- VIDEO CONFERENCING -

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Abstract

This paper outlines the functionality and application of video conferencing in relation to relevant learning theories. It also explores the strengths and weaknesses that might be created by this technology. The outcomes of a trial undertaken at the University of Oxford during a group project also provides the basis for predicting the usefulness of the technology for learner-centred interactions.

As part of the wider discussion, this paper helps to identify circumstances in which organisational members may prefer to use VC as a step in undertanding how VC can become incorporated into organisations as an additional medium for workplace learning (Panteli, N., Dawson, P., 2001). Moreover, it presents a decision-making framework for employers to consider when integrating videoconferencing into their daily practices.

Furthermore, a detailed plan including a full rationale for the application of video conferencing in a work place has been put forward.

Introduction

The evolution of distance education has been one of the few areas in education where technology has been central to the teaching task (Bates, A.W., 1995). One of these interesting current technologies is video conferencing (Heath, M.J., Holznagel, D., 2002).

As we move into the new century, advances in technology communication systems provide more sophisticated educational opportunities for content delivery across distances to reach wider audiences (Heath, M.J., Holznagel, D., 2002). At the same time, advances in technology challenge the traditional paradigms of teaching and learning. Video conferencing is one of the powerful alternatives that educators can use to deliver instruction either face-to-face or across distances (Heath, M.J., Holznagel, D., 2002).

Video conferencing offers a viable means to develop a framework for addressing social changes (Panteli, N., Dawson, P., 2001) impacting also the work place. Videoconferencing can reduce barriers such as travel safety, costs, and time that can impede trips for interviews, visits to potential job sites and conferences designed for intellectual exchanges (Panteli, N., Dawson, P., 2001).

Definition of Video Conferencing

Videoconferencing has been in use since the early 1960s (Perey, C., 1997). However, there is an abundance of definitions of video conferencing ranging from the highly technical to the very simple.

The term video conferencing is defined by Laurillard as a "One-to-many medium, making it a sensible way to provide access for many sites to a remote academic expert." (Laurillard, D., 2000) According to another definition by the British Educational Communications and Technology Agency (Becta, 2003), video conferencing allows people in different locations to see and talk to each other. It may also support the electronic exchange of files, sharing of computer applications and co-working. Distinctions are becoming blurred by technological developments, but three types of video conferencing system exist (Becta, 2003):

_ desktop units

_ roll-abouts

_ room systems

Desktop video conferencing involves each individual using a computer, with one on-screen window for each site. A roll-about system stores all the equipment required in a wheeled cabinet. A room system includes the same equipment, but housed in a permanent installation (Becta, 2003).

In the discussion below, the term video conferencing (VC) is used to describe both stand-alone VC technology comprising small- and medium-sized systems capable of facilitating high-speed synchronous, interactive visual communication between individuals, small and large groups using Internet Protocol and synchronous web conferencing using desktop computers fitted with a camera and appropriate software (Smyth, R., 2005).

Functionality

VC can network rural schools, colleges, and/or service centers, giving them the capability to transmit and receive live programming (Heath, M.J., Holznagel, D., 2002).

While some educators are exploring the use of VC to supplement traditional, face-to-face coursework, many educational institutions use VC to deliver extensive coursework at a distance (Heath, M.J., Holznagel, D., 2002). Complete university degrees, high school equivalency programs, and K-12 school enrichment programs are some of the common uses for VC (Heath, M.J., Holznagel, D., 2002).

VC fosters collaborative teaching and learning environment, facilitates communication with experts, and is easily tailored to individual or group needs (Goggin, N.L., Finkenberg, M.E., & Morrow, Jr., 1997). Foreman (2003) points out that for collaborative, problem-based learning that requires brainstorming, planning, negotiation and problem solving synchronous communication optimizes performance because of its speed and immediacy.

Moreover, VC comes closest to reproducing the multi-sensory experience of "presence" and enables teams to collaborate efficiently and effectively (Smith, J., 2004). VC can be a useful tool for improving student outcomes through meeting more needs of the diverse body of students by opening up possibilities for clarification, negotiation, collaborative feedback, and thoughtful evaluation of teaching and learning (Laurillard, 2000) via easier access to a means for personalised dialogue and collaborative teaching and learning (Smyth, R., 2005).

Furthermore, through the use of VC, students are put into contact with "communities of practice" that allow them to obtain knowledge and skills from the experts (Lave, J. & Wenger, E., 1991).

