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Integrating Video Conferencing Technology into Classroom Practices as a Way to Work with Others in the Larger Community

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Abstract

The demand for citizens to become technologically competent is great in an ever-changing world. As educators, it is imperative that we recognise the potential of different tools and explore ways to use them to enhance the learning experience. This paper will look specifically at one form of technology – video conferencing. The advantages and challenges of integrating it into classroom practices will be discussed. Further, we will suggest some practical strategies drawn upon literature review and the results of a recent study funded by the Social Sciences and Humanities Research Council of Canada, where this tool was used to encourage students in both urban and rural regions to learn mathematic and science.

Abstrak

Permintaan daripada warganegara untuk mahir dalam teknologi adalah tinggi dalam dunia yang sentiasa berubah. Sebagai pendidik, adalah penting untuk kita mengenal pasti potensi alat-alat yang berbeza dan meneroka cara untuk menggunakannya dalam mempertingkatkan pengalaman pembelajaran. Kertas kerja ini akan melihat secara spesifik satu bentuk teknologi iaitu sidang video. Kelebihan dan cabaran dalam mengintegrasikannya di dalam praktis bilik darjah akan dibincangkan. Selanjutnya kita akan mencadangkan beberapa strategi praktikal yang diambil daripada ulasan literatur dan kajian daripada kajian terkini yang dibiayai melalui Majlis Penyelidikan Sosial Sains dan Kemasyarakatan Kanada di mana alat ini digunakan untuk menggalakkan pelajar di kawasan bandar dan luar bandar untuk mempelajari matematik dan sains.

Introduction

The demand for technologically skilled citizens is great in an ever-changing world. As educators, it is imperative that we recognize the potential of technology and actively seek ways of using it to enhance the learning experience and prepare children for their future. With the emergence of new teaching paradigms and media, students are both encouraged and empowered to be active learners, i.e. learners who get to decide what, where, when and how they want to learn, as well as whom they want to learn from. At the same time, rapid advancements in technology have altered the way in which information is presented, delivered and stored. To a large extent, these changes imply new roles and responsibilities for educators and instructional designers. Planning and teaching a class has become a much more complicated process. In order to provide students with valuable learning experiences, one must carefully examine various factors, including the background of the target audience, the curriculum materials, the environment as well as access to any form of technology. In this paper, we will look closely at the use of video conferencing as a means to meet the educational demand.

In addressing these issues and making decisions about the use of video conferencing, it is important to remember, as Aggarwal (2003) has stated, that:

> "Technology needs to be driven by appropriate educational and design considerations, not vice versa… There is the need for a sound educational pedagogical base for integrating technology into the curriculum… If e-education is not grounded in sound educational pedagogy, faculty will fail to meet the challenge of encouraging lifelong learning skills" (p. 39).

Theoretical Framework

This work lies on the intersection of constructivism (Vygotsky, 1978; Young, 1997) and the development of new learning technologies (Scardamalia & Bereiter, 2003; Scardamalia, et al., 1994). Social constructivism, in particular, underlies our conception of the current work. In this view, knowledge is constructed and advanced through social interactions (Kanuka & Anderson, 1998). Further, knowledge construction is based on social experiences, and technology such as multimedia and

computer-mediated communication help to provide "an effective means for implementing constructivist strategies that would be difficult to accomplish in other media" (Driscoll, 1994: p. 376).

Anderson and Rourke (2005) have conducted a thorough review of literature resources focusing on the interactions between learner characteristics, media attributes and instructional activities. They have looked at studies surveying the attitudes of teachers and students towards the use of video conferencing as a means to enhance traditional instruction. They have also identified some key factors which contribute to the successful adoption of video conferencing technology, including:

- A clear understanding of costs and learning effectiveness.
- The need to engage learners through effective interaction between and among students and teachers.
- The development of instructional designs and learning activities that are congenial to video conferencing and to particular teachers styles (e.g., inquiry based, constructivist, instructional system design etc.) (p. 14).

Purpose of Study

This paper aims to extend the work of Anderson and Rourke (2005) in three directions. The first involves presenting an extensive literature review of previous studies. In particular, the advantages and challenges of integrating video conferencing technology into the curriculum will be discussed. Secondly, we will examine the results of a recent study funded by the Social Sciences and Humanities Research Council of Canada, where this tool was used to encourage students in both urban and rural regions to learn math and science. Lastly, we will provide some practical strategies to educators who are interested in its application for the enhancement of teaching and learning.

