

E-learning

The Implications for Education and Curriculum

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Schools and other educational institutions traditionally have been regarded as physical and geographic places where the learners have assembled to be put into contact with the teachers and/or other knowledge sources. Within the context of rapid social change and the associated challenges to the institutionalisation of knowledge, the increasing possibility of information technology and e-learning fundamentally challenges this notion of 'place'. Such possibilities bring new challenges to educators.

This paper is exploratory. It initially reviews ideas related to education and 'place' and 'process'. It then begins to explore the implications of e-learning and a number of questions are raised.

The next big killer application for the Internet is going to be education. Education over the Internet is going to be so big it is going to make e-mail look like a rounding error (Chambers, 2000).

The ideas for this paper began two years ago with engagement by the authors in a Sydney-based project for Cyber Education Australia. The project was to be a trial for a telephone supported on-line tutor program to enhance student learning in a number of Sydney schools. For reasons mainly related to lack of adequate funding the project was terminated in July, 1999 but the ideas presented in the paper, were further stimulated by access to reports of the Virtual High School in the United States and developments in the OTEN learning programs in NSW. This paper seeks to generate discussion about the implications of cyberlearning or e-learning for educators involved in all levels of teaching and learning.

Schools and other educational institutions have traditionally been regarded as physical and geographic places where the learners have assembled to be put into contact with the teachers and/or other knowledge sources. Within a context of rapid social change and the

associated challenges to the possible continued institutionalisation of knowledge, the increasing possibility of information technology, principally, but not totally based on computers, being able to deliver on-line learning fundamentally challenges the notion of school as 'place'. While the learning still occurs in a space, this space is not physical but a virtual cyberspace reality. Such possibilities bring new challenges to us as educators.

The paper initially reviews ideas related to the educational institution as 'place'. It then begins to explore the changing capacity for learning not to be necessarily located in a geographical place and the factors responsible for this. Some examples of these are reported and discussed. In the next section of the paper, a number of implications from considering the educational institution as process rather than place are discussed. Finally, a number of questions are raised. What should be emphasised is that the paper is very much exploratory and a work in progress. While some of the ideas relate to students and learning in senior primary school, in the main, the paper is concerned with teaching and learning in secondary and post secondary contexts.

The Educational Institution as 'Place'

Arguably, all previous notions of school, technical colleges and universities, and thus, formalised notions of teaching and learning, have employed, albeit not necessarily explicitly, the concept of a specific geographic space. Educational institutions have been regarded as bricks, mortar and glass in physical space with at least one campus. In addition, many of these buildings were dedicated to education and would be empty when not being used in the evening or during holidays (Kress,2000).

The notion of school as a particular space, for example, is summed up in expressions such as 'going to school' or 'school is where the peer group meets'. Even the common idea of a school's 'drawing area' again has the notion of the school being a place close enough for some students to travel to, but too far for others. The physicality of schools and other learning institutions is reflected clearly in their lack of flexibility. The increasing incidence of overfit schools in locations of changing demographics where the proportion of young people is declining and underfit schools where there is insufficient capacity to accommodate increasing numbers of young people is testament to this. While schooling may be arguably perceived as a set of activities, processes and relationships within a framework of institutional norms, rituals, and practices, these occur in a physical space and always have done. Even when the male author completed his first degree by distance education, located some 1000 kms from the university, he was obliged to travel every vacation to a physical place where all the participants enrolled in a particular course met together. The recent extension of school, TAFE and university calendars is a tangible acknowledgement of the concept of lifelong or ongoing learning, but still this generally occurs, at least in part, in physical space.