Instructional practices such as scaffolding within one's "zone of proximal development" (Leong, D.J. & Bodrova, E., 1995), case-based or problem-based learning, and apprenticeship are ways of implementing a contextualized learning environment (Jonassen, D.H., 1995). These environments are easily put into practice using the VC technology.

Additionally students come into close proximity with communities of practice as the VC serves as gateway to a community of learners (LeJeune, N., Richardson K., 1998). The VC also enables students to reflect upon and analyze their performance and compare their performance to that of experts (LeJeune, N., Richardson K., 1998).

Benefits of VC

VC has the following benefits in the areas outlined below when used in educational institutions:

General Benefits

- It supports distance learning by linking up tutors and students, and also offers a means of reassurance and social contact for students (Hearnshaw, D., 1997).

- Subject teaching can be enriched by input from experts or practitioners (Gage *et al.* 2002).

- Students can develop communication and social skills by collaborating with their peers in other institutions (Becta, 2003).

- Students who normally stay in the background participate more; they are motivated to take part in VC (Becta, 2003).

Benefits for Students

- Collaboration with schools where the pupils come from different cultures leads to the development of multicultural relationships and understanding, while enriching traditional activities (Cifuentes & Murphy 2000).

- It provides enhanced opportunities for language students to interact with native speakers (Kinginger, C. 1998; Wright, N. & Whitehead, M., 1998).

- It offers an alternative outlet for expression by those normally hampered by poor literacy skills (Eales, R.T.J, *et al.,* 1999).

Benefits for Teachers

- Academic aspirations are raised amongst those students communicating with more assured students, who become positive role models (Cifuentes, L. & Murphy, K.L., 2000).

- Strong relationships are fostered with peers when working with other schools on collaborative projects (Cifuentes, L. & Murphy, K.L., 2000).

- The audience for courses can be increased by teaching face to face with one group and simultaneously transmitting to a second centre elsewhere (Gilbert, J. 1999; Carville, S. & Mitchell, D.R., 2000).

- Clips from sessions may be used as material for evaluating and modifying anti-social behaviour by students (Coverdale-Jones, T., 1999).

Benefits for Students with Special Educational Needs

- Support can be provided to children with complex physical and communication difficulties without professionals or families spending lots of time travelling (Donegan, M., 2002).

- Students may overcome feelings of isolation and develop social skills by associating with peers who have similar needs (Thorpe, R., 1998).

- The VC context acts as a focus for some students, helping them to organise the way they think and act (Thorpe, R., 1998).

- Students discover that if they shout out or talk over one another they cannot be understood, and alter their behaviour to take turns to talk (Thorpe, R., 1998).

Moreover, VC is also increasingly being used by companies as a workplace learning medium which enables audio and visual communication between distant sites around the globe (Panteli, N., Dawson, P., 2001).

Benefits for Organisations

- VC can be used as a cost-minimisation medium. As Maschack (1968) states, direct costs, such as telephone and ISDN charges and travelling costs, and indirect or effort costs which relate to the physical activities required to use a particular medium, such as booking arrangements are reduced.

- Due to the fact that VC is a synchronous communication medium, communication and information sharing takes place simultaneously (Panteli, N., Dawson, P., 2001) and there is the timely dissemination of information (Stout, V.J., Hite, D.A., Watson, P.R., Drewry, J.R., Morris, M.L., 2002).

- Based on the assumption that participants prepare in advance, VCs can enable highly structured collaboration and can minimize deviations from the targeted agenda (Stout, V.J., Hite, D.A., Watson, P.R., Drewry, J.R., Morris, M.L., 2002). VCs can also accommodate a forum for discussions, brainstorming, problem-solving and decision-making (Stout, V.J., Hite, D.A., Watson, P.R., Drewry, J.R., Morris, M.L., 2002).

- VC enables people, regardless of distance, to meet and work together, share ideas, data and applications without leaving their organisational site, and with desktop VC, not even their office (Panteli, N., Dawson, P., 2001). Besides, it allows interaction with and coaching from experts at a distance (Stout, V.J., Hite, D.A., Watson, P.R., Drewry, J.R., Morris, M.L., 2002).

Drawbacks and Limitations of VC

While the advantages of VC have been widely acknowledged, VC has the following drawbacks and limitations:

General Limitations

- The initial cost of the equipment and leasing the lines to transmit conferences may be prohibitive (Idaho, U., 2006).

- The actual use of VC may be limited due to signal discrepancies between the transmitted and received messages and transmission or reception delays due to limited bandwidth or busy lines (Panteli, N., Dawson, P., 2001).