Literature Review

Overview of Systems and Learning Activities

Video conferencing is an interactive, synchronous communication tool that allows pictures, sounds and other data to be transmitted to different locations by converting a television image into a digital signal. Other names used to describe this technology include: tele-conferencing, interactive video communication, interactive television, compressed video, two-way audio/video and multimedia collaborative computing (Heath & Holznagel, 2002; Roberts, 1998; Simonson et al., 2003).

As broadband technology becomes more ubiquitous, we can expect to see more creative and frequent applications of video conferencing in many different areas including aerospace, pharmaceutical, tele-medicine and government operations. For instance, within the medical field, this technology is being used for both clinical and non-clinical purposes. Some typical services made available via this channel are: specialist referrals, mobile emergency response, patient education, physiological monitoring, psychiatric evaluation, legal consultation and professional development (Rhodes, 2001). At the same time, broadband is also widely employed for information exchange, internal and/or external relationship building and training purposes in corporate settings (Forcheri, Molfino & Quarati, 2000). While e-mail and the World Wide Web remain two of the most popular communication tools, many businesses are realising and taking advantage of the capabilities of tele-conferencing. Integration of this technology within an educational context has also been reported, although to date, usage at the K-12 level is still relatively low compared to that in the higher education community (Heath & Holznagel, 2002). Moreover, according to Anderson and Rourke (2005), "the bulk of writing in this area consists of anecdotal reports, project descriptions, and informal case studies – a type of dissemination that is endemic to the early stages of technology implementation" (p. 3).

Video conferencing technology has advanced considerably over the last decade, providing new options for those interested in its implementation. Numerous hardware and software combinations are available, but generally there are three types of systems: (1) desktop systems, (2) midrange systems, commonly referred to as set-top boxes or roll-about

systems, and (3) room-based systems. Each of these options has its strengths and weaknesses with respect to its ease of use, performance, ergonomics, instructional quality and cost, etc.

Desktop video conferencing has become increasingly popular in the home and office. It is appealing in that setup is quite user-friendly and inexpensive. In its simplest form, desktop video conferencing can be operated on a personal computer with an internal or external camera and a few other audio devices such as a microphone and a speaker or a headset. Conferencing capabilities can usually be sustained over relatively low bandwidths. The Apple MacBook is one of many systems pre-configured for video conferencing. It comes with a built-in camera and microphone as well as an application called iChat, which allows users to communicate simultaneously via text, voice and/or video. Other programmes that have similar capacities include: CU-SeeMe, Skype, Windows Live Messenger and Elluminate Live!

The following section presents examples of how desktop video conferencing has been used to support teaching and learning in various settings.

Falconer and Lignugaris/Kraft (2002) have explored the viability of utilising this tool to supervise pre-service teachers in remote field sites. The participants included several practicum students, cooperating teachers, a para professional and a university supervisor. Three main themes have emerged from the reports given by the informants with regard to the benefits of two-way conferencing technology: observation benefits, communication benefits and nature of system benefits. Users indicated that the system has enabled them to make observations of classroom instruction, discuss their portfolio, demonstrate a skill and provide or receive instant feedback and clarification. Moreover, it has been noted that "communication was enhanced in terms of frequency, immediacy and type of communication" (p. 374). In general, the participants found that it was relatively convenient to use the equipment and to schedule their meetings. As a result, this encouraged more communication between people on and off campus. Another major benefit of the technology was that it provided opportunities for face-to-face interactions even when the individuals were separated by geographic distance. Some participants also indicated that they preferred using the conferencing technology over telephone and

email or having live observations mainly because it added a more personal or authentic dimension to the dialogue without causing too much disruption in the classroom.

Pemberton et al. (2004) have conducted a similar study and examined the potential of using desktop video conferencing to connect faculty members with student teachers, particularly with those who had their practicum assignments in rural areas. The medium proved to be a feasible and affordable option. It was suggested that it could possibly eliminate the need to hire an adjunct for on-site observation when faculty supervisors were not available. Expenses such as car mileage and time could also be reduced. In addition, the authors have claimed that "[t]apping into the expertise of colleagues is easier because other faculty members can join in the observation when additional feedback is needed" (p. 6).

