of web-based collaborative learning between the schools and between schools and the university. The project members included four science teachers from four different schools, two high schools and two middle schools. Two of the schools are in the Town of Blacksburg and are approximately 12 miles (19 km) away from the other two schools in a rural part of the county.

During our time on this project, the principal interest was experimenting with web-based desktop videoconferencing (DVC) between the schools and between the schools and mentors at the university. The videoconferencing provided a small window to the outside world that never failed to interest the students. Perhaps the most significant educational issue to emerge from our introduction of videoconferencing into the classroom was that many of the most active and competent system users were what might be termed "average" students. The particular demands of the videoconferencing medium appeared to empower and motivate a set of previously relatively disadvantaged students. The experienced teachers in the project first highlighted this characteristic of DVC. For example, one middle school student when asked which method of communication he preferred replied:

> Josh: *The video [DVC], because you actually get a chance to see and talk to the person rather than spending a lot of time typing.*

Videoconferencing introduces a new form of communication into the classroom that requires new skills. Many of those that demonstrated competency in this area were students who normally do not get the opportunity to excel in the classroom. Student motivation that developed during videoconferencing appeared to be transferred to areas where literacy skills are

more central. For example, students coordinated videoconferencing sessions via e-mail messages and presented their final project reports in the form of web pages.

It seemed that students were motivated by the "reality" of videoconferencing with the outside world. Willis' (1980) classic ethnographic study of schooling in an English industrial town has some very interesting perspectives on the relationship between schooling and reality. Willis contrasts the motivations of the anti-school group, "the lads", with the more pro-school group, "the ear 'oles". One of the most interesting aspects of this study is that he follows the boys beyond the school into the workplace. Willis demonstrates that the counter-school culture of "the lads" has many similarities with the culture of the factory floor. If we take a perspective that equates the culture of the workplace with reality, it is possible to interpret the lads' rejection of school as a rejection of the inauthenticity of schooling. The "ear 'oles", on the other hand, are prepared to accept, at least partially, the alternative reality of the school. The lads left school as early as possible. The "ultra-realists" seem to be the first out the door of the school. CSCL, in its ability to afford sustained collaborative interaction with "real" people and situations outside the classroom, may be able to offer a valuable educational motivating force. This may have a specific positive influence on those students who typically perform badly within the current prevailing educational environment.

University

The context for our university-level CSCL "experiments" was a third year undergraduate module in Computer Supported Cooperative Work (CSCW) in the department of Computer Science and Information Systems at the University of Luton, England (see Eales, 2001). This module ran in 1999 and in 2000 and had 35 students on each occasion. The field of CSCW is concerned with the study of group activities and the design of computer-based technologies to support cooperative work (sometimes referred to as groupware). A particular problem (especially at undergraduate level) in CSCW education is that most students have only limited previous experience of computer-mediated group activities. An important part of understanding CSCW is appreciating the subtleties of group activities and group dynamics mediated by technology. Without this personal experience there is a danger that the learning will be overly theoretical and detached from the learner (Dewey, 1966). Our solution, which seemed appropriate, was to use a CSCW system to provide a hopefully authentic CSCW experience to underpin the teaching of CSCW theory. The software used was the Basic Support for Cooperative Work (BSCW) system (Bentley et al., 1997) developed at the German National IT Research Center (GMD) (**http://bscw.gmd.de/**). This system is essentially an asynchronous shared workspace system. Access to a group workspace requires only a standard web browser. The system supports a variety of information-sharing activities including structured discussions, uploading and downloading of documents and links to websites. The BSCW system was originally created as primarily a business tool but is being increasingly used for educational purposes (Appelt and Mambrey 1999). For us the system had a number of distinct advantages. It was easy to set up (we used the servers in Germany), it offered web-based access, was content-free, flexible and reasonably easy to use, in effect, an educational technology test bed.

The use and development of the shared workspace became an integral part of the learning experience for this module. Having taken the decision to use the system it then seemed appropriate to seek to use it to investigate novel ways of supporting learning. An important part of our investigation was the involvement of an authentic domain "expert". The expert was importantly not an academic but a practising researcher in CSCW, based at a major government research establishment in Australia.