- Poor image transmission may affect not only visual interaction associated with body language, eye contact, social cues, but also document sharing capability and the image of objects that participants may be asked to comment upon (Panteli, N., Dawson, P., 2001).

- Unfamiliarity and inexperience with technology may be a drawback in initiating VC meetings (Panteli, N., Dawson, P., 2001).

- VC restricts less formal and non-verbal forms of communication since gestures and other body language features are often not easily picked up due to poor transmission, slow motion and unclear pictures (Panteli, N., Dawson, P., 2001).

Limitations for Education

- Unless a strong effort is made by the instructor, students not located with the instructor may remain uninvolved in the course (Idaho, U., 2006).

- If visuals, like handwritten or copied materials, are not properly prepared, students may have a difficult time reading them (Idaho, U., 2006).

- If the system is not properly configured, class members may observe an audio "echo" effect (Reed, J., Woodruff, M., 1995). The result is audio interference that detracts from the learning environment.

Limitations for Organisations

- Maintaining constant eye contact with the people at the other end (by looking at the screen) limits opportunities for side-conversations (Panteli, N., Dawson, P., 2001).

- Managers too often fail to apply rules in running a video-conference that they would normally use in setting up a conventional face-to-face meeting (Panteli, N., Dawson, P., 2001).

- There is a need to change individual behaviour within the setting of a virtual meeting in order to avoid potential misunderstandings and possible social embarrassment (Panteli, N., Dawson, P., 2001). For example, participants are

expected to address questions to specific people by calling their names, rather than just establishing an eye contact (Panteli, N., Dawson, P., 2001).

The Use of VC in the Classroom

The potential of videoconferencing in general to provide authentic classroom contexts (Smith, J., 2004) to university students has also been explored during a videoconference session linking the University of Oxford to a Japanese university.

University students interacted in real time after VC observation of classes, posing questions to each other about their learning experience (Smith, J., 2004). The experience was felt to be both collaborative and communicative (Smith, J., 2004).

In order for the VC session to take place, the required connection was made across a network within the Computing Services of University of Oxford. Although reliable equipment, which provided good sound quality and was supported by a fast connection, was available, interactivity during the video conference was problematic (Becta, 2003). Besides, there was a time delay between picture and sound.

Another factor affecting the use of VC during the group project was that not all participants were able to see each other, and therefore they missed visual clues indicating that somebody wished to speak (Becta, 2003).

Remote students from a Japanese university participated in a live lesson several thousand kilometres from the Oxford campus (Smyth, R., 2005), where e-learning

students were actively engaged in presenting their e-learning tools. The Japanese students interacted constantly with their peers and saw the presentations that the students were demonstrating (Scanlon, 2002).

Moreover, students in MSc in E-Learning Programme in University of Oxford using videoconferencing developed several multi-tasks practical abilities such as setting objectives, determining alternatives, evaluating alternatives and restraints, implementing, and follow-up (Nealy, C., 1998) during their group project.

In general, despite some weaknesses as explained above, students reacted positively to VC, finding it enjoyable and showing considerable interest in the medium (Wright, N. & Whitehead, M., 1998, Eales, R.T.J., *et al.,* 1999) during the group project.

VC as a Workplace Learning Medium

Time constraints and other competitive factors, such as high travel costs (Press, L., 1998) and the scarce availability and high cost of specialized human expertise, have created an increased demand for organizations to explore the use of technologies that empower employees to communicate and work in some form of virtual mode (Martin, J., 1996; Townsend, A., et al., 1998). In this environment, employees are increasingly required to collaborate with co-workers to accomplish organizational projects and tasks (Boyett, J.H. & Conn, H.P., 1992; Davidow, W.H. & Malone, M.S., 1992; Tapscott, D. & Caston, A., 1993). Communications and information systems developers have begun to recognize this new organizational context and have created

a variety of new technologies to help meet the evolving challenges of the new workplace (Wiley, D., 1993; Negroponte, N., 1995; Lucas, H.C., 1996).

Recent advances in this technology have made VC among co-workers an affordable telecommunication option for a broad variety of users and organizations (Townsend, A., DeMarie, S., Hendrickson, A., 2001; Fortune, 1997). One of the most exciting potential uses of this new technology is to facilitate the interaction of co-workers on a common corporate project or task. VC provides an important communicative capability to these groups; its enhanced social presence (Fulk, J., et al., 1987) combines with a high level of media richness (Daft, R.L., Lenger, R.H., 1984) to place it closer to face-to-face interactions than other computer-mediated technologies (Kettinger, W.J. & Grover, V., 1997).