Audio and video issues were identified in both studies as limitations. Occasionally, communication may be interrupted due to network congestion or insufficient bandwidth, resulting in sound delays, howling, echoing or static during the session. Specific video problems included: (a) limited view from the camera, restricting the number of participants and the area that would fit in the picture, and (b) choppy or frozen images. Limited mobility or flexibility of placement could also be a problem, as in cases where the microphone cord would get in the way of students or when there were not enough ports to plug in all the peripheral devices.

Overall, desktop video conferencing is relatively inexpensive and easy to employ. It has transformed many areas of work and life, particularly in the area of teacher education:

> "While field experiences have long been a part of most teacher preparation programmes, they are often limited by available placement opportunities in the vicinity of the college or university. Video conferencing technology offers a flexible tool with which teacher education institutions can connect with K-12 schools at a distance. Such connections, while not a replacement for traditional field experience, offer opportunities for new experiences and for ways to introduce future teachers to students and settings that they would be unable to encounter otherwise" (Lehman & Richardson, 2004: p. 426–427).

Unquestionably, as computers become more robust and affordable, interest in using desktop video conferencing will continue to grow. Nevertheless, this type of system may not be the most appropriate choice when large groups or multiple locations are involved, due to some of the constraints mentioned above. According to Rhodes (2001), "Desktop systems are suitable for use by only one or two people at a time, per unit" (p. 63). Martin (2005) echoes this view, but also recognises the potential of the technology:

> "Webcams are also worth considering for certain situations. Obviously, the picture and audio quality will be an issue here, but webcams can be an inexpensive way of communicating between very small groups. Webcams would also be of benefit to individual distant students or students who are unable to attend school for a period" (p. 404).

Another type of tele-conferencing is the mid-range system, also known as set-top box or roll-about system. As the name implies, its cost is comparatively higher than that of desktop video conferencing, yet it is a lot cheaper than a room-based system. Price may range from US$ 3,000 to US$ 50,000. Typical arrangement consists of: (1) a television monitor, (2) a camera, (3) a microphone, (4) a control tablet, and (5) an encoder/ decoder (codec) – a device that converts signals for transmission and reception (Muller, 1998; Rhodes, 2001). The unit is often mounted on a cart so it is easy to move the system around to different rooms. Setting up the equipment is more complicated and should not be the responsibility of a teacher, but that of the school's technician or the vendor. Today, many companies would offer to provide free installation and some basic training to their clients. Once the system has been configured, operation is relatively simple.

O'Dowd (2000) has described an intercultural learning experience made possible via video conferencing. Thirteen EFL students from the University of León in Spain were connected with ten students of Spanish at the University of Northern Michigan, USA. A midrange system that operated on one ISDN (Integrated Services Digital Network) line was used. Students were asked to work in groups. They sat in front of a big screen, portraying the group on the other side of the world. In the corner, they also saw a smaller image of themselves. The author has concluded that video conferencing can be a powerful tool for intercultural learning as

it allows people from different cultures to observe and interact with each other and to practice their language skills within a more authentic context.

The use of this type of system provides opportunities for other experiences as well. Pachnowski (2002) has highlighted some of the possibilities and advantages: "Schools are increasingly finding that virtual field trips (through video conferencing) are cost effective and reduce issues involved with actual field trips, such as student transportation safety and time issues" (p. 10). She recognises it as an exciting way to enrich the curriculum. The medium enables students to make connections between their schoolwork and the "real world". Teachers can invite experts to "come into" the classroom and talk to the students. At the same time, learners can also be "brought out" and given the chance to observe a different environment. Examples of virtual field sites include: Museums, zoos, historic parks, universities, hospitals, reserves, different geographical regions or countries, and the list goes on. Obviously, organising an actual field excursion to some of these places will not be possible considering the costs, time and risks that are involved.

NASA (National Aeronautics and Space Administration) supports creating new learning environments through the use of video conferencing technology. According to Petersen (2000), this experience enables NASA to:

- help students make connections between what they learn in school and how this knowledge is applied in the real world.
- share information and experiences by answering students' questions directly.
- partner with learners as they work on projects and develop problem-solving skills.
- "provide a bridge to digital learning – an education approach that integrates technology, connectivity, content, and human resources" (p. 5).