The use of a shared workspace system as the basis for a learning environment obviously supports collaborative learning. Luton students typically represent an extreme range of abilities and this range was reflected in this particular module. Often, in instructor-led educational settings, students are unaware of the contributions from other students. The technology-facilitated group workspace made the contributions, views, and particularly the reflections, of all students more visible to the entire group, hopefully improving overall standards of scholarship and intellectual reasoning. Such a system can provide a level of participation and visibility that would be difficult to facilitate in a physical classroom.

In previous modules, where participation in a shared workspace had been voluntary, student use had been somewhat limited. We decided from the outset that the extrinsic motivation of 25% of the final grade for participation in the workspace was a necessary evil. Ideally we would hope that student reaction would be of this form:

> Enda: *Finally I think I would have contributed whether or not there was a grade involved, simply because it has been fun to use a new system like this!!*

However the more common student feedback was:

> Lisa: *There is no way I would have participated in BSCW if there was no grade attached to it. I find it takes too long wading through all the various folders and discussions that are going on, by the time I finish doing that I don't feel like replying to anything. The sole reason for my participation is the GRADE.*

We announced at the beginning of the course that there would be a grade for participation in the workspace and then rather naively hoped that the students would put the matter to the backs of their minds and just get on with participating. However, the issue of what constituted the right kind of participation was a recurring topic of discussion. Most students

adopted the "sensible" strategy of mainly taking part in lecturer-initiated discussions or discussions that appeared to be important to the lecturer, (a kind of cyber-stalking). In this way, their contributions were sure to be noticed. These strategies clearly worked against many of the objectives of collaborative learning. For example, some students tried to initiate discussions of their own but other students did not respond. Student behaviour at times resembled pigeons pecking for seed in a Skinner box (a device for developing and measuring behaviouristic learning).

We consider access to the "authentic" to be a valuable resource. Our virtual expert had a significant influence on the activities and learning in the module. However, we would like to have magnified her influence. One of the main problems seemed to be that she had to come to terms with our university culture. In many ways the shared workspace became an extension of the module and of the university; a place where the standard "rules of schooling" applied. It seems we had tried to escape from schooling and to create a more authentic environment only to find that schooling had followed us. This student focus on getting a good grade is at the heart of what we term inauthentic learning. We intend to explore the issue of authenticity in more depth, and its relationship to CSCL, later in this paper.

MOTIVATION

What general conclusions, based on our experiences, can we make about motivation and CSCL? As we mentioned earlier, in trying to make generalisations across our experiences, to some extent, we are not comparing like with like. There were a number of significant variations other than the domain of interaction. However, rather than a disadvantage, these changes may have allowed us to experience a wider cross section of motivational factors.

We do not fully understand the complete geography of motivation, but we can make a number of tentative observations. We want to make a distinction between authentic and inauthentic motivation. Authenticity is a particularly complex philosophical concept, but in very simple terms, authentic motivation is related to a focus on the development of robust, long-term knowledge, whereas, inauthentic motivation is focused on assessment and the tactics of schooling, i.e., getting a good grade. Ownership of the learning problem appears to be a particularly powerful form of motivation. However, perhaps because it is so compelling, so demanding, this type of motivation is also very fragile. In the workplace, learners seemed only too ready to surrender their ownership in return for a reduction in the anxiety related to their skill development. Importantly, communities of practice appear to offer a model where commitment to the community retains ownership but spreads the burden of the learning problem across the whole community. Rather than surrendering ownership to a group of professional trainers, ownership of problems and the need to develop appropriate solutions is integrated into the collective objectives of the whole community. We feel that CSCL appears to offer opportunities to create technically augmented communities of practice that spread the burden of learning problems while retaining the all important ownership of those problems. For example, Scardamalia and Bereiter (1996) present the idea of knowledge building in communities as a way of facilitating superior education (or authentic learning) in schools.