In even earliest historical time, there was still the notion of teaching and learning located in a place. It was the learners or those in need of the skills of the intellectuals who gathered around the learned members of the societies. It was the learners who came to meet the priests, the scribes, the travelling schoolmasters as they moved systematically from one town or city to another. This same concept of learners moving to a place in which teachers were located was retained in the more modern traditions of universities and more recently of mass public schooling. These places or sites for learning became famous in their own right (eg. Uppsala, Oxford, Cambridge, Harvard). This geographical basis of schooling has changed little, arguably, in 150 years. More recently, however, pressures increasingly have developed which fundamentally challenge this arrangement for formalised learning. More important, developments in information technology provide the possibility for breaking the restrictions that a notion of 'schooling as place' has constructed.

The institutionalisation of knowledge

One of the major reasons for gathering learners at a place called school or university has been because of the manner in which knowledge has been socially constructed and institutionalised. Thus, until now, the knowledge that has been prescribed by governments as necessary for young people to know in our society has been located within teachers who have undertaken preservice 'professional' training in post-school academic institutions. This is not to assert that there have not been many community people who may also have much to offer young people from their experience and knowledge. It is to assert, however, that generally, the knowledge that young people have been required to study at school has been fairly strongly guarded within the teaching profession and its members. Similarly, tertiary institutions have fiercely guarded 'their' body of knowledge and expertise.

Such a model of institutionalised learning operates reasonably effectively under two conditions. The first is that knowledge remains constant and legitimate long enough so that someone can be trained to teach that knowledge. An important corollary of this is that the length of time for which the knowledge inculcated remains legitimate is longer than the period of time it takes to train someone in that knowledge. This, arguably, is the main assumption behind the current model of teacher education ie that a teacher's half life is longer than the time it takes for that teacher's training. For some subjects taught in schools this may still be the case. For other subjects, particularly those in any way related to information technology, such an assumption is increasingly erroneous. Thus our traditional model of teacher education is being fundamentally questioned (Smith, 2000). Similarly, the boundaries between particular educational sites are becoming blurred: school students may begin tertiary study while still completing their school qualifications; universities are offering courses on school sites.

Associated with such changes are others that challenge the existing model of school as place. The first has already been alluded to above. That is the shifting demographics where schools that have expanding numbers of students often are unable to increase their physical resources to accommodate them. Such demographic changes have occurred in some places naturally as a result of increased population in developing areas. However, in other places this natural tendency has been exacerbated by the creation of competitive schooling markets in which, for example, selective and specialist schools have increased their populations at the expense of comprehensive secondary schools. Similarly, the move to dezoning has put increased pressure on primary and secondary schools that are perceived as being 'good' schools by parents and community members. In addition, there are examples of some schools which are not able to expand their physical space because the site on which they are located is severely restricted because, for example, it is in the centre of the CBD of a major city.

Second, forces of economic rationalism and associated aspects of the new Right politics impacting on education as one area of the reform of the public sector, further reduces funding for schooling and universities and the possibility of expanding the geographic areas of these institutions. In fact, partly as a result of economic rationalist politics, it is more likely that the physical spaces occupied currently by schools are being sold to realise their high property values. In addition, reduced funding and staff reductions, for example, particularly in universities, along with the necessity of increasing student numbers, has meant identifying possible means of teaching and learning which are alternative to traditional face-to-face methods of teaching (Smith, 2000).

The second condition relates to the opportunity for alternative methods of providing necessary knowledge, or the possibility that the knowledge that learners need to know is able to be accessed through methods other than teachers gathered in a specific geographic

