Editorial

Networking the Learner

Promises, Complexities, Opportunities, and Issues

Deryn Watson
Department of Education and Professional Studies, King's College London, London SE1 9NN, UK.
deryn.watson@kcl.ac.uk

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Abstract: This editorial presents the structure of the book through a matrix of main themes and keywords. Thus the reader may select a particular theme, such as *open and distance learning,* or *national initiatives,* or select keywords such as *object oriented modelling* or *virtual learning*. Throughout a picture emerges of both the potentials and problematics of harnessing new information technologies in education for networking the learner.

1. INTRODUCTION

The papers, panel discussions and professional group reports that form chapters in this book provide a powerful analysis on the role that Information and Communication Technologies (ICT) can have in teaching and learning. In particular, with the focus on networking the learner, there is an emphasis on how the growth of communication capability has opened up new avenues for perceiving the nature of the teacher/learner interface itself, just as much as the learner/technology interface.

The perspectives presented here provide us with a range of insights that enable this volume to do justice to this important topic. Thus this is not about simple matters or making unsupported claims. The authors draw upon experience and research to probe the use they and others are making of the complexity of networking capabilities – the internet, world wide web, chat rooms, asynchronous communications and multimedia. Such use is inevitably both exciting and problematic. There can be little doubt that most

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of those engaged in this work are themselves convinced of the substantial advantages that ICT can have for education, and in particular for the nature and style of learning which it can stimulate and support. But equally, the writings of these individuals and groups presented here carefully explore not simply the possibilities and myths, but also the reality and problematics of use. The reader will find here reports of experiments and case studies, the probing through large questionnaires or detailed interviews of the perceptions of various groups involved - software designers, administrators, teachers and learners – at all levels of education. This reflects a mature community concerned to look beyond the surface.

This community has for some time been engaged in exploring the integration of new information and communication technologies into education, and in re-thinking the purposes and forms of education in ways that harness the potential ICT presents. Each new wave of technologies, or enthusiasm for particular aspects, can lure us into thinking that this time there will be a definite advance towards substantive change. And this may be the case, though not necessarily in the direction that was anticipated. This is now the seventh book associated with the (roughly) quinquennial World Conferences on Computers in Education, an international event organised by the IFIP Technical Committee on Education. Because of its scale, and the time period, the refereed selected contributions here provide a perspective on changes to the ICT environment, and what we educationalists have made of it, over a period of time.

Thus perusal of these chapters indicates how far ideas and initiatives about networks and the learner have moved since the last conference in 1995. The tentative ideas then about the potential of using communications technologies have firmed up into a strong series of chapters that reflect teaching and researching the use of the internet and web as networks to support learners in a range of settings. A focus on liberating the learner though networks has grown into concern for the nature of user interactions and the related styles of learning and pedagogy. New themes are emerging, such as schools of the future, relationships between distance learning and virtual environments, synchronous and asynchronous communication, and equity. All provide frameworks for the testing of new and important ideas. Thus the chapters in this book display a heady mix of foreseeing and practical reporting, of planning for the future but at the same time respecting the problems we already have with networking technologies.

The richness of the book stems in part from the range of experience of the international authors – from academics, administrators and policy makers, to teachers and curriculum and software designers. This mix ensures that the central questions that are addressed are considered not simply from a variety of personal perspectives, but also from different cultural and

environmental experiences. And yet interest must also lie in the commonality of reporting and discussion-based reflections of activity in the field. All contributions draw heavily on research and experience in a range of educational settings, both formal and informal, virtual and real, and with all ages – from pupils in the kindergarten to adults in the community. The opinions and discussions are thus grounded in knowledge gained from work embedded in the reality of today's use of networks for learning. This must be the only sound base upon which to reflect on the promises for the future.