To realize the full potential of this new technology, organizations must create interactive opportunities that allow geographically dispersed employees to interact as meaningfully as they would in traditional face-to-face environments (Grenier, R., Metes, G., 1995; Martin, J., 1996). If this is possible, then VC can provide two primary benefits. First, VC will allow co-workers to increase their productive capacity by eliminating downtime associated with travel, and second, it will allow organizations to increase their potential labour pool by transcending geographical barriers to recruitment (DeMarie, S.M., et al., 1997). Thus, the primary goal in the use of this technology is to provide a cost-effective substitute for face-to-face interaction with minimal losses in productivity and utility of collaboration (Townsend, A.M, Demarie, S.M., Hendrickson, A.R., 2001).

For several years, VC has afforded in-person meetings without the expense of long-distance travel (Grimes, B., 2001); however, some industries have only vaguely

understood or valued its enormous potential (Weiner, R., 2000). From the comfort of their own desks, VC users can ". . .converse, chat online, share applications, annotate documents, and in some cases see each other through Web-based video cameras" (Grimes, B., 2001, p.30). Some organizations have opted to use interactive voice data video for streamlining professional conferences and conducting Internet-based education and training (Campbell, J., A., 2000).

Rationale

Communication activities are the most important aspect of managerial work and account for around 75 percent of the working time of managers (Mintzberg, H., 1973).

While managers still rely predominantly on face-to-face communication, they are becoming more reliant on electronic media alternatives including voice-mail, e-mail and videoconferencing (Rice, R.E., Shook, D., 1990). Because of this trend, it is important to develop a greater understanding of the implications of widespread organizational use of communication technologies on the workplace and individual performance (Campbell, J., A., 2000). In particular, a better understanding of the managerial use of videoconferencing is required since videoconferencing usage is rapidly increasing as organizations become more globally focused (Campbell, J., A., 2000).

VC has been viewed as a rich communication medium due to its audio and visual links, and its potential for interactive communication (Kydd, C.T., Ferry, D.L., 1994;

Leonards et al., 199). As stated above, VC is an electronic form of online audio and visual communication that overcomes the problems of physical distance while reducing the need for travelling (Panteli, N., Dawson, P., 2001). By providing document and data sharing and by adding intranet, internet and white boarding technologies, VC has become far more than simply a way of being able to see other participants (Creighton, J.L., Adams, J.W.R., 1998).

Although considerable interest has been given to the use of this electronic-mediated communication there are surprisingly few studies and scarce data on the organisational use of VC (Panteli, N., Dawson, P., 2001).

Recent developments in networking and communication technologies along with falling costs to make this technology a more affordable, attractive and effective means of remote visual communication (Panteli, N., Dawson, P., 2001). Indeed, over 50 per cent of the UK's top 200 companies viewed the technology as a means to cut down travel budgets and time spent in meetings, while 12 per cent saw VC as a way of improving internal communications (*Financial Times*, 3 April 1996). These operational benefits were also identified by Agius and Angelides (1997) who also suggested that the organisational implications of VC are far wider than often assumed, including user benefits as a result of prompt face-to-face meetings and potentially developmental benefits which may create opportunities for improving competitive advantage.

In a global market place affected by heightened concern for travel and personal safety, the conferencing technologies have a great potential for enabling and enhancing

performance (Cohn, M., 2002). To exemplify, a telecommunication carrier experienced as much as a 200% increase in VC among its users immediately following the September 11 attacks.(Campbell, J., A., 2000). Similarly, Citigroup Inc. depended upon VC as a means for staying connected with business partners and customers when domestic air transportation systems shut down immediately following the September 11, 2001, terrorist attacks (Bills, S. 2001). Clark (2001) reported that the shares of one VC company rose 47% on the Nasdaq Stock Market within one week of the September 11, 2001, attacks.

Moreover, results of a study concerning collaboration technology use before and after the September 11, 2001, terrorist attacks showed that collaboration technology tool use is up and business travel is down (Campbell, J., A., 2000).

Plan for Application of VC

As Nayman (1999) listed, there are several pointers for agencies developing videoconference events:

- Distributing session agendas and materials several days ahead of time so that expectations are clear.
- Involving managers or teachers in the development of programs for their professional development.
- Making sure there is enough time for interaction.
- Establishing a protocol for taking turns in order to avoid confusion and frustration.

- Having a backup plan and maintain a telephone bridge if possible.
- Making sure the set up area affords some sense of privacy.