place. Since the 1970s there have been increasing developments in information technology and the possibility now exists that this technology is at a point of being able to assume at least some of the previous roles of teachers. The degree that this is now possible may be seen in the example of the future inservice training by GMH of their service staff. Prompted to some extent by an economic rationalist context and the need to reduce inservice training budgets by one third, GMH International has recently entered into an arrangement with a Queensland-based company, DVP. The contract is the production of a series of CD roms that will deal with any aspect of the mechanics and servicing of GMH products. A revised set of CD roms will be produced for each new model. In this scenario, the phrase 'learning on the job' takes on a new meaning. Say, for example, that a mechanic in a Sydney or Perth suburban garage, or more likely, in a service centre in a rural town is about to carry out a service procedure on a recently released GMH car about which the mechanic has no knowledge or experience. With the relevant CD rom in a laptop computer sited alongside the mechanic, she/he is taken through each step of the procedure, using a highly sophisticated set of computer graphic based and audio and text supported interactive programs. If the mechanic needs more assistance, the CD roms are also linked into the GMH interactive website. This example of the servicing of our automobiles is an interesting attempt to address the inability to institutionalize necessary knowledge through traditional approaches to training. It also provides an insight into challenges for those of us who are teacher educators and educators more generally. It is clear that the Internet can be used successfully to design, deliver, select, administer, support and extend knowledge.

The important point that is made in the example above, is that the information technology capacity now exists to seriously consider the possibility of effective on-line learning. In turn, such a possibility is beginning to challenge the concept of the educational institution as place and provide the opportunity for us to begin to examine the concept of 'school as process' (Beare, 1998) and some of the significant questions that such a concept raises.

Virtual High Schools

The first complete virtual high school commenced operation in 1997 in the United States centred in Massachussetts, however, the first virtual high school for Sydney is not far away. On July 1 1999 a proposal to establish the first such school was supported by a ruling of the NSW Administrative Decisions Tribunal against the NSW Board of Studies, who has responsibility for the registration of schools in NSW (Sydney Morning Herald). The proposers of the school had passed all requirements for the registration except one. This, of course, was the unnecessary criteria of buildings and physical space! From the decision by the Tribunal the Minister of Education and Youth Affairs, Mr Aquilina, has been directed to reconsider the proposal. Net Grammar, already has a principal, teachers, a website and eleven HSC courses ready for offering to students. This school is interesting because it illustrates a further impetus to the notion of 'school as process' in that its market is principally directed to offshore students. Thus, another factor that is important, is the impact of globalism and the possibility of students being located anywhere on the globe. Such a possibility is very attractive to a school that is highly restricted in physical space (eg St Andrews Cathedral School; Moriah College in Sydney), and therefore constricted in rooming, timetabling and recreational activities, but would like to increase its number of students and has a high demand from clients to do so.

The virtual high school in the United States, however, is not oriented, as yet, to offshore students. It is a consortium of high schools that offer net-based courses taught by consortium teachers. The following details derive from Zucker, 1999 and the web site, <http://www.sri.com/policy/ctl/html/vhs.htm>. In 1997-8 the school offered 29 Internet -based credit-bearing courses to over 500 students in 27 schools across 10 states. In 1999-2000 100 courses were offered to 100 schools and to 2000 students. The school is virtual in a

number of senses. Courses are virtual, and so is faculty, the student body, the administration and organization of the school. Teachers teach both face-to-face in their own schools and in virtual space on the Net school. They are released from some load to teach in the virtual classes and all participate in a cyber professional development program that deals with issues related to on-line teaching and learning.

Students who enrolled in the virtual high school demographically were similar to national averages in race, ethnicity and socioeconomic background. This was different for the teachers where a large majority were Caucasian, fifty two per cent were women and ages concentrated in the 30-49 year bracket. All of these characteristics are different from the national average. Half of the teachers already used computers daily prior to their involvement in the virtual high school.

In the evaluation undertaken by Zucker (1999) and his colleagues, one of the major advantages claimed by students and teachers was flexibility. The opportunity to undertake learning at any time for students was very important. This fits with some national surveys that suggest that the most popular time for activity on the Internet is between midnight and four in the morning. In addition, both students and teachers found being able to work from home an important benefit. The asynchronous nature of the course provision was important in allowing students from a wide variety of schools with very different timetables and schedules to access their learning at times that fitted into this variety of schedules.

