Title	Computer communications discourse for Singapore's practicum students
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Computer Communications Discourse for Singapore's Practicum Students

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1. Introduction

This paper reports progress on Phase Two of the NIE Practicum Discourse research project (Sharpe et al., 1994), which began in January of this year. The project's main focus is the use of desktop video conferencing (DVC) as a vehicle for improving supervision discourse between student teachers and supervisors on teaching practice. During the course of the year we have concentrated on researching available DVC systems and have finally settled on a system that meets many of our needs. Although our main interest is to explore the use of DVC in improving the quantity and quality of discourse in practicum conferences, as the research has progressed, a number of other interests have emerged and been incorporated into the project. Probably the most important of these arises from changes to the structure of the practicum at NIE to be implemented from January 1999. These changes involve the introduction of a 'partnership' with schools, involving more responsibility for schools in the day-to-day running of the practicum as well as changes to the role of the NIE supervisor. We are interested in how DVC can facilitate these new arrangements, especially through the provision of an additional medium for dialogue and support. Another development during the year, which has a bearing on the previously mentioned two issues, is the introduction of Cluster Schools. We are interested in how DVC can be utilised by staff and students to share experiences and resources within the cluster schools. Clearly, these are just some of the possible uses of DVC, but there are many more, and we shall mention some of them at the end of the paper. What, then, is desktop video conferencing and is it a viable option in present-day Singapore?

2. Desktop Video Conferencing

Desktop video conferencing allows users at different locations to see and hear each other using ordinary desktop computers fitted with cameras, microphones, speakers and necessary hardware and software. Probably the most misunderstood aspect is the difference between 'point-to-point' and 'multi-point' conferences. Point-to-point involves just two people, whereas multi-point involves three or more. Point-to-point conferences are relatively easy to perform, although performance standards using the ordinary Internet are usually very low. Whenever the Singapore press has run stories on VCD, for example of local schools linking up with their counterparts in S. America, it is the point-to-point version of DVC that has been used. Multi-point conferences are much more difficult to organise. The main problem is the need to link up to a remote 'reflector' or 'server', which is necessary in order to organise the flow of conversations between several participants. Furthermore, if privacy is required – as it usually is in educational conferences involving children – a private chat room with password protection is essential. Commercial organisations do not provide such a facility, or if they do it is exorbitantly expensive and targeted at large international companies (such as the Lucent Technologies Bell Labs reflector that requires expensive multi-channel ISDN connections, with at least two ISDN channels per participant). The well-known Global School House project does offer such a facility free of charge, but the booking system is off-putting and runs counter to the notion of DVC on demand. Even when the above conditions have been met, there is yet another requirement for good quality DVC, namely access to a broadband network and high-speed telephone lines (details of specifications are given later on in this paper). The general IT requirements for conducting DVC sessions for practicum teacher-trainees were published (Sharpe et al., 1998) earlier this year as being:

1. We require a user-friendly solution for greater accessibility to videoconferencing. On this point we envisage that DVC is preferable to the other 'big studio' solutions that require persons to muster at domains outside of the normal office environment.

2. We would like to use the Internet as a communications information technology (CIT) medium, as it is both cost-effective and accessible to nearly all users, independent of whether they use a PC or Mac. For this we need to consider Internet gateway access via either an ISDN or ADSL local network connection service.

3. We need a multi-point DVC solution that allows shared parallel conversations across multiple venues. This requires a special networking server resource called a bridge 'reflector'.

4. We need a private working domain to ensure professional confidentiality. This is an important practicum discourse protocol that we need to observe. (p. 5)