And it is here that the reporting of panel discussions and professional groups provides a unique opportunity for readers to engage with the current reflections of this community. These reports provide a window on their perspectives on future issues that need to be addressed – from social and ethical concerns, virtual universities, and the next generation of programming languages, to the interface between virtuality and reality in schools, and the role of large multinational projects to stimulate change. This book is therefore not simply a passive collection of papers from a conference; and although it has emerged from a particular event, it is far more than a simple proceedings. It deliberately attempts to present ongoing agendas, to reflect the concerns and dynamism of community, and the growing contribution it is making to the ongoing debates about the nature of education itself.

In this chapter it is my intention to present the variety of promises, complexities, opportunities, and issues associated with networking the learner, through the themes and cross-cutting keywords around which this book has been structured. I have argued above that the substance and value of this book lies in its complexity. And yet such complexity needs to be framed in such a way that there are signposts of content. The themes and keywords provide the equivalence of a matrix that readers may chose to use according to their interests. My purpose is to enable the reader to engage enough for other conceptual themes to also emerge.

2. THEMES

Contributions in the book are grouped into a sequence of sections or themes into which the material falls: open and distance learning, ICT in learning, new pedagogic ideas, teaching mathematics, teaching computer science, forms of assessment, management and resource, teacher education, and national initiatives. Each theme has a form of coherence, and a linear structure which loosely relates chapters with their neighbours. Thus readers may select themes to suit themselves, and use the abstracts for each chapter to provide further detail. An alternative strategy could be to select a keyword

from the list at the end, such as secondary education, multimedia, distance education or video-conferencing, to identify those chapters that include this area. Others may search by author, or simply dip in from place to place. And so this book should be seen not simply as a linear text, but a complex resource.

2.1 Open and distance learning

The chapters within this theme focus on different experiences that students and teachers have had with open and distance learning environments – from university students in the Netherlands (Lam and Markenhof) to teachers in Brazil (Vidal et al) and adults in France (Nodenot). Perspectives include concerns that the potential of virtual learning processes does not mean that they will necessarily be fully used (Takle et al), a conviction that virtual schooling can only occur with a complete cultural shift (Jo and Russell), and an affirmation that only through conceptual understanding of the processes of higher order thinking can instructional programs promote effective and interactive online learning (Nicholson and White). Notions such the social presence online (Stacey) and three interlocking facets of online education environments (Nodenot) illustrate the range covered in this theme. Here Schrum provides an illustration of concerns.

> Development of an online educational environment is a complex task. Faculty members have had an especially difficult time changing the ways in which they teach, regardless of these educators' own personal use of electronic media (Candiotti and Clarke 1998). In an electronic environment the role of faculty changes in many ways, and in particular, each instructor must give up some control of the classroom environment. Faculty members are forced to develop and design their activities and interactions in new ways, and may be frustrated without the ability to recognise when students are puzzled (Schrum and Berge 1998). Kember (1995) urged designers to work toward deep learning, which requires moving away from excessive assignments and shallow assessments, and toward some individual freedom in activities. These challenges go far beyond the need to be comfortable with the reliance on technology to support their courses. Wiesenberg and Hutton (1996) identified three major challenges for the designer to consider: increased time for delivery of the course (they estimate two or three times what is necessary for a traditional course), creating a sense of online community, and encouraging students to become independent learners. They also reported fewer interactions than expected from participants of an online course.

These issues all have implications for faculty members and students in an online environment.

2.2 ICT in learning

The chapters in this theme focus on a range of different learning issues, from a problem-based learning in Hong Kong (Yip), technology mediated interactions in Australia (Geer and Barnes) to encouraging students to make oral presentations in Turkey (Inelman) and new approaches to design education (Sagun). Authors focus on topics such as lessons learnt through trans-national analysis of research on teachers in training, indicating gender differences (Knezek and Christensen), secondary students scaffolding learning in a technology rich environment (McDougall and Boyle), and the role of intelligent computer programs to act as agents to mediate learning (Dowling). Iding et al remind us of some additional advantages the technologies may bring.

> Machine interviewing technologies like the Past Recorder and Automatic Interviewer have great potential as formative and summative assessment tools for students in all content areas, especially when linked to electronic portfolios and even to content performance standards. These technologies are particularly appealing for recording changes in individuals' understandings over time, and for capturing important verbal interchanges and performances that might not as easily be expressed in written form.