This asynchronous feature of course provision is also important, more generally, from another perspective. Because of increasing diversity in the educational needs of students there has also been an increasing diversity of subject offerings in the curriculum. For example, in NSW, this is particularly the case in the Social Sciences, where there is a possibility of ten different subject offerings, Technological and Applied Studies, with more than six subjects and Languages Other than English with fifteen or more subjects. Being able to offer a wide enough range of subjects to meet student need and demand is difficult enough in large schools. In small schools, or where demographics mean a reducing population of students, the task becomes almost impossible. In such cases, the possibility of asynchronous web based courses becomes a very attractive alternative. Likewise when programs to rationalise the number of schools because of changing population and demographic patterns are thwarted by distances for learners to travel, the possibility of virtual courses also becomes viable. One of the issues in the development of effective asynchronous web-based learning, which was a feature of the American virtual school, is access to teacher support. There are some interesting Australian examples of this approach to web-based learning already developing.

In the university sector, e-learning is being used to reach new student markets as well as to better serve existing ones. The marketplace is international An excerpt from a recent preamble for an e-learning forum on November 23 at the University of Technology, Sydney stated:

Unext, a virtual university drawing on Columbia, Stanford, Chicago, Carnegie Mellon and LSE, including three noble laureates as well as Michael Milken and Oracle's Larry Ellison, is now contemplating a move to China. While not everyone wants an online degree experience, Newsweek (24.4.2000) comment: "Unext won't pretend to be the ideal school for everyone. It just attracts the other 99 percent". Australian universities are also joining in consortia, such as Universitas 21.

Approaches using web-based learning have been a feature of teaching within the University of Sydney, as with other Australian universities, for the last five years, including both 'chat

rooms' and teacher tutorial support. Increasing amounts of web-based course content and information and full courses are a feature of the Master of Teaching degree in the Faculty of Education (Ewing & Smith, 1999). In fact, it would not be possible for a candidate to complete the degree successfully without a reasonable level of web-based skills.

Virtual Learning in New South Wales

There are also increasing examples within the school sector of virtual learning. The now defunct CyberEducation project would have used a web-based on-line learning support system in conjunction with telephone tutoring which used technology capable of both two way voice and the creation of touchpad text. It was to be offered in both synchronous and asynchronous modes and unlike the American virtual school, was designed to specifically support existing programs in the schools that were part of the project. Thus, students would be able to log on independently between the hours of 4.00pm-9.00pm Monday to Friday and all day Saturday and receive live voice telephone assistance to deal with problems they were encountering in their schoolwork/homework/assignment/projects. Supporting the live voice support was the possibility of direction to on-line information and interaction. Such a service, including all of the necessary technology on a hire-update basis could be provided for less than what it would cost a family for a private tutor (approx \$50-60.00), thus making such a service possible to even students from low socioeconomic backgrounds.

In addition, synchronous sessions were also planned in which teachers from the schools would organize an on-line session dealing with some aspect of the school-based curriculum. All students would be expected to log on and participate in this session as a regular part of their school learning. Such sessions, which could easily be electronically monitored for attendance and participation, could be offered both outside regular timetabled lessons or as part of the timetable. Thus, an approach such as this clearly is not conceived as replacing teachers in the schools, but as an important support for teaching and learning in which the teachers are important participants. Arguably, rather than replacing teachers, or deskilling their work, such an approach provides the opportunity for them to maximise their time and opportunities for learning, because students are better prepared to engage in learning activities because of the on-line preparation and tutor assistance.

A similar project is now in operation by a company called World School (<http://www.worldschool.com.au> or e-mail info@worldschool.com.au; The Sunday Herald, 18 July, 1999). This approach may be described as Home Study on the Internet or a learning system for students at home and at school. Again working in conjunction with schools and teachers, World School offers a service of identifying and sanitising a number of web sites that are relevant to a particular task/project for a specific group of students. It then creates this as a safe closed site which students access. In addition, it also offers trained tutors to assist students in their tasks, reviewing essays and providing sample and model answers. The latter follows a model developed by the 'cheat' sites that have attracted enormous student interest and use and pose a number of difficult issues for educators. In addition, World School, through its design of on-line screens, attempts to assist students to gain simple metacognitive skills associated with the interpretation of questions and tasks and the planning and drafting of appropriate and relevant responses. Like the planned Cyber Education project, World School assists families and individuals to offset costs through a number of benefits and services provided by 'smart' technology (eg., reducing 'phone bills and provision of services).