Moreover, the following planning issues should be taken into consideration:

- Using visualization techniques to take advantage of the visual opportunities that VC provides (Cyrs, T. E., 2001).
- Planning and managing remote site activities (Cyrs, T. E., 2001).
- Creating and using questioning strategies with remote sites (Cyrs, T. E., 2001).
- Correlating handouts to what is seen on the screen (Cyrs, T. E., 2001).
- Planning and managing materials at the remote sites (Cyrs, T. E., 2001).
- Using good presentation skills such as appropriate style and colour of dress, voice, movement, facial expressions, gestures, and eye contact (Cyrs, T. E., 2001).
- Using different types of camera shots and using props (Cyrs, T. E., 2001).
- Knowing and following copyright laws (Cyrs, T. E., 2001).
- Planning how evaluation will be carried out (Heath, M.J., Holznagel, D., 2002).

Please refer to *Appendix A* for installing a VC tool.

Research Methodology

Research Setting

A research project on VC implementation in a multinational organisation wil be conducted over eight months.

Participants

Permission can be granted by both the company and the sub-contracted training organisation), to participate and observe VC training sessions and to interview all participants, both trainers and trainees, as well as other users of the system.

Research Design

The present study will employ a mixed design with the researchers collecting data over an eight-month timeframe in a naturalistic setting.

The aim of the research is to understand the impact of VC on business communication by examining the factors that influence its choice and use.

a) Research Questions

In pursuit of fulfilling the purpose of this investigation, the following two research questions are formulated:

1. What are the common factors preventing the VC participants from engaging in conversations during workplace training sessions?
2. What are the related costs of workplace training conducted via VC?

b) Background on Theory

The most cited theory in this area is information richness theory which forwards the view that organisational participants actively select learning media depending on their information requirements (Daft, R.L., Lenger, R.H., 1984). Under this theory, richness is identified as the ability of information to change understanding within a specific timeframe (Panteli, N., Dawson, P., 2001).

An important indicator of this theory is the capacity of a medium to reduce ambiguity about the meaning of the transmitted information (Panteli, N., Dawson, P., 2001). According to this theory, learning media vary in their level of information richness depending on their capacity for: immediate feedback; the number of cues and channels utilised; personalisation; and language variety (Panteli, N., Dawson, P., 2001).

c) Hypotheses

Based on this theory, VC has been viewed as a rich learning medium due to its audio and visual links, and its potential for interactive communication (Kydd, C.T. and

Ferry, D.L., 1994; Leonard, D.A., et al., 1998). So, the following hypotheses will be derived:

H1: VC is a rich workplace learning medium due to its audio and visual characteristics.

H2: VC is a cost minimisation medium that can be used for workplace learning.

Measures

The fieldwork will consist of three phases and different data collection techniques will be developed for each phase (Panteli, N., Dawson, P., 2001). During the first phase, a better understanding of VC as a workplace learning medium will be gained (Panteli, N., Dawson, P., 2001). Documentation will be collected and analysed and interviews will be conducted (Panteli, N., Dawson, P., 2001). Essentially, interviews will be held with the VC project leader, the trainers and their managers (Panteli, N., Dawson, P., 2001). Insights into the reasons for implementing the VC project and the nature of the training programme will also be gained (Panteli, N., Dawson, P., 2001).

The second and main phase covered the training programme for VC, data will be collected through the use of participant observation studies, individual and group discussions and in-depth interviews (Panteli, N., Dawson, P., 2001). Observation is one of the main methods of data collection in order to gather first hand information on VC use. Different training sessions will be observed and observation notes of related training activities will be kept (Panteli, N., Dawson, P., 2001). During this phase,

participants in the video-conferencing suites will be observed, interactions between trainers and other participants will be monitored, the level of confidence in using the video-conferencing equipment will also be noted (Panteli, N., Dawson, P., 2001). Additionally, questions and comments made during the training session will be noted together with any immediate verbal or non-verbal responses to the video-conferencing training environment (Panteli, N., Dawson, P., 2001). Besides, a short survey questionnaire will be distributed to all training participants at the end of their training session (Panteli, N., Dawson, P., 2001). Finally, in-depth interviews will be carried out with some employees who took the VC training.

Phase 3 will be a follow up of the second phase that aimed to investigate the subsequent use of VC post-training (Panteli, N., Dawson, P., 2001). This phase in which 20 follow up interviews will be conducted is planned take place after three months after the completion of training.