Only a few months ago we had come to the reluctant conclusion that DVC was something of a pipe dream for anyone other than an 'enthusiast'. We had spent the first part of the year closely scrutinising the various exaggerated claims made by manufacturers and distributors. All the systems we researched were found to be lacking in one way or another. Some were outright dishonest in their claims and other so-called DVC solutions were what might be termed, 'commercially deceitful'. Most were point-to-point systems, and consequently did not support multi-party conferences. Where a multi-point system was available it was found to operate only in the public domain and consequently useless for teaching practice discussions. Furthermore, all of the systems investigated had the technical limitation of access to the Internet *via* ordinary phone lines. This invariably resulted in broken-up audio and frozen video frames rates, so much so that most users appeared resigned to using the keyboard for text message communication only. As mentioned, we found that the Global School House service, a joint US pedagogical initiative sponsored by NASA and the CU-SeeMe developers, offered free time on its reflector to educational institutions. However, the booking system was oversubscribed and in any case there was still the problem of access via narrow bandwidth communications channels. Happily, at this point the 'Intelligent Island' concept began to take shape with the inception of the Singapore ONE broadband network. Commercial access to the Singapore ONE's wide-band network, which is often referred to as an ATM backbone, is via Singapore Telecommunications (SingTel) Magix[®] service. With the advent of such a communications infrastructure multi-point desktop video conferencing (DVC) had finally become a reality in Singapore.

3. DVC Multi-Point Trials

In October of this year we worked closely with Raffles Girls School (RGS) to mount what we believed was the first multi-point DVC school conference in Singapore. The conference linked together two computer laboratories at RGS with two other local schools and several commercial establishments. These were: Montford Secondary school; Montford Primary school; SingTel; and, staff at Information Management Resources. Information Management Resources have been

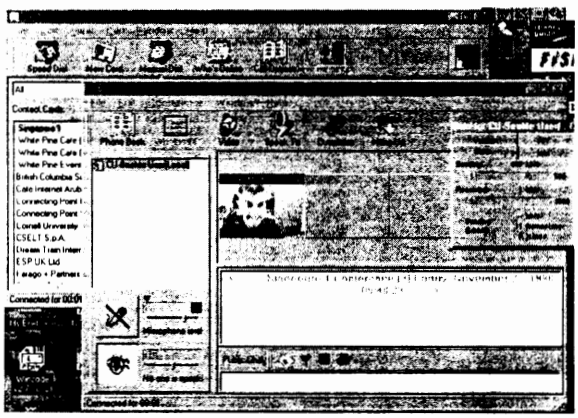

Figure 1: The CU-SeeMe DVC interface

enlisted as commercial consultants and software suppliers to our project as they are Singapore's sole distributors of White Pine products, including the CU-SeeMe DVC software we are using. There was a general consensus that the trial we instigated with RGS et al. was a success. Figure 1 shows a typical computer screen of the CU-SeeMe DVC system used in the trial. Each computer screen displayed six colour video screen insets, one for each of the participants. The video frame rate was relatively high, at around 15-20 frames per second, and there was no discernable audio break-up. With the help of IMR staff, participants were not only able to see and talk to one another, but were also able to share a whiteboard and Internet pages. Furthermore, the conference was free and private, thanks to the co-operation of Singapore ONE in allowing NIE to set up its own experimental server on the Singapore ONE network. The trial demonstrated to us for the first time that DVC is a viable option for our project, given that certain conditions are met. Subsequent trials, however, have been less successful, due largely to inadequate equipment, and it is to these requirements and limitations that we turn next. Figure 2 illustrates the nature of running a multi-point conference by having several screen insets on the same display. In this case, the screen insets show that several users have connected to the NASA CU-SeeMe Website. The three inset video screens show the local user and NASA's two TV stations.

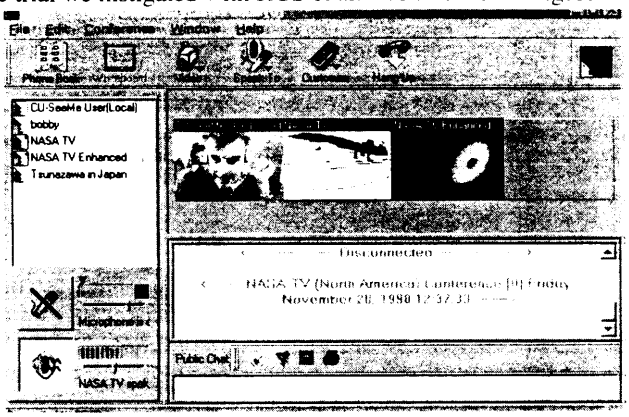

Figure 2: The Multi-point conference interface

4. Technical Matters

Because of the high commitment in developing Singapore as an 'Intelligent Island', the main ATM back-bone infrastructure necessary for multi-point DVC is already in place. Singapore ONE provides a broadband island-wide ATM network that is capable of supporting video conferencing. We understand that by mid-1999 SingTel will be offering a point-to-point service via Singapore ONE, using soft-ware developed locally by the Kent Ridge Digital Laboratories (KRDL), which will effectively provide users with video telephones.