What the paper has established so far, is that there are numerous reasons why the concept of 'school as process' rather than 'place' is becoming increasingly attractive to a range of stakeholders in schooling. Such groups include, government bureaucrats and politicians and media/technology entrepreneurs, as well as, school principals and members of governing

bodies, parents and students. Arguably, teachers might also be included in this list but matters related to this will be taken up below. More importantly, there is clear evidence that the possibility for such virtual schools and virtual teaching and learning exists. If this is an authentic scenario for the future of schooling, then what are some of the most important implications and questions that will need to be investigated. Some of these are addressed in the final section of the paper.

Implications and Questions

Apart from a wide range of technical and administrative issues related to the effective delivery of on-line teaching/learning (see Zucker, 1999), there are a range of even more important political, pedagogical and ethical questions.

The first, and generally most important, is that related to on-line teaching and computers replacing real, live, warm teachers and thus, the concomitant both political and human issue of taking teachers' jobs and deskilling their work. This is an extremely complex issue and goes to the very heart of the work of teachers and whether their work, if it is based in the degree to which knowledge is able to be institutionalised, is increasingly being challenged by the rapidity of change in society and the movement into a post-industrial world (Kress, 2000, Heath, 2000, Lovat & Smith, 1995). We are not mounting an argument, in any sense, that on-line learning should replace human beings, and would agree that those of us who are committed educators can find many reasons for why this should not be so. Such reasons, however, may not hold much weight when matters of cost and resourcing are the main considerations for politicians operating within an economic rationalist framework, and teacher salaries are seen to be the majority cost for providing schooling. With the prospect of 51% of the teaching workforce retired by 2001 in NSW, and similar prospects in other states in Australia and other western countries (eg., Ontario 1999, 14,000 retirements), the difficulty of staffing educational institutions with 'live' bodies may hasten such considerations.

Offset against arguments based on replacing teachers because of their cost, however, may well be considerations of the control of young people in society. Certainly schooling has been used by politicians across the political spectrum to reduce the figures of unemployed young people, and this may still well be an important consideration. On the other hand, student management and discipline, even student violence at school, is emerging as the most important issue for teachers, principals and school leaders in the western world. The issues associated with this may, at least in part, be conceptualised as problems that arise because of the aggregation of groups of young people in one place, as part of the notion of 'school as place'. It is interesting to consider what the impact on problems of student discipline and management might be with on-line learning, where students are not in one physical space but separated, at least for part of the time, in their learning. Would this mean that problems of student management are lessened? Could it mean that because teachers are spending less time on management, on-task learning may increase along with student learning outcomes? Could on-line learning actually contribute to more effective student learning?

Nevertheless, the main assault on traditional approaches to schooling, teaching and learning may not come from such decision makers. It seems that the main interest may well be shown by international multimedia magnates such as the Packers and the Murdochs of this world because of the vast profits that are potentially available and access to markets for a wide range of services. Already there are examples of interest in on-line education by such entrepreneurs (eg. Channel 7 Sydney and its footprint into Asian countries for professional inservice training; NSW Department of Education & Training with Sky Network in the OTEN project).