The NASA Glenn Research Center website (http://www.nasa.gov/centers/glenn/home/index.html) contains information about some of the projects and research that have been conducted.

Last but not least, there is the room system option. This setup is ideal when working with a large group or class. The components are usually

installed permanently within a room in a building. Minimum requirements are cameras, microphones and speakers, a big screen display, furniture for the participants and appropriate networking. Most systems are flexible enough to allow users to add on more sophisticated tools such as electronic whiteboards, personal computers or document/graphics/copy-stand cameras. Room-based video conferencing appeals particularly strongly to organisations that often need to facilitate collaboration among a large, geographically dispersed audience. Many universities have already adopted this technical infrastructure. The technology is powerful, but implementation at the K-12 level is still limited because of its complexity and the resource requirements such as room allocation and the commitment of time and money to set up, operate, troubleshoot and maintain the system.

Benefits and Limitations

The potential of integrating video conferencing in the workplace has been well documented. Some advantages cited frequently in the literature include: (1) faster decision-making cycles; (2) reduced travel expenses such as hotel accommodations and transportation cost; (3) increased internal communication and strengthened teamwork; (4) more effective training or project management as well as (5) better relationships between customers and suppliers (Diamond & Roberts, 1996; Rhodes, 2001). Within the educational context, researchers have highlighted the following benefits:

- Travel time can be minimised, "creating an opportunity to provide more frequent observations, with feedback delivered in a timely manner" (Pemberton et al., 2004: p. 6).
- Participants are given the "experience of collaborative learning, of becoming part of a larger community of learners, and of having a meaningful and beneficial distance learning experience" (Martin, 2005: p. 399).
- Teachers can be connected with experts and peers all around the globe, leading to "an enhancement of their continuous learning as professionals… It is also extremely cost-effective" (Martin, 2005: p. 400).

In addition to these advantages, Martin (2005) has claimed that "video

conferencing can be used to cater for a range of intelligences and learning styles" (p. 398).

Certainly, as with any technology, video conferencing is not without its limitations. Despite much enthusiasm, many challenges remain to be addressed. A few of the issues include: lack of technical expertise; unintended capital and operating costs; increased workload for teachers; difficulty maintaining learners' attention and problems with connection, which often lead to low sound and picture quality (Roberts, 1998; Falconer and Lignugaris/Kraft, 2002; Martin, 2005; Pemberton et al., 2004; Smyth, 2005). Thus, prior to adopting video conference systems in schools, it is worthwhile for administrators and teachers to pause and consider the implications from various standpoints, especially from a pedagogical and technological perspective. After all, as Dias and Atkinson (2001) have cautioned: "We should not be impressed with the mere 'use of technology' unless that use is supported by a carefully crafted pedagogy" (p. 10). At the same time, it is important to understand that although access to the latest technology may not necessarily lead to a valuable learning experience, the technical quality of the exchange does predict to a certain extent the overall satisfaction of those engaged in the activity (Kinnear et al., 2002).

Technical problems are inevitable whenever new tools are introduced. Specific issues associated with the integration of video conferencing range from system incompatibility, to lack of teacher training and technical support as well as inconsistent network connections. To compensate for these limitations, it is necessary to adapt new social, organisational and technical infrastructures (Sonnenwald et al., 2002). Gaskell (2002), from the Galileo Educational Network Association, acknowledges the complexities of the support systems that need to be in place: "When we take a look at technology in schools, it's important for us to split the technology into multiple layers because you can affect changes in the environment that students use at many different points." Specifically, he has identified five different layers of infrastructure: (1) human component, (2) software component, (3) hardware layer, (4) network services layer, and (5) physical network layer. In determining what specific practices and structures to implement in schools, Rhodes (2001) suggests, first and foremost, to conduct a thorough needs analysis. The following are some critical questions that should be addressed during the early planning

stages: What are the needs of the learning community? What digital communication infrastructures (e.g. network, hardware and software) currently exist within the school? Is expansion of these capabilities possible or is there a need to purchase new equipment? What does a typical video conferencing session look like in terms of meeting size and format? Answers to these and related questions will influence the layout of the meeting room, the type of system to be selected, the level of technical support required as well as the design and facilitation of the learning experience.