Analysis

Data will be collected on the following variables related to the research questions: over an eight-month timeframe in the research setting explained above. The variables and their related measurements will include:

(a) factors discouraging VC participants: This independent variable will included on the first survey instrument in the second phase. Each item will be scored on a seven-point Likert-type scale (Townsend, A.M, Demarie, S.M., Hendrickson, A.R., 2001). The scale is designed to measure subjects'

perceptions as to how difficult it will be to operate the system (Townsend, A.M, Demarie, S.M., Hendrickson, A.R., 2001).

(b) requirements and costs: This independent variable will also be included on the first survey instrument in the second phase. Each item will be scored on a seven-point Likert-type scale (Townsend, A.M, Demarie, S.M., Hendrickson, A.R., 2001).

Moreover, data from observations, interviews and documentations will be analyzed, synthesized, and evaluated at different phases during the eight months timeframe.

Means, standard deviations, correlations and coefficient alphas will be also computed for each measure.

Both hypotheses H1 and H2 will be supported by the analysis if they will have significant positive coefficients.

Limitations of Study

The research plan in this study uses data from a single site within one organization thus significantly reducing the external validity of the findings. Despite this shortcoming, the research context will provide significant benefits according to the researcher.

A number of instruments were used to measure the variables of interest in this study. While the reliabilities of most measures were within acceptable limits, some items would benefit from further development (Campbell, J., A., 2000). Greater consideration should be given to gaining a better understanding of the interaction between technological and human factors (Campbell, J., A., 2000).

Future research should also consider whether attitudes towards videoconferencing are uniformly developed across organizational boundaries and within other organizational contexts (Campbell, J., A., 2000).

Conclusions

As VC technologies become easier and cheaper to use, innovative uses will become more common and inherent among organizational and industry cultures (Stout, V.J., Hite, D.A., Watson, P.R., Drewry, J.R., Morris, M.L., 2002). Moreover, organizations credit their ability to meet virtually with employees to having already established a corporate culture that supports remote collaboration in response to contemporary market demands (Stout, V.J., Hite, D.A., Watson, P.R., Drewry, J.R., Morris, M.L., 2002).

The social experience of virtual collaboration is radically changing the workplace, and should prove to be an important topic for organizational research (Townsend, A., DeMarie, S., Hendrickson, A., 2001. Earlier studies have argued that information richness is not just a function of the learning medium, but of the interaction between the medium and the organisation in which it is embedded (Panteli, N., Dawson, P., 2001). This study presents empirical data on the use of VC (Panteli, N., Dawson, P., 2001) and demonstrates that error, delay and social costs are likely to influence the choice and use of VC (Panteli, N., Dawson, P., 2001).

Since field research into the effects of videoconferencing technology is scarce (Campbell, J., A., 2000), this analysis aims to provide a valuable insight into the role of VC technology in workplace learning (Campbell, J., A., 2000).

Although the present study helps to identify circumstances in which organisational members may prefer to use VC it is a step in undertanding how VC can become

incorporated into organisations as an additional learning medium (Panteli, N., Dawson, P., 2001). These issues deserve further inverstigation and should be on the agenda for future VCS research (Panteli, N., Dawson, P., 2001).

Finally, VC-related performance enhancements to be derived through training and development will mandate carefully designed and employed strategies for transfer so that it is not left to chance (Stout, V.J., Hite, D.A., Watson, P.R., Drewry, J.R., Morris, M.L., 2002).