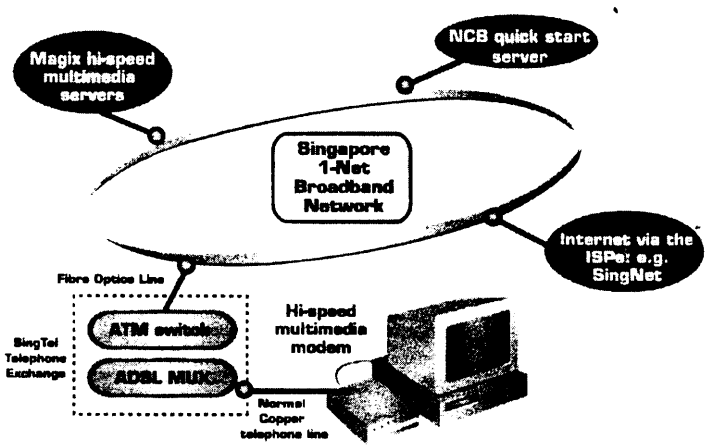

Figure 3: Access to Singapore ONE via the Magix ADSL gateway –by courtesy of Magix©

Multi-point conferencing, too, is already available on an experimental basis, but requires users to dial into public chat rooms. The provision of private chat rooms, with password protection, is still some way off, as is the development of locally produced software. However, Singapore ONE has provided NIE with it own password protected chat room for the purpose of this project. The currently available public domain access routes, or gateways, into the Singapore ONE network is through either SingTel's Magix service or Singapore Cable Vision (SCV). Figure 3, reproduced by courtesy of Magix, illustrates the gateway access routes into and out of Singapore ONE. You will see that access into Singapore's superhighway network requires an ATM switch linked via fibre-optic cables. It is interesting to note that under the IT MasterPlan the Ministry of Education (MOE) and National Computer Board (NCB) have collaborated to ensure that over 300 schools in Singapore now have access to the Singapore ONE superhighway via ADSL modems. We have learnt that many schools actually have two ADSL PC connections, usually to be found in the library and staff room. This logistical infrastructure means that linking-up schools with DVC IT solutions via ADSL is an easy option. The equipment specification required are summarised in Table 1 below and was recommended by us to the Superintendents of the project's cluster schools. In addition to the minimum equipment requirements the schools involved will need to have competent technical assistance backup in order to troubleshoot the myriad of idiosyncratic teething problems that an IT-based project of this nature tends to throw-up. Additional support (Gawith, 1998) will also be required in funding IT consultancy to provide in-service training of IT staff in both technical matters related to the operation of DVC as a teaching resource, as well as prepare an understanding of the discourse pedagogies involved.

Table 1: Recommended DVC technical specification for Singapore schools

DVC Equipment specification	Comments
Dedicated Pentium machine not linked into any other LAN	We found that using the ADSL network in parallel with our own NIE/NTU network caused many problems with our DVC equipment, including reduced performance and random systems crashes.
ADSL gateway into Singapore ONE	Provided for Singapore schools via the MOE/NCB IT MasterPlan initiative. Alternative access is via the commercial Magix service
CU-SeeMe/ClassPoint® software	DVC software available from White Pine.
Video camera with video-capture card and software.	Video camera solutions using the parallel port tend to operate too slowly. A video capture card system can operate up to speeds of 30fps.
DVC multipoint reflector.	Currently provided free of charge via NIE's private DVC chat room on Singapore ONE, courtesy of the NCB and White Pine licenses. Our aim is to provide an NIE DVC-dedicated server that is permanently switched into Singapore ONE.

5. Discourse Research

The present phase of the research will build on the findings of the first phase (Sharpe et al., 1994), taking into account NIE's transition to a partnership teaching practice model (1990) and the introduction of Cluster schools. The first phase of the project was actually completed in 1994. The study investigated the quantity and quality of practicum conferences held between NIE primary student teachers and their NIE supervisors and school-based co-operating teachers (CTs).