2.3 New pedagogic ideas

Chapters in this theme remind us of the stimulation that ICT can have through generating new ideas for pedagogy. From details of primary teachers using software about mini-beasts such as insects and arachnids (Masters and Yelland), cross-sectional teaching for media literacy (Hauf-Tulodziecki and Weber), to the use of Encarta to influence learning retrieval skills (Drenoyianni et al), and the develoment of a web-based project to enable students to encounter the biodiversity of the natural world (Hawkey), authors provide a subject or area context for the pedagogy they discuss. Cautionary notes on the use of the web (Le and Le) contrast the positive reports on the effects on the learning of disadvantaged students. Dimitriadi, writing about new technological environments to support children with learning difficulties, reports the following.

The preliminary findings have indicated that the children's work included all the elements and the responsibilities involved in authorship. They took ownership of the product, and they negotiated meaning. The effect of mastery in the use of the tool led on from a sensory-motor activity to a conscious and structured task where respect towards varied needs of different types of audience became part of the context. One of the children's responses to those needs was to create a guessing 'Game' card as the people who were going to use the project 'must have fun'. As indicated by their teachers and samples of their schoolwork, the children demonstrated an active role in the process quite different to their previous authoring attempts with more traditional media. They were willing to revisit their work and redraft it, discuss the choice of language, the style and content of their presentations.

2.4 Teaching mathematics

It is inevitable that in the search for new ideas in pedagogy, there will be a particular place for mathematics. Chapters here include substantial initiatives to support mathematics teaching in the USA (Bitter and Pryor) and Germany (Weber and Frankhanel) and cover such topics as automatic differentiation for graphing (Katkov and Novosselova) and discrete mathematics for computation (Mendes et al). Vincent reports on the role of software for learning geometry.

While there are certain restrictions imposed on modelling with dynamic geometry software and constructions of many linkages may prove too difficult for the majority of students, these limitations do not diminish the usefulness of the computer models in exploring geometric properties and relationships. Whether the students construct the computer models of the linkages themselves or are provided with constructions, the unique features of dynamic geometry software and the curiosity aroused by the operation of the linkages create a visually rich and motivating environment for students to explore, conjecture and construct geometric proofs.

2.5 Teaching computer science

These chapters cover themes of object oriented modelling (Brinda and Schubert), simulations (Gabbert and Tru), systems engineering (Ohnari) and programming environments (Henri and Dore). Topics include accreditation of computer science course for undergraduates in the USA (Lu et al), teaching microcomputer interfacing and real time computing in Australia

(Fulcher), and using simulators to teach theory of computation in a new way in Brazil (Tiaraju). Ohnari reflects on the need for students to use and build something in which they are interested.

> Education of the computer is usually aimed to make students able to use computers up to a limited level. The theme of this conference is Computers in Education. I think this theme urges teachers to create an environment to students who freely use computers for their interesting field and chances to cultivate their abilities of finding issues and solving problems by computers. For these purposes it is important to maintain computer environments and to prepare useful application software for their use. As a result these environments strengthen their insights into issues, user's requirements and selection of software in views of problem solving and raise the level of their abilities for IT.

2.6 Forms of assessment

Chapters here cover work on adult education and assessment in Denmark (Witfelt et al), assessing performance quality in Australia (Summons), assessment through electronic portfolios in the USA (Barrett), and web-based student profiling in Australia (Fountain and Allison). This hitherto little discussed area appears now to be attracting more attention. Witfelt et al reflect on the issues associated with change.

> To many people, chatting suggests the notion of non-serious, very light discussions, often without deeper meaning. However, our experiences as teachers from other flexible courses and education was that chat can be used for discussing serious issues as well - with very good results. But in order to turn chat into a valuable tool, the users need to develop a special language, as is the case with any other media. We wanted to stimulate the students to do this and to test chat as a media for serious discussions by using chat as a media for exams.