APPENDIX A

Installation Manual for a VC Tool

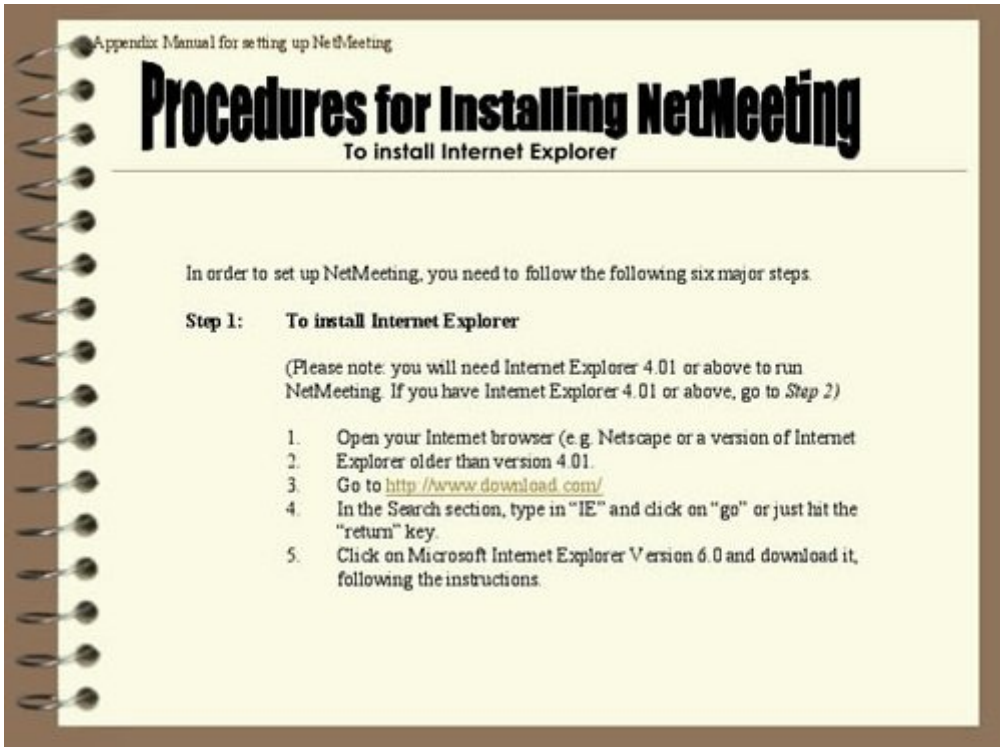

Figure 1.1 Manual for Setting Up NetMeeting (http://llt.msu.edu/vol8num3/wang/default.html)

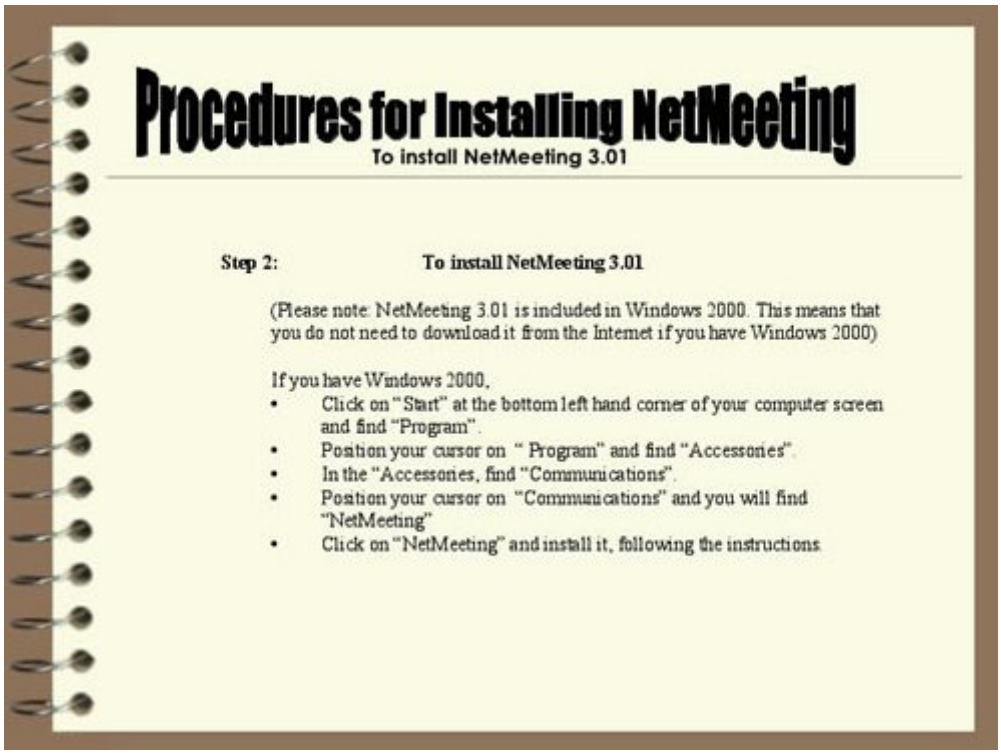

Figure 1.2 Manual for Setting Up NetMeeting (http://llt.msu.edu/vol8num3/wang/default.html)

