media managers; in this context the wide coverage of technology, policy, applications, and implications is appropriate for these two audiences. For others it provides an interesting foray into journalism and news media developments within the United States.

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Sociomedia: Multimedia, Hypermedia and the Social Construction of Knowledge *edited by Edward Barrett* (The MIT Press, Cambridge MA, 1994), pp. vii + 580, ISBN 0-262-52193-8 (pbk) or 0-262-02346-6 (hbk)

Sociomedia presents twenty five gender-balanced papers, mostly from a 1991 MIT Conference, on hypertext, hypermedia, and multimedia applications technology in the university. The editor coins the term *sociomedia* to direct attention from the machinery aspects onto the social purposes of IT because it is the 'complex interaction of human relationships which define "university" and "education," human relationships that are the real content of all educational technology' (p. 9). Unfortunately, his stated editorial aim to 'textualise the computer' is only partly successful.

Although divided into two sections, 'Perspectives' and 'Practices', the book is clearly directed at the practice. A major disappointment for me is the lack of critique with problems seen largely as technological matters. Nevertheless, those already committed to the wider use of information technology in universities will find much of interest. There are fifteen papers on teaching and learning applications, particularly multimedia visualisation - combining graphic, textual, audio, and video representation cross-referenced with audiovisual and textual information from other disciplines (Davis p. 392) - and virtual classrooms.

Multimedia papers cover curriculum areas ranging from Physics (CUPLE Project) and Engineering Design (EDICS and CATS at MIT) to Literature (Brown IRIS Intermedia Project), as well as successful applications in urban planning and geology engineering. Janet H. Murray shows how multimedia programs can enhance cultural understanding in Language Learning. Surrogate travel is provided by embedding maps on one another so that students can obtain increasing levels of detail in the simulated reality of travel. Other language programs which allow the user to interact and vary the narrative structure (eg. the programs *Philippe* and *No recuerdo*) look interesting, but conversations, it is admitted, remain stilted and limited. Anderson's assessment of the *Medical Centre* program that links problem solving protocols of the Patient Module to relevant content information in Hypermedia databases indicates that medical students can assess the solution to medical problems but, more importantly, the heuristic of the decision making process.

Virtual classrooms (VC) are defined by Slatin as 'a process whereby students and instructors interact with one another and with the course materials through the medium of interactive written discourse' (p. 31). Those universities that are attempting to provide education on the cheap by technologising intellectual labour would do well to reflect on the book's papers on VCs. Consistent with Barrett's theme of textualising the computer, Hiltz's paper provides two worthy objectives: improved access to advanced education for those in communities made remote by distance, time factors, or circumstances; and improved quality and effectiveness of education by promoting a collaborative learning environment (p. 348).

Of course, computer mediated communication systems in universities will inevitably change the relationship among text, teacher, student, and classroom. Davis prophetically claims that highpowered computing systems have 'changed forever the way education is done as we now have the 'University Without Walls' (p. 396). Most contributors adopt a sanguine, indeed roseate, belief that the changes will be for the best. Interactive written text, says Slatin, 'offers unprecedented access to what's going on in the minds of the students, and to their understanding of the course material' (p. 32). Hiltz makes the obvious, but largely unexplored point, that speaking and listening are being replaced by typing and reading from a computer terminal (p. 350). If the library is to 'remain pivotal in the social creation of knowledge', says Anderson, 'it must capture, create, and nurture the linkages, pathways, and management of nodes of information' (p. 115). However, those who see the library's role as more than Anderson's portrayal, a passive 'collective after the fact', might be less inclined to share his vision of the library as a hypertext-hypermedia clearing house. Libraries are invaluable curators of textual artefacts in society. Furthermore, libraries help to order knowledge into epistemic boundaries which, although challengeable in a poststructural world, serve valuable functions for inveterate structuralists like me. Some claimed pedagogical improvements also deserve closer attention. For example, the increasing application of 'peer evaluation' (Carlson p. 57), facilitated by networked lessons, is not universally viewed as an educational advance, especially by those who fear that it undermines academic rigour.

The book is replete with claimed benefits provided by the new technology in universities, broadly summarised by Hiltz (p. 347) as significantly improving the access to and the quality of education.

Although the 'infinite variety of permutations' of knowledge is a significant improvement (Anderson, p. 111), papers by Redish, Wilson, and McDaniel (chapter 12) and Carlson (chapter 3) tend to draw what I think is a too easy binary between 'static' and 'linear' representations of old textual knowledge and the 'liberated', 'multi dimensional', and 'flexible' offering of the new technology. Students now have freedom to create personal knowledge rather than to be forced to understand 'an imposed external categorisation of that knowledge', claims Anderson (p. 114) in one of those 'new age is dawning' claims throughout the book. But surely a passing awareness of subjectivity and intertextuality theories should make such claims rather difficult. Nevertheless, Landow's and Murray's papers are right in asserting that hypertext promotes 'connectivity' and encourages users to think in a more inter disciplinary and multicausal mode (Landow p. 196). My fear, however, is that thought can lose in depth what it gains in breadth.