2.7 Management and resource

Chapters in this theme include work on computerised school management systems in The Netherlands, Hong Kong and the United Kingdom (Fung et al), portal technology as a means to establishing the effective management of resource in Malaysia (Abdullah and Udin), visions on the value of mobile technologies as a resource for primary learning in Finland (Ketamo et al), and a perception that wireless is nearly the total solution for resourcing (Newhouse). While diverse in content the

relationship between the nature of the resources that the technology now offers and management of the learning potential and administration is becoming clearer. In the comparative study between three countries, Fung et al explore school information systems (SIS), and conclude that as with other applications, implementation is only as effective as the design of an application and training in its use.

> Overall, the research indicates that although there is room for improvement SISs are a useful, if not indispensable tool for school administration. However, school staff should benefit much more from the possibilities of SISs to support their higher order management work. To achieve the latter we first of all need better SISs, systems that have been designed from the perspective of school management work. The results clearly highlight the impact of the implementation process, particularly the role played by training.

2.8 Teacher education

Chapters in this theme reflect the opportunities for distance education that networking provides for trainee teachers. Using the internet is a common thread, from reducing stress (White and le Cornu), disseminating examples of practice through video case studies (Cannings and Talley), to virtual tutoring and electronic conferencing between the institution and schools (Albion), and using virtual reality to improve kindergarten teachers awareness of children's emotional experiences (Passig and Noyman). All suggest that various aspects of networking changes the nature of the education experience, for teachers as much as students. Nevertheless, Albion points to one of the residual inhibitors of uptake.

> Although computers are widely available in schools and their use is supported by public policy, their uptake by teachers is not universal. There is evidence that, even where teachers have access and essential skills, they lack confidence in their ability to integrate computers in their teaching. Multimedia cases have been developed for the purpose of increasing teachers' self-efficacy beliefs (confidence) for teaching with computers. It was important to understand what factors might influence such beliefs.

2.9 National initiatives

The importance which governments attach to ICT, and in particular the growth of communications capabilities, cannot be overemphasised. The

chapters under this theme report and analyse a range of national initiatives, including Brazil (Notare et al), Jamaica (Abernethy et al), Gemany (Hense et al), Oman (Naqvi) and New Zealand (Lamont). Reports cover phases or stages that are considered essential to successful development (Notare et al, and Callegrin and Cortesi), and also describe the impact of policy in different levels (Rohs). Throughout there is a sense of policies in the process of implementation, and the significance placed on the web as a source for consolidating coverage. Most of all, there is a sense of substantial difference in progress in different parts of any one system. Here Notare et al emphasis this differential.

> With the identification of the phases of computer usage in education we can notice that there are in Brazil schools in all levels of evolution, in other words, there are schools that have not started the use of computer not even in their administrative activities and, at the same time, there are schools that use the Internet in order to promote research, communication and co-operative work among students. It is known that the computerisation process of education is slow if compared to the computerisation of other activity areas. And this is because it involves a change of mind concerning the society's concepts and values, as new ways of thinking and acting come up with this revolution.

3. COMPLEXITIES AND ISSUES

All the chapters raise a variety of issues, but these concerns are specifically articulated in the last two sections of the book.

3.1 Professional concerns

A variety of issues were raised by the professional groups, each organised by one of the seven working groups (WGs) that make up the Education Committee of IFIP. The significant contribution of these group reports is that they reflect not a single voice, but the considered perspective of a number of individuals, who met at the event for possibly the first time, and used the opportunity to probe an issue in depth over four separate meetings. These chapters, reporting their deliberations and concerns, are a means of capturing some of the problematics with which we are still grappling.

Chapters here report a range of concerns: that pupils leave education with little understanding of the basic concepts of informatics/ICT, and even less of associated social and ethical issues; that schools of the future will involve

a radical re-think of structural and organisational matters to support new conceptions of the role of school; and that teachers and students need to develop critical understandings about the nature and use of virtual reality. Here also professionals debated the nature of indicators of success, the challenges of teacher co-operation, the problems facing implementing ICT in higher education, and need to author meaningful content for learning with networks. Research offers agendas to understand more fully the nature of knowledge transmission and the ongoing debate about professional development strategies most likely to succeed; tools for concept mapping alert us to different forms of perception and articulation; the impact of learning at a distance and virtual universities force us to probe the nature of learning and teaching to be expected with such change. The concerns for cultural change and the dangers of networking increasing social division force us to ask if we care about the less beneficial affects of the internet.