So far, however, all developments in virtual schools, both in Australia and the United States have been undertaken in close cooperation with teachers. On-line learning has been seen as an important adjunct to face-to-face teaching; an important support to teachers' classroom work (e.g. worldschool.com.au). In many cases the on-line time has been used to provide students with introductory information or ideas that are then used as a basis for more complex in-class learning tasks. Some educators would still reject such a notion, saying that it is only the 'live' teacher who can deliver such knowledge effectively. This is not our experience in the Master of Teaching at the University of Sydney. For example, basic information related to content readings or syllabus documents or government school policies provided on-line for guided independent study have been found to be the basis of stimulating discussion and more sophisticated tasks, for example, associated with case stories of teachers, students and teaching. The reduced time spent in face-to-face teaching results in more exciting stimulating and effective learning because of the individual time spent on-line.

A second issue concerns whether e-learning is equally attractive and effective for all learners. There is by now, a well established literature dealing with the supposed learning style preferences of girls and boys, as part of the wider context of learning styles more generally. That research suggests that, in general, girls prefer more cooperative ways of learning as compared to boys, who generally prefer more competitive learning formats. Cooperative learning exhibits much more social interaction. Such interaction has been identified more recently in the research that has confirmed the importance of 'talking ourselves into meaning' and constructivist learning. Consideration of these ideas would suggest that at least some forms of on-line learning, particularly those that have an individual learner working on their own computer in their own space, may well be more suited to learners who prefer to learn independently than those who are social learners. If the gender-based research is accurate, then it may suggest that, at least some forms of on-line learning are more suited to boys than girls. It was for reasons of trying to accommodate the importance of talk in learning, that the proposed Cyber Education project was to use telephone technology to support the on-line capability. Certainly, however, e-learning provides opportunities for collaborative learning which traditional forms of distance learning could not - through self paced threaded discussion and e-mail and through real time live web based delivery.

As yet, there does not appear to be any firm data regarding on-line learning and learning style preference. Within the Master of Teaching degree, men, equally with women are compelled to utilise the web based learning tasks. However, this on-line learning is still within a context of face-to-face teaching. Chat room options have not been taken up to any large extent. Those M.Teach students completing their internships overseas or interstate who were forced to attend the post internship conference electronically used the conference 'chat rooms.' Those physically attending the conference did not. Similarly, from the evaluation of another undergraduate program that employs on-line learning at the University of Sydney, it was found that students reported that they did not use opportunities for social interaction in the virtual 'chatroom' because they were all students who could interact with one another in the physical Faculty building space. This evaluation suggests that it is the context in which on-line learning takes place that may have an important influence on the manner in which students use the opportunities. The possibility of face-to-face interaction in physical space may offset issues of learning style disadvantage for some students, that on-line learning presents.

The American virtual high school provides a different context in which it was not possible for learners to interact with one another in any physical space. Early findings from the evaluation (Zucker, 1999) do suggest that at the end of the on-line learning, students appeared to have a preference for independent learning. Unfortunately, since data on learning style was not collected at the beginning of the project, it is not possible to establish

whether the students who were attracted to study in virtual reality did so because they were independent learners or whether the experience of the structure of virtual learning constructed them as independent learners. Certainly, findings showed that the students did not use the 'chatroom' as an opportunity for virtual social interaction and that interaction patterns tended to be individual query to the teacher and response by the teacher to the individual: a similar pattern to that found in classrooms generally in the 1970s, and, arguably, one that continues still (Cusworth, 1995).

Thus, questions about learning style preferences, including those related to gender and possibly race and ethnicity, and the structure and nature of on-line learning demand further investigation. While some would argue that cyberspace learning can never replicate 'real live' teaching in face-to-face physical space, this is a bit like saying a pear cannot be an apple. Of course it can't! It is not a matter of trying to make e-learning the same as physical classroom learning. It is a matter of finding ways to use the potential that cyberspace learning offers to enhance the teaching of teachers and make learning more effective and successful for learners. While many of the arguments against cyberspace learning and supporting 'real live' teachers hangs on the assertion that in the latter it is possible to develop human relationships and interactions that are essential to effective learning, it behoves us well to remember that there are increasing numbers of students, particularly boys, who are alienated from school and teachers, who are not finding the possibility of having warm, positive human relationships with teachers and who are swelling the ranks of 'behaviour disordered' and 'emotionally disordered' students. In addition, arguably, the two most dominant movements in American education are 'home schooling' and the development of independent Charter schools. Similar trends are occurring also in other countries. What needs to be recognised is that increasingly, traditional school and schooling, and patterns of traditional teaching and learning are failing increasing numbers of students. This is not because of teachers. It is not only because of 'uneducational' political decision making. It is also because of the structural changes that are taking place in the very foundational institutions of an industrial age society. E-learning may have something to offer to make learning for some students more effective.