Using a modified version of the Zeichner discourse inventory, the authors concluded that there was a preponderance of low-level "factual" and "prudential" discourse and a relatively low level of higher 'justificatory' and 'critical' discourse. Conferences were typically one-way affairs, where students were 'told' about their lessons. A further concern over and above this 'telling' mode of discourse, was the short amount of time spent in conferences and the almost total lack of discussion between NIE supervisors and school-based CTs. Ways and means, it was argued, needed to be found urgently to address this situation.

If supervision discourse was problematic in the old, traditional model of teaching practice, the question is whether the current partnership, or school-based, model will be any better. Overseas experience of partnership models, such as the Oxford Internship Scheme (Benton, 1990), shows that their success depends heavily on maintaining good relationships over time between school and university staff, and that this involves the provision of opportunities for regular meetings between them. DVC offers both university and school staff the possibility of maintaining regular informal contact with one another without the need for time-consuming face-to-face meetings. This is likely to be a major consideration with increased demands being made on university staff time in the foreseeable future. However, it would be wrong to view DVC simply as a 'second best' to face-to-face meetings. There are, we believe, unique benefits too that are especially important to the matter at hand. For example university staff will be able to hold similar multi-point conferences with their students spread across different schools; the students, too, will be able to use the technology to share experiences, ideas and resources with each other. Furthermore, in the not too distant future, we envisage that students will be able to video parts of their lessons and share these immediately with peers and supervisors using DVC. It is easy to see how these arrangements could be facilitated if university staff were allocated a particular school cluster for teaching practice, and also very easy to see how the technology might rapidly spread into the normal day-to-day functioning of these cluster schools as staff became acquainted with it. Superintendents, for example, could maintain regular contact with school principals and heads of departments could hold similar sharing sessions. Cluster schools, the partnership model and DVC seem made for each other, a rare case of a convergence of an educational need with a readily available technological solution. Clearly, DVC provides a distinct possibility here of increasing both the quantity and quality of discourse on teaching practice, and in the schools generally. The availability of reliable DVC is, of course, only the first step towards the goal of improved discourse. For the immediate future, we envisage a two-stage research design:

Stage One of the discourse project

We are currently planning this phase of the research project to start from this coming January 1999, despite the fact that our research funding proposal cannot be sanctioned until some time after March 1999, owing to administrative procedures. However, we intend to make a head-start in January because we have the opportunity of involving our first year Diploma in Education students who are on teaching practicum at that time. We have made arrangements to have our practicum student caseloads concentrated only in schools located within the North 2 cluster schools and have met with the Superintendent to discuss practical arrangements. By the end of this stage it is anticipated that NIE discourse project staff would have gained valuable experience using the technology and that DVC pedagogic protocols would have been identified and drawn up for use in the second stage. Stage one also provides the opportunity to familiarise IT co-ordinators in the Cluster Schools with hands-on experience of using DVC. School personnel will be encouraged to work closely with project staff both informally and formally via envisaged IT

in-service training sessions. The student teachers involved would also have gained valuable experience from the opportunity to conference with other students and their NIE practicum supervisors.

Stage Two of the discourse project

This phase will start from March 1999 and will involve PGDE primary student teachers on practicum from 1st March until the 7th May. The envisaged focus at this stage would be to use DVC as a vehicle for dialogue between NIE and school supervisors, between NIE supervisors and student teachers, and between the student teachers themselves. Secondly, it would be used as a means to foster professional staff development by bringing together subject staff across the cluster schools. Our intention is to obtain quantitative and qualitative evidence of this DVC-assisted discourse practice and evaluate the evidence so as to establish the benefits of DVC, pedagogic protocols, and teaching guidelines for wider use.

By the end of stage 2, it is envisaged that the project will be established on a firmer footing. The next stage would then be the design and field-based implementation of qualitative research surveys. Methods to be employed would include: qualitative data-capture via DVC Website feedback and evaluation survey forms; video-recorded and transcripted interviews with team members, IT school-based staff and practicum students using DVC; and, finally, collation and presentation of technical and pedagogic data drawn from DVC project participants. To this end the support of a full-time research assistant would be required to help perform a wide range of essential research tasks, including: 1) IT technical development, liaison and consultancy, both in-house at NIE, across our cluster school project partners, and with other affiliated research bodies such as KRDL. 2) 'Webministration' duties (Coombs, 1997). To work closely with the teams to implement a DVC action research project Website, linked into the research links of NIE's SOE Website. This would provide an active and high-profile means of on-going project dissemination. Webministratiaon duties include both the technical design and implementation of Webpages and the regular up-dating and administrative maintenance on a perpetual basis.