Readers who want to focus on the issues and problematics may chose to read these reports of the professional groups first.

3.2 Panel reports

Panels were an opportunity for attendees to debate points raised at the start of the session by the panellists. Arguments ranged across the rooms, and reflect the diverse options and opinions in each topic. Programming as an engineering discipline, using robotics to engineer change, can research that can lead to practical outcomes, and can ICT improve teaching and learning – such topics indicate the vibrancy of the discussions.

Experiments in tele-learning, setting national standards, setting up a new project on the rainforest, and attempts to provoke new approaches to learning and integrating ICT at a curriculum level, all report work ongoing. The history of the Nordic countries initiatives, and the international PLANIT project findings point to a long trajectory for such work, and the enduring nature if some of the questions probed.

What these panel discussions indicate is that many face similar problems in implementation, and as we become closer to understanding them, we often expose further issues to be considered. And all while the technology advances and enables us to have greater visions for change.

4. KEYNOTE ADDRESSES

A contrast to the concerns expressed in other chapters and sections, the keynote speakers presented views focussed on the opportunities and

displayed substantial optimism for the field. A synopsis of their presentations indicates the basis of such a perspective.

4.1 The landscape for education is changing in Europe

Mike Couzens, Managing Director Corporate Communications and Training, Cisco Systems, Europe, Middle East and Africa, invited us to imagine 200,000 students attending one education institution – impossible? No, not when the courses are available and continuously updated via the Internet. This is what Cisco Networking Academy Programme has developed, and always is expanding. A programme that can be followed in 6,706 educational establishments world-wide. Cisco helps the education centres' networking by providing them with an online up-to-date curriculum that matches needs within the industry. The programme is a result of public-private partnership launched to meet the demand for people who can design, build and maintain computer networks.

Couzens believes the traditional education systems are not able to adapt quickly enough to the changes in skills and the scales for technology used in the field of education. In several countries the public sector is merely in the process of discussing pros and cons of integrating ITC in education. The private sector, however, is experienced in developing and changing technology rapidly and efficiently - and in educating their staff at a rapid pace. If we want efficient and up-to-date education that meets the need of labour manpower, a public-private partnership is an evident option in the achievement of this goal.

4.2 The power of knowledge

Hans Appel, Chief Technology Officer at Sun Microsystems, subtitled his presentation The Disappearing of the Internet. What he meant this was that the tools we use for communication and sharing information are going to be more and more invisible. Computers are going to be ubiquitous and yet invisible. A tool we use for work, communication, sharing information without having to think about how to use it. Like a telephone. We can use it without any understanding of how the software or hardware works. We will not need to know how the appliances work, but how to use them. We do not have to be software experts to write an email. At the same time the actual web is going to be split up in six interconnected webs.

The six webs are the pocket communicator web, the entertainment web, the e-business web, the voice-activated web, the pervasive computing web, and of course the traditional web. The pocket computer web is the personal web for connecting mobile phones and DPA's, and follows you around. The

entertainment web is for video games, storytelling and other kinds of entertainment brought instantly to you on the couch. The e-business web is a marketplace for consumers and businesses. The voice-activated web is the web that understands what we are saying and also a web that responds in an intelligent way. The pervasive computing web is the web of machines talking to each other so that the information we give to one machine will be handed over to the machines that need that information to respond adequately to our demands.

Appel believes we are going to prepare our children for a market of e-communities, where conversations, loyalty, empathy and fascination are keywords and an employee is an entrepreneur in a networked community. A society where the human imaginative power and intellectual capital is vital and adaptation to the constant development is crucial for individual person.