Research Project Implementation

The following section describes a project recently conducted in Alberta, involving the use of two out of the three types of video conferencing systems discussed in this paper. Various system combinations/connections were experimented with: room-based with room-based, set-top with set-top, and room-based with set-top. The main objective of the project was to explore the use of new technology, such as virtual visitation via tele-conferencing, to encourage students in both urban and rural regions to learn math and science (Li, 2006). This study was part of a larger research program involving five school districts and over 550 participants. Both pre- and post-questionnaires have been administered to the participating students.

Methods

Participants in this study were 60 junior high students in three classes and four teachers. In each participating class, 8–10 student volunteers have been recruited for a series of in-depth interviews. The teachers were also interviewed continuously to gather information regarding their beliefs as well as the effects of the project.

Data was collected in the form of:

- Field notes taken during regular instructional periods, teacher planning meetings and actual video conferencing sessions.
- Reflective journals from the teachers, student artifacts and achievement scores.
- Video recordings and transcription of semi-structured interviews with teachers and students at various stages. (All meetings were conducted

face-to-face except for two occasions where roll-about video conferencing systems were used to connect the interviewer and interviewees).

The first phase involved three teachers along with their two Grade 9 classes at an urban school. Several virtual sessions have been arranged throughout the semester, allowing the learners to be linked with a female role model/scientist. At the time of the study, the school has not yet purchased its own video conferencing equipment and so students had to travel the University of Calgary and use the system on campus. Interestingly, the role model was also accessing the Virtual Conference facility situated on the same floor. When students discovered that she was in the building, many wanted to meet her face-to-face and even questioned the purpose of having a virtual conference. The lack of authenticity was perhaps one of the major limitations of the study. However, this provided an opportune moment for the teachers to initiate a discussion with their students about the possibilities offered by video conferencing technology. Moreover, the fact that both parties were connecting from the university helped to eliminate some technical issues. The audio and video signals were very stable and a technician was always on-site to give any necessary assistance.

The second phase of the study involved the same role model and a Grade 8 Mathematic class in a rural setting. The school has just received its own roll-about system and was excited to put it to use. Unfortunately, there were more technical difficulties than expected. Problems ranged from minor sound delays to frozen frames to complete loss of contact. Trying to maintain a stable connection was the greatest challenge. At best, the technology glitches were just a slight annoyance, but in worse cases, they have shut down a normal flow of conversation and have possibly led to some frustrations and miscommunication. A few of the sessions had to be rescheduled. At the end of the project, the role model even made extra effort to drive out to the town to meet the students face-to-face.

Results

Perceived Benefits

Our analysis of the data collected has shown some positive results. First of

all, video conferencing gives teachers and students the opportunity to connect with a remote expert and keeps them in touch with the "real world", consequently broadening their views. Secondly, video conferencing can enrich the professional development of teachers. It also gives students an experience of collaborative learning and allows them to become part of a larger community of learners. Comments made after the virtual sessions included the following:

> *Teacher N*: In terms of possibilities, we could explore using video conferencing to be in touch with political figures…having access to authors…asking questions of people who study in the field.
>
> *Teacher A*: It allowed me to see… how we can connect bigger… I think what happens in schools is, as teachers, this becomes very much our world and we often forget how life is out there… so to see and listen to [the expert's] stories about either her direction of growth and where she went professionally and educationally changed, that's refreshing to hear for our girls when they're planning their careers out.
>
> *Student P*: It's really neat because usually there seems to be like a concrete barrier between you and like the rest of the world, but that kind of opens up places where you've never thought of travelling or going to yourself.
>
> *Student S*: [The expert] showed us the kind of the road she went down, so like if we ever did want to go into mathematic or science as a career, we'd know like what could probably happen.

Finally, video conferencing can also be used to address different learning styles and allow students to experience various approaches, as indicated by the following responses:

> *Teacher M*: I think it's… good because it uses… technology in a different way rather than researching… It's not something they would typically do.
>
> *Student M*: I think it's good because… if you're learning something and you needed help on it or like you can talk to someone who knows a lot about it, and then… if you use like the tele-conferencing thing, instead of just talking with them on the phone… then you can see them, and they can show you examples and stuff and how it looks…

> *Student A*: It's a different experience, I've learned from it than I would have just learning it out of a textbook.

Challenges

The technical challenges associated with video conferencing also deserve some special attention. For example, IP systems, as opposed to designated ISDN systems, provide free access time in any location with Internet connection. However, even with broadband networks, unstable bandwidth problems can still occur, causing delays in sound transmission and broken picture frames.