Inauthentic motivation, on the other hand, often appears to represent a surrendering of ownership, of what is to be learned, in return for some extrinsic reward like a qualification. It also often allows the learner to adopt a more passive role. In its extreme form, "learners" have no interest in what they are learning, only in increasing their rewards and/or decreasing their efforts. We will argue later in the paper that this is inauthentic because the content and the rewards are misaligned. Knowledge within this kind of "learning" environment tends to only have short-term exchange value. In educational institutions, CSCL may offer opportunities to challenge deeply ingrained inauthentic motivation by bringing students into contact with authentic situations and problems from outside these environments. In particular, the ability of CSCL to introduce an element of "reality" into schools may engage those underachieving students who have previously largely rejected the inauthenticity of formal education.

AUTHENTIC LEARNING

From our current position in higher education, we find it hard to interpret our complete CSCL experience as anything other than "a journey away from reality and authenticity". In the workplace, at the informal level, workers had real problems that necessitated learning. In particular, they needed to connect with expertise and manage the time and effort associated with learning, but there was also a real sense of collective ownership of the problems. That is not to say, however, that inauthenticity does not exist in the workplace at other levels. In the classroom environment of the K-12 school, there was genuine interest in the glimpses of reality from beyond the classroom. In the university, although technology afforded many valuable "educational" experiences, undergraduates eschewed the authentic, remaining focused on the game of schooling or "getting a degree". In this section, we want to discuss in more detail the inauthenticity of most university learning and how this can perhaps be addressed by CSCL-based "virtual deschooling".

For many years, there has been debate about the fundamental basis of university education. One side has championed various professional or vocational skills specific to the age, whereas the other has advocated more theoretical general-purpose skills as being the best preparation for life after university. Accusations such as "dumbing-down" are levelled at one side and "living in ivory towers" levelled at the other. One thing, however, that unites both camps is their use of success in the real world as a yardstick to justify their theories and practices. This appeal to real world values or

authenticity is an implicit aspect of all theories of education and has been a consistent ingredient in calls for educational reform. After all, who would propose a theory of education that prepared students only for a life in educational institutions?

Brown, Collins and Duguid (1989) offer the following definition of authenticity: "The activities of a domain are framed by its culture. Their meaning and purpose are socially constructed through negotiations among present and past members. Activities thus cohere in a way that is, in theory, if not always in practice, accessible to members who move within the social framework. These coherent, meaningful, and purposeful activities are authentic, according to the definition of the term we use here. Authentic activities then, are most simply defined as the ordinary practices of the culture" (p. 34). Koschmann et al. (1996) include the principle of authenticity as one of their six principles of effective learning and instruction. They summarise this principle as "Learning is sensitive to perspective, goals, and context, that is, the learner's orientation, goals and experiences in the learning process determine the nature and usability of what is learned; instruction, therefore, should provide for engagement in the types of activities that are required and valued in the real world" (p. 91). But just what are the types of activities that are required and valued in the real world? Resnick (1987) suggests that there are four broad characteristics of mental activity used outside of school that stand in marked contrast to mental activities developed in schools:

1. Individual cognition in school versus shared cognition outside school.
2. Pure mentation in school versus tool manipulation outside school.
3. Symbol manipulation in school versus contextualized reasoning outside school.
4. Generalized learning in school versus situation-specific competencies outside school.

Being aware of the value of authentic learning and facilitating authentic learning, are, of course, two different things. In particular, it seems difficult to understand what is currently going on in universities. University lecturers often seem to be motivated most by their own interests and what they believe is the inherent value of "their" subject. Nothing brings them back to "reality" quicker than a question from a student such as "will this be in the exam" or "are your lecture notes on your website?" There seems to be a paradox here. The education system constantly selects on the student's grades, and yet we are appalled by the "Frankenstein's monster" that our selection process creates. Of course, the more sophisticated students are adept at hiding their interest in the game of schooling.

A critical description of the education system by Jean Lave (1990) may help us to at least tease apart the most obvious competing versions of reality/authenticity. She argues "the problem is that any curriculum intended to be a specification *of* practice, rather than an arrangement of opportunities *for* practice (for fashioning and resolving ownable dilemmas) is bound to result in the teaching of a misanalysis of practice (...) and the learning of still another" (p. 324). From this we can identify three curricula:

- Curriculum 1 - The curriculum as an arrangement of opportunities *for* practice (for fashioning and resolving ownable dilemmas)
- Curriculum 2 - The curriculum as a taught specification *of* practice
- Curriculum 3 – The curriculum as a learned specification *of* practice.