6. Conclusion

Our experience in this phase of the project has been challenging, given he technical problems that we have faced. Nevertheless, our strong feeling is that despite all the inherent problems and difficulties that an IT-based project such as DVC brings, this kind of practical school-based research is essential if we wish to develop the pedagogic protocols for using new technology to assist social collaborative learning environments. The difficulties are not solely technical ones, of course, as critical theorists such as Michelle Selinger (Selinger, 1997), working in this field of personal communications technology for the UK's Open University, have noted:

"There is still much to be found out about the way *practising* teachers perceive the value of electronic networking. It is clear from the very small survey here, that it is seen as a possibility by very few. For others the costs and time are prohibitive when so many other factors challenge their daily routines and pressures. Evidence from the Open University PGCE students suggests that extensive use of such a system encourages collaboration and a recognition that it can support and enhance practice" (p. 83).

Gwen Gawith (Gawith, 1998) concurs with this view that "telelearning" communications systems are difficult to initiate and sustain because they bear many hidden costs. These indirect costs include the time needed by teachers to practise using the technology before it can be properly integrated into curriculum programmes, and both the time and support resources required in order that teachers can: "rethink and redesign these programmes so that the technology is used as a learning tool, not a clip-on toy" (p. 5).

Singapore has a head start over many societies in already having the infrastructure to support DVC. Already, pupils are using the Internet for point-to-point video-phoning their friends after school in much the same way as they use the ordinary telephone. Not too much further into the future it will be possible for groups of pupils to video conference together after school, perhaps in connection with a project that they will be jointly researching. All this will be done using the broad-band Singapore ONE network. It will not be unusual for them to share white boards, documents as well as Internet pages. The lone surfer might very well be socialised thanks to DVC! We can also predict that when NIE moves into its purpose built accommodation at the Jurong Campus there will be infrastructural support for high quality DVC. Big business will ensure that the technology spreads. As educators, we shall decide whether it gets left in the store cupboard. The experience we are gathering now, albeit with inadequate and unreliable equipment, will, we believe, stand us in good stead for this inevitable future because we shall have considered beforehand its educational potential.

6. References

Benton, P. (ed.) (1990). *The Oxford Internship Scheme: Integration + Partnership in Initial Teacher Education.* London: Calouste Gulbenkian Foundation

Coombs, S. (1997). *Towards a Telematic-Assisted Learning Environment.* Singapore: Paper published in the proceedings of the On-Line Educa Asia: International Conference on Technology Supported Learning held in Singapore, September.

Gawith, G. (1998). The Real Cost of Telelearning: A Case Study, in *Computers in NZ Schools*, March 1998.

Selinger, M. (1997). Open Learning, Electronic Communications and Beginning Teachers, in *European Journal of Teacher Education, 20*(1), 71-84.

Sharpe, L.; Coombs, S. & Gopinathan, S. (1998). *Teaching practice discourse and computer communications technology* , conference paper submitted to the 1st inaugural Malaysian Educational Research Association conference - Penang: Universiti Sains Malaysia.

Sharpe, L., Ngoh, M.S., Crawford, L. & Gopinathan, S. (1994). Teacher Supervision Patterns of Discourse. *Singapore: National Institute of Education.*

Zeichner, K.M. et al. (1988). The Structure and Goals of a Student Teaching Program and the Character and Quality of Supervisory Discourse. *Teaching and Teacher Education.* Vol 4,4, 349-362.

Useful Website addresses that are related to our project

http://www.ncet.org.uk/info-sheets/videoconf.html#what
http://cu-seeme.cornell.edu (shareware); http://www.wpine.com/ (commercial)
http://www.ncb.gov.sg/ncb/transform.asp
http://www.moe.edu.sg/iteducation/masterplan/welcome.htm
http://www.soe.ntu.edu.sg:8000/coombs/homepage.html