4.3 Go ahead – give your mind a hand

Robert Kramer Rasmussen, Director for Product and Research Development in Lego Dacta, is a former schoolteacher and, as he puts it, representative of the children. The network in our brain is essential to learning. We need to connect the 125 billions neurons in our brain in order to learn; the better connected the more learning will take place. We need to facilitate creativity, learning (creating knowledge) and thinking (using knowledge) with a fundamental aspect: motivation.

Rasmussen asserts that learning has to be enjoyable, because in that way we can make the children remember and share what they have learned. Enjoyable learning happens when the learning environment offers hard fun and learning by making. And when you do something you care about the learning becomes richer, because the motivation is there. Emotions combined with motivation will then be the engine of useful and creative learning.

Hard fun is finding the challenges for the children and is placed somewhere between challenge and skills, between "can do" and "have to do". In this interaction between our skills, the challenges we meet and our emotions can be used to reach the highest level of learning. Learning is not just about thinking, but just as much emotions; a combination of cognitive and evolutionary psychology. Learning by making is about making learning tangible and letting the motivation push the learning forward and up. Lego is trying to combine IT and children's fascination of IT with their need for building and creating. By building and creating children can make their ideas tangible and that is, as Rasmussen says, fuel for the urge to learn.

4.4 How to increase the level of communication between schools and communities

As 'Chief Evangelist of Centrinity', Scott Welsh perceives himself as the bringer of good tidings, and the tidings he brings are about First Class. Complex technology lies behind the systems and facilities we use today. And yet applications designs are often invasive and affect how the user perceives the functions of the tool. The challenge is to design around the functionality of the tool a user needs, and not the technology used to build it.

First Class was the result of collaboration between three authors, including Welsh, challenged to build a tool to bring together and then establish educational communities built upon collaboration and communication using simply email. Education is fundamentally a different world than that of business and corporations. First class was designed to account for these differences - it is fast, complex and reliable; it enables you to work on your individual machine safe in the knowledge that all the information you need is at your fingertips; it is designed with the needs of education in mind.

So Welsh believes that First Class supports the nature of education as a community, with different players all with the same goals. Collaboration has enabled educational communities to move forwards for years before it became the goals of businesses. There is strength in communities – the class, school, business country, parents and children. First Class supports project based learning, drawing on the different strengths in each community to provide a collaborative product. And all this supports rather than replaces face-to-face learning, though the face to face encounters may not always be in a classroom..

5. ALTERNATIVE SLICES

5.1 Keywords

Keywords are of course pointers that enable readers to take different slices across all the chapters. They enable the reader to trace through which chapters may be of particular interest to them – whether a level, such as primary or higher education, or an approach, such as distance education of object oriented modelling. Any reader could probably produce a valid alternative structure to the one used here, based in these levels and foci.

Keywords however also provide and opportunity to look at different conceptual slices. A selection of certain words, such as collaboration,

problem solving, interactions, and cognition will take you to a range of contexts and levels, but where the conceptual concerns are fundamentally the same, although how they are interpreted may be different. And what these keywords also indicate is that this book represents work which has moved well beyond reporting into a level of analysis that often uses fundamental constructs, drawn from theories of the sociology and psychology of learning, in our attempts to come to terms ICT and education. Chapters about problem-solving curriculum design, learners scaffolding knowledge, social interaction, and the role of modelling environments frequently draw on theoretical frames as a basis, for instance, for developing software, structuring the learning, and analysing teacher and learner behaviour.

My search through one keyword may illustrate the point about alternative slices and thus construction of meaning from the book.

5.2 Collaborative learning

The interactive nature of the new technologies has for long been seen as a contributor to the development of collaborative learning around the keyboard. Networks have brought the use of collaboration as a valuable process to the fore. This could be perceived as fundamental plank upon which much discussion about the new learning is based.