To this list, we should add perhaps the most dominant curriculum (or possibly it is a meta curriculum). What Illich (1973) describes as the "hidden curriculum of schooling" – the curriculum as an arrangement of dilemmas related to performance. University students rightly understand that university is a community of practice where the "real" practice is getting a good grade and ultimately getting a degree, the rest is just window dressing. The owned dilemmas are dilemmas of performance not of learning or understanding. Ironically, the more inauthentic university education appears to be the more it supports the claims of situated learning. In that, in the university situation, most students quite successfully learn the tacit knowledge that will usually ensure their survival in that particular environment. What makes this practice inauthentic, however, is that it has little value outside of a university. We believe university education is particularly inauthentic because of the "front loading" of education. Most students go straight from K-12 school to university. By the time they reach university graduation they have been at school continuously for over fifteen years. No wonder then that in terms of intrinsic motivation most students are "running on empty", just trying to keep going long enough to finally get a degree.

SUPPORTING AUTHENTIC LEARNING

We agree with Fischer and Scarff (1998) that we need to go beyond the "gift-wrapping" approach, where new technology is merely wrapped around old frameworks for education. Authentic learning clearly needs to be collaborative, but CSCL also appears to offer the opportunity to *virtually deschool* education by bridging educational and outside worlds. Indeed, in the virtual, the issue of what is inside and what is outside becomes problematic. This means that CSCL systems, with their ability to support interaction with diverse remote communities are of value to all students and not just those involved in distance education.

In 1997 (Eales & Byrd, 1997), we outlined a preliminary three-level model of authentic learning. Our three levels were:

1. Engagement with information
2. Engagement with simulation
3. Engagement with authenticity

We still stand by our three-level model, however, we would define the levels a little differently (especially avoiding the self-referential third level description):

1. Engagement with authentic data and information
2. Engagement with authentic procedures and skills (usually involving simulation)
3. Engagement with authentic contexts

Our original aim in proposing this model was to distinguish the third level from the other areas claiming to be authentic learning. An important characteristic of the first two levels is that they imply a certain degree of pre-authentication (Petraglia, J., 1997, Barab et al., 2000). They depend to a large extent on an educator-derived definition of what is authentic, whereas third level authenticity is an emergent property of the interaction. In other words, attempts by educators to teach what is authentic rather than to facilitate student engagement with the authentic are unlikely to lead to authentic learning.

As outlined earlier, we have experimented with what we term Authentic Learning Environments (ALE's), networked technical systems allied to appropriate authentic learning activities. Our aim was to bring together university students and outside domain experts in a virtual environment, unfortunately the mentality of schooling is not that easily defeated. Although the environment provided a number of valuable educational experiences, the all-powerful collective motivation of getting a good grade ensured that the virtual space became an extension of the university, where university rules of reality held sway.

Currently, we are experimenting with connecting university students to well-established virtual communities with strong existing authentic motivations, what Brown and Duguid (2000) describe as networks of practice. Although we are generally pessimistic, we are interested in exploring whether virtual interaction can blur the distinction between inside and outside of the university and challenge the participant's identities as students (or degree-getters). There are obviously limits to the level of authentic engagement possible in undergraduate education. The inauthentic motivation of undergraduates is strong and we only have the opportunity to mount a small challenge (perhaps a single university module) to this prevailing perspective; what Carl Rogers (1969) termed "institutional press". Nevertheless, we believe CSCL at university level should be used to explore the limits of inauthenticity. An alternative role for CSCL systems as hi-tech skinner boxes will only serve to reinforce existing inauthentic practices.

CONCLUSIONS

We have suggested that motivation is an essential but often overlooked ingredient in successful learning. We have attempted to illustrate this with descriptions and discussion of our CSCL research experiences. CSCL by virtue of its defining characteristics of technically augmented collaborative learning appears to be uniquely suited to address both the issue of extending informal communities of practice and challenging inauthentic learning in educational institutions. To address these key issues, however, we need to continue to pursue a radical educational agenda in CSCL.

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