A third important set of issues concerns ethical questions related to cyberlearning, particularly those dealing with the nature of interactions and information exchanged between learners and tutors, and learners and learners. Increasingly, similar issues associated with the use of the Net and web sites are beginning to occupy lawyers and moral philosophers. To some extent, cyberspace offers a closed environment for the transaction of information and opportunities. As already revealed in a number of media grabbing incidents, such information and opportunities are not necessarily accurate, honest, or ethical, nor do they necessarily act in the interests of the parties. Thus any tutorial and on-line framework and associated interactions will need to be carefully monitored and evaluated. Similarly, any training program will need to have ethical issues as a major part of tutor/teacher training. Certainly, as cyberlearning expands, there will be numerous issues that will attract both the lawyers and the moral philosophers of society. Whether they will have solutions to this new range of issues remains to be seen.

A fourth aspect concerns the possible diversification of roles of 'teachers' in a cyberlearning framework. There is no doubt that for many reasons, in the foreseeable future, for some teachers, their main role will be in face-to-face teaching in physical space. Increasingly, however, we would argue, other teachers will be engaged in other work. Some may be trained and employed to teach/tutor students in cyberspace. Still others will not be engaged in 'teaching', as has been traditionally defined (ie., in interacting with learners in physical space). Instead, they will be 'knowledge workers' translating content into programs to be used in different on-line formats, developing Net based programs for specific topics or purposes, or identifying and sanitising existing sites and preparing closed sites and servers.

Some of these latter roles may be undertaken in close association with the teachers in physical schools supporting their teaching. Others, increasingly, probably, will not. The beginning of such roles can already be seen in the American virtual high school and World School.

It is clear that there is a new emphasis on the learner. The learner is much more seen as the agent in his or her own learning, freer to be his or her own person rather than conform to the socialisation of the particular institution (Russell and Holmes, 1996). Kress (2000:141) suggests that the learner must become *transformative, creative and innovative* and that design should become a more central focus of the curriculum. He says:

Design asks for production of the new rather than replication of the old. Thus putting 'design' at the centre of the curriculum and of its purposes is to redefine the goal of education as the making of individual dispositions oriented towards innovation, creativity, transformation and change.

At the same time, there is no indication that print media will be eclipsed or indeed at all. According to Hunt (2000) the new and the old, two quite different mindsets will operate simultaneously in our education system for some time.

There are a range of other questions that could be raised. These include questions related to providing skills, resources, particularly time, and opportunity for existing teachers to engage in e-learning. They include questions related to the quality of materials produced. They also include questions of who owns the material that forms the basis of on-line programs. Ultimately there are much bigger questions of who will control whatever forms of learning are deemed necessary for young people in society. At the moment, e-learning is only just beginning. For many reasons, some discussed in this paper, however, it would seem that opportunities for such learning will increase rapidly. The expected development of information technology only serves to reinforce this possibility. While there are many serious questions that will need to be investigated, the concept of 'school as process' has the potential to open up a number of exciting possibilities that, while posing dilemmas to be wrestled with, at the same time offer the potential to address some of the current problems in the relationships between schooling and society. At the same time, the possibilities that e-learning presents will also shake some of the very premises, assumptions and 'sacred cows' that have been constructed in relation to schools, teaching and learning.

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