A search through these chapters using the keywords collaboration and collaborative learning will produce around 19 different 'hits'. Many stress the importance of collaborative learning; Geer and Barnes reflect that collaboration can be perceived as providing the highest level of meaningful interaction and engagement – it implies not simply working with each other, but also challenging and critiquing each other's ideas. But in this book we also learn though direct experience and research that providing the networks for learners results in neither automatic collaboration, nor an even spread of its use. The panel chaired by Bruillard comments in particular on differences in culture and learning style as problems affecting collaborating groups. Both Lockhorst et al and Schrum outline a number of variables that appear to be needed to ensure effective collaboration.

Absence of some variables will create disadvantage for some. For instance Schrum reports that some students, despite plenty of access to the technology, felt they never had enough time to complete the [open-ended] work. Other students had no place to study at home; some had families who made fun of their efforts to learn on-line. Stacey reports that the socio-effective support provided by the collaborative group environment was of major importance to the success of the students. Here the role of the teacher was crucial to helping students project their on-line social presence, and thus establishing an environment for learning in computer conferences.

Naruse, reporting on the video conferencing between Northern Ireland and Japan, found that the availability of the facility was not enough to facilitate meaningful use. It was only when collaborative assignments were set that two communities were forced to work collaboratively, rather than simply report to each other, that the students began to develop the skills that enabled them to communicate effectively. The effect of the task, its style and design purpose is also significant; Lockhorst et al report that group and task behaviour differs according to task and design elements. And not all members of the group are collaborating; as Geer and Barnes also report, non-participating students deserve and may need considerable individual attention from a diligent educator to get them to engage and then contribute.

Groups collaborating open up real considerations of assessment of group as well as individual efforts, and matters of privacy security. But mostly effective collaborative learning appears to demand substantial amounts of teacher/educator time and input to ensure it is effective. Here the real meaning of 'a facilitator for learning' emerges.

6. CONCLUSION

And so the networking technologies - aiding communication and collaboration though the exciting advent of email, the web and electronic fora - enable us to overcome previous physical and time constraints, and probe the new opportunities these creates. Harnessing ICT effectively demands a re-consideration of the nature and style of teaching, learning, and educational institutions (virtual or real), a reconsideration that is already underway in educational thinking in general. But just as critically an exploration of the means to encompass such change exposes both shifts in perception and a recognition of enduring issues that remain.

It is my hope that this book leaves the reader in no doubt that WCCE 2001 was not a dry academic conference – teachers, lecturers and informatics experts, policy makers and researchers, learners and manufacturers mingled and worked together to explore, reflect, discuss and plan for the future. We know the added value of networking in conference is that that it will have an impact on future practice; networks have been formed, both virtual and real - ideas will change and new ones will emerge. It is our intention that this book will have a similar effect. Networking the Learner encapsulates the promises and opportunities of an innovation, while forcing us to come to terms with the issues and complexities of change.

6.1 A Coda

An interesting coda to the concerns explored here is provided by some reflections of three students who addressed the conference during the closing session. They study at Elizabeth Vale School in South Australia, a Discovery Schools in the Learning Technologies Project.

Samantha Burge stated that in the five days they had learnt a lot about how grownups behave at conferences..... They have heard a lot of adults talking a lot about using technology. But what they had not heard is a lot of people talking a lot about learning; it would be good next time to hear more about the education in computers. She really liked the presenter in one session who said "You should fit the computer into the curriculum, not the curriculum into the computer".

Chloe Worden is on the Learning Technology Committee at their school, and appreciated the opportunity to hear what other countries are doing. In her opinion they have a pretty good deal with the technology in their school and what they can do. But one of the things that had puzzled them was that presenters kept talking about kids using easy software first. They think adults should trust students, because using simple software can be a waste of their learning time. They would rather use the best software to do the job; so maybe adults should ask kids what they would like to do.

Rebecca Maher recognised that it had been a real privilege to come to the 7th World Conference; they would like to thank the Education Department of South Australia for making it happen. In particular they were going back to challenge themselves more in some areas like animation and Robolab. They hoped that adult participants would take what they have learnt back and make a difference for their learners.

Such a coda is a timely reminder that the views and experiences of learners need to be incorporated into educational frames of reference.