Another difficulty relates to camera and monitor limitations which restrict whom or what could be shown on the screen. This largely affects the dynamics of the interaction and may create an experience that is frustrating for the participants, especially the presenter. For example, in our study, switching between the different modes of operation or camera views during the conference was a troublesome procedure, often causing enough distractions to disrupt the flow of a meaningful dialogue. Sometimes, important information conveyed through body language and facial expressions was lost in the process of toggling between wide shots and close-ups. Even with high quality cameras and large monitors, the speaker may still have difficulty seeing the audience clearly and in gathering any immediate feedback on her presentation. This underscores the importance of facilitators on site to monitor the learning process and to provide any necessary clarification or details.

Discussion

The study provides a glimpse of what can possibly go well or present challenges when trying to integrate video conferencing technology into the classroom. To conclude this paper, we would like to offer some practical strategies for anyone who is interested in using this tool to enhance the teaching and learning experience. It is by no means, an exhaustive list.

Based on the work of other researchers and the results of this recent study, we suggest adopting these practices in the planning, execution and follow-up of a video conferencing session:

Pre-conference

- Engage in training to learn about the basic use and capabilities of the technology (Burns, 2002).
- Work closely with the technical personnel (Roberts, 1998).
- Plan the room layout, paying attention to elements such as lighting, acoustics and class distribution (Rhodes, 2001).
- Ensure that the video conferencing systems at the different venues are compatible and that the school's firewall is pre-configured to allow certain inbound and outbound connections (Pemberton et al., 2004).
- Create a contingency plan in case the technology fails and obtain important contact information so that the status of any technical problem can be communicated in a timely manner (Pachnowski, 2002)
- Conduct a test session.
- Review video conference etiquette with students (Sonnenwald et al., 2002).

Video Conference Facilitation

- Maximise interaction by:
  - beginning with an ice-breaker activity to get audience excited (O'Dowd, 2000).
  - engaging students in a meaningful dialogue.
  - encouraging learners to share their work and ask questions (Smyth, 2005).
  - incorporating hands-on or collaborative activities (Heath & Holznagel, 2002).
- Maintain learners' attention by:
  - including information that the audience cannot view or have access to any other way, e.g. virtual field trip and career exploration (Petersen, 2000).
  - using a variety of presentation techniques and visual materials, e.g. PowerPoint, handouts, video clips, overhead transparencies, document camera, SmartBoard and Internet sites (Emery & Schubert, 1993).
  - avoiding the "talking head" or lecture style of presentation.

- Ensure technical support is readily available.

Post-conference

- Design follow-up activities, e.g. reflection, highlights of the meeting.
- Evaluate the experience and determine if further sessions or improvements are needed.

Finally, of utmost importance, is the need to have good instructional design throughout all stages. As Bates (1995, as cited in Heath & Holznagel, 2002) has so clearly stated:

> "Technology is not the central issue. The central issue is 'How and what do I want students to learn? And where?' Good teaching may overcome a poor choice in technology, but technology will never save bad teaching; usually it makes it worse. Good teaching matters. In addition, the needs of the learners, program goals, and the context of the learning should drive the choice of technology, not the novelty of the technology." (p. 7)

Conclusion

As schools are increasingly investing in technology and using it in various ways, this will inevitably raise some important questions: Do people accept technology simply because of the appearance of "ease of use" and the glossy, professional-looking forms of representing knowledge? What are teachers and students' perceptions about technology integration? In particular, our study aimed to find out more about their views and experience in using video conferencing in learning.

Successful integration of technology in the classroom depends on a number of factors, including whether or not there are sufficient training/ professional development, support, funding, access to equipment and leadership (Bitner & Bitner, 2002; Hope, 1997; Picciano, 2002; Slavit, Sawyer & Curley, 2003; Slowinski, 2003). Most important of all, as Heath and Holznagel (2002) have indicated, it is necessary to set clear objectives and to structure learning materials and activities that are relevant to the students' needs: "If these principles are ignored, then the teaching will fail even if the unique characteristics of the technology are appropriately

exploited" (p. 6). We concur with this view which resonates with many others (Dias & Atkinson, 2001; Aggarwal, 2003; Haughey & Anderson, 1998; Palaskas, 2002).

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