Computer mediated teaching and learning can also promote a more collaborative learning environment if used correctly as Hiltz shows. However, Redish, Wilson, and McDaniel's enthusiasm for modular computerised data gatherers in physics is not matched by supporting evidence. The least attractive 'benefit' for me is the use of multi media as an alternative to student attentiveness. Using a video clip, say Hartman, Diem, and Quagliana, helps to keep students' attention (p. 177) because it takes into account the students' context and schemata. This sort of benefit worries me immensely. Student evaluations and the valorisation of 'innovative' lectures are pressuring lecturers to use anything that moves, makes noise, has colour and lasts a short time. Surely this is antithetical to the knowledge, understanding, and wisdom that is developed through the application, rigour, and critique of sustained listening, reading, writing, and computation.

Disappointingly, very little empirical evidence is actually adduced to prove that virtual classrooms and computer mediated communication systems actually work better than the traditional classroom. Is Landow right when he says that students tend to write better when their writing is exposed through networked lessons or that they take a more active role in

their own education (p. 209)? Evidence remains at the level of anecdote provided by advocates. Hitz provides the only evidence (and this is largely attitude surveys). Incredibly (for this book) he finds that there are no consistent differences between the traditional (TC) and virtual (VC) classroom in the outcome of mastering material taught. Students nevertheless reported that the VC 'improves the overall quality of the learning experience' (p. 357). The most significant and reassuring finding for me is that the highest satifaction ratings are achieved where there is a high degree of interaction between teacher and student.

The book is not entirely blind to the shortcomings. A significant problem is the limited state of technological development. Unfortunately, many universities use Computer Based Training (CBT) which is limited to low-skill and knowledge recall aspects of learning. As Carlson points out, there is no working model of intelligent computer aided instruction which 'comes anywhere close to duplicating the flexibility or insight of a human teacher' (p. 59). Making 'semantic links' rather than just factual links is exceptionally difficult; and if it were possible, would the semantic links be generic or customised?

The issue of control and responsibility is also a significant problem. As Shirk points out, 'the reader is constantly confronting structural choices established by its author' (p. 81). The challenge she says is to 'design the structure of the hypertext database to match the ways that a user might want to think about the topics'. But it is not that simple.

A third problem is that the VC is not recommended for students with weak literacy and computational skills (Hiltz p. 367). Finally, there are resource problems. Constructing effective materials and VCs demands large set-up time and money that is not often available to most instructors (Landow p. 197). Students also have limited time resources whereas VCs require more time than traditional classes (Hiltz p. 367).

Although *Sociomedia* is a very useful and interesting book, I have three concerns about it. Barrett should have found some space in such a large book (580 pp) for a critical, even sceptical, perspective. However, his careful advocacy in the introduction of a humanising educational technology is immediately undermined by the first paper in which Shneiderman presents a 'Star Wars Plan' vision of the US government spending of $100 billion to place 10 million edu-stations in schools. This presages the imperative tone in most papers (eg. 'We need to build libraries that are ...'. Anderson, p. 123) that reveal its proselytising purpose. Indicative of the uncritical approach is Slatin's ridicule of the university's professor's status which he claims is a 'medieval arrangement ... conferred by a privileged relation to that once rare commodity, the book' (Slatin, 30). What Slatin overlooks is that the computer age does not alter the fact that relationships of power are mediated by various discourses (be it the Ptolemaic worldview or the entrepreneurial culture) and accessed through technology (the quill or the PC). New technology always produces winners and losers in power roles and this is determined by discourse value and access. Slatin's belief, then, that re-arranging computers around the outer walls somehow breaks the power of the lecturer (p. 31) is a laughably naive claim because it fails to realise how knowledge, is produced, valorised, and commodified.

Another instance of critical weakness is the acceptance of the concept of student 'needs' which has crept into liberal pedagogic discourse in an insidious way. Although good teachers relate new learning to the student's context and schemata these do not constitute needs, but interests. Somehow, adolescent *interest* in movement, noise, and the visual has become an adolescent *need.* We are enjoined in Hartman, Diem, and Quagliana's paper to take these 'needs' into account 'in such a way that the students are in control, actively guiding the learning process and tailoring it to their individual needs' (p. 179). But I want to know why these interests are called needs; what role teachers have in selecting and creating appropriate knowledge and processes; and if teachers are educators or technological 'facilitators'. Student 'needs' must be scrutinised and counteracted if they are anti intellectual, or inappropri-

ate (eg, masculinist violent media scenes; or the lure of the ephemeral over the enduring). Teachers must develop the students' ability to read extended texts, to synthesise and to critique and move beyond entertaining.

A frequent assertion in these papers (eg, Anderson, Landow, Carlson) is that the new technology provides students with the freedom to create their own knowledge rather than be forced to understand 'an imposed external categorisation of that knowledge' (Anderson, p. 114). But the grammar in which these claims are expressed suggests the problematic nature of such statements. For example, the passive voice of Carlson's statement that modules 'are stored as a textbase and can be accessed in a sequence determined solely by the reader' (p. 59) begs the questions: who stores them; who determines the selections of 'knowledge'; who has access? As in the creation of any text, someone has to select the content. Teachers and software companies have to generate the text in the first place making the links. Even apparently benign topics such as Carlson's recreating the virtual environments of the French revolutionary period raise questions of who constructs the history. Simulated travel, art selections and cultural artefacts also present the same problem. Whereas Hoptman makes a serious attempt to come to terms with this in 'The virtual museum and related epistemological concerns' (Ch 8), other contributors ignore the problem or unwittingly provide the answer as Shneiderman does when he lists among the advantages the 'expansion of computer hardware manufacturing, development of software tools, and the growth of the whole computing industry' (p. 15) or when Barrett recognises 'the dependence of the university upon corporate sponsors' (p. 4).

My third criticism is the misuse of language. I get annoyed when terms become debased by careless usage. Just as *deconstruct* now means merely to analyse, Slatin seems to have redefined *discourse* (p. 31) to mean text, as in

> ... students and instructors interact with one another and with the course materials through the medium of interactive written discourse.

Foucault's defining use of disclosure is essentially that thought is a set of social practices, 'a group of *rules* that are immanent in a practice, and define it in its specifity'[1]. Thus any discourse mediated in text must involve concepts of knowledge, social practices, subjectivity, and power relations.

Perhaps more important, however, is Barrett's use of *social construction* which he specifically defines in a 'very pragmatic' way to mean 'people reading and talking and writing to each other in order to synthesize their thoughts' (p. 2). He claims to adopt Vygotsky's understanding that 'all the higher functions originate as actual relations between human individuals' (p. 2). But this is the sanitised, ideology-free version of Vygotsky. What this Marxist psychologist argued in the 1930s is that symbolic activity has an 'organising function that penetrates the process of tool use and produces fundamentally new forms of behaviour'. This is an aspect that *Sociomedia* considers in a de-ideologised way for, as Vygotsky asserts, there is an underlying unity between the various cognitive processes of speech, perception and action. As a result, language and the various technologies for mediating language help to construct a human's social experience in particular cultural and historical ways[2].

These miuses of language provide a useful metaphor for my concerns about hypermediated-education junkies. That is, they have a poweful technology whose increasing usage has so far had a dream run of support from educational institutions. But their power to homogenise knowledge, even language to their own limited usages is immense and unchallenged. For me, the hypermediated university presents enormous positive possiblities, as this book enthusiastically reveals, but the new challenge is to ensure that the vital roles of understanding and critique are not undermined by the colonising glibness of shiny new technological packages.

NOTES AND REFERENCES

1 Michel Foucault, 1972. [trans. A.M. Sheridan-Smith] *The Archaelogy of Knowledge,* Tavistock, London, 1972, p. 46.
2 Michael Cole, Vera John-Stener, Sylvia Scribner & Ellen Souberman (eds), *Mind in Society - The Development of Higher Psychological Processes,* Harvard University Press, Cambridge, MA, 1978, pp. 24-37.

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Research with a View to Implementation *by D. J. Gouws* (Human Sciences Research Council, Pretoria, 1994), pp. 231, ISBN 0-9583801-5-5.

Case Studes in Research with a View to Implementation *edited by D. J. Gouws* (Human Sciences Research Council, Pretoria, 1994), pp. 248, ISBN 0-9583801-4-7.

These are not, I suspect, easily accessible texts. This could be unfortunate because their combined message is both important and opportune. The two sister volumes provide an investigation into the *implementation* of research findings. Not surprisingly it is illustrated in numerous ways, but with detailed and methodical nicety, that formal *planning* for implementation is a prerequisite for success.

The source material comes from the SAC/HSRC Programe (Science Advisory Council/Human Sciences Research Council) on the Implementation of Research, initiated in South Africa in the late 1980s. The background and source should not deter the interested reader: there is considerable methodological insight to be gained from a careful reading of the two volumes. Indeed, the first volume comprises an interesting, informative and important source of information.

The book is divided into three main sections. The first section outlines the SAC/HSRC investigation into the problems, circumstances, methodological considerations, personal and organisational factors which influence the success or otherwise of the implementation of research findings. (This investigation ran as a national programme from 1985 to 1990 and involved more than a hundred researchers.) The second section comprises the author's views as to what the main determinants of successful implementation are and relates to such topics as individual differences between researchers, the role of stakeholders and factors hindering or promoting successful implementation. In treating those topics the author reviews and collates a fairly wide range of psychological, sociological and organizational literature. In the final section of the book a concise 'implementation manual is provided'.

Overall the two books (the second comprises a series of case studies) examine the increasingly "crucial issue of planning and executing research in such a way that the optimal implementation of its findings is facilitated". At a time when research funds are becoming ever more scarce, when the competition for such scarce resources is much more ferocious than in earlier years, when the application and utility of research findings are of even greater social and economic importance, we see increasing attention being paid by most governments and funding agencies to priority-selection, evaluation and monitoring. The output stage, the potential *implementation*, the impact of research findings, the successful *application* of research findings, whilst obviously an important component of the resource-allocation process have not been subject to the degree of analysis that they merit. Gouw's two volumes are