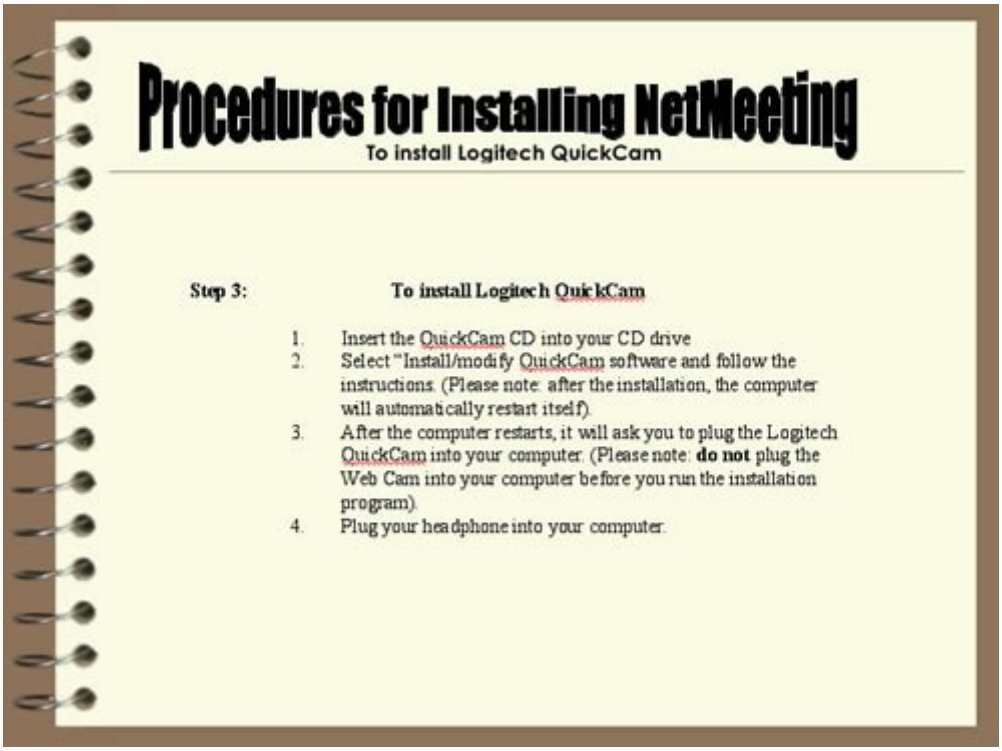

Figure 2 Manual for Installing QuickCam (http://llt.msu.edu/vol8num3/wang/default.html)

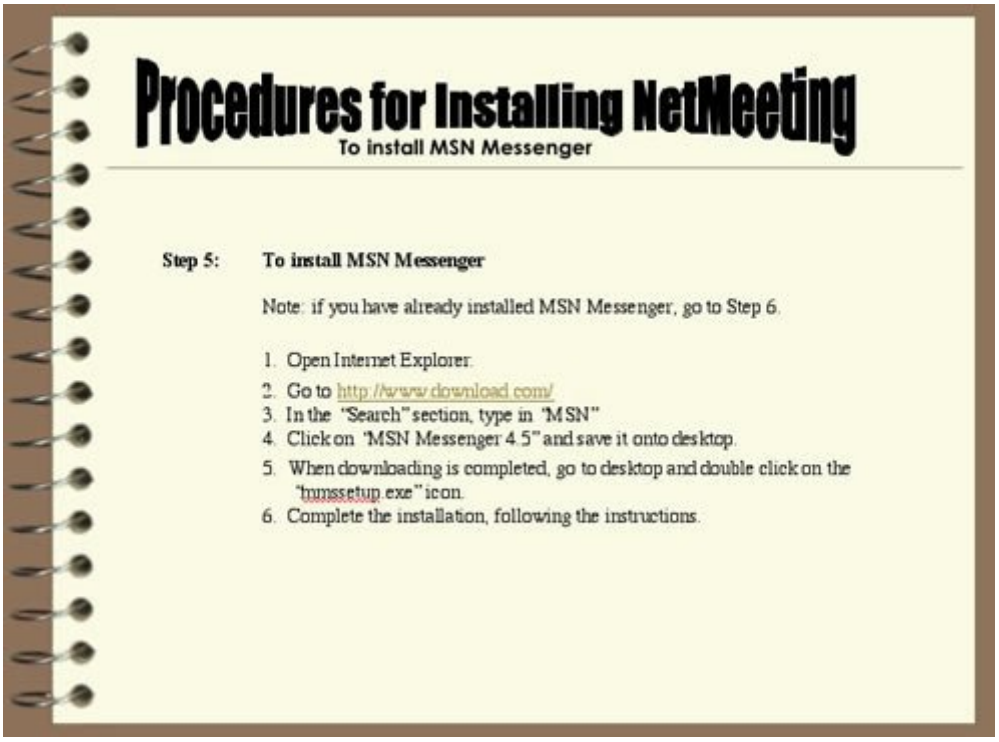

Figure 3 Manual for Installing MSN Messenger (http://llt.msu.edu/vol8num3/wang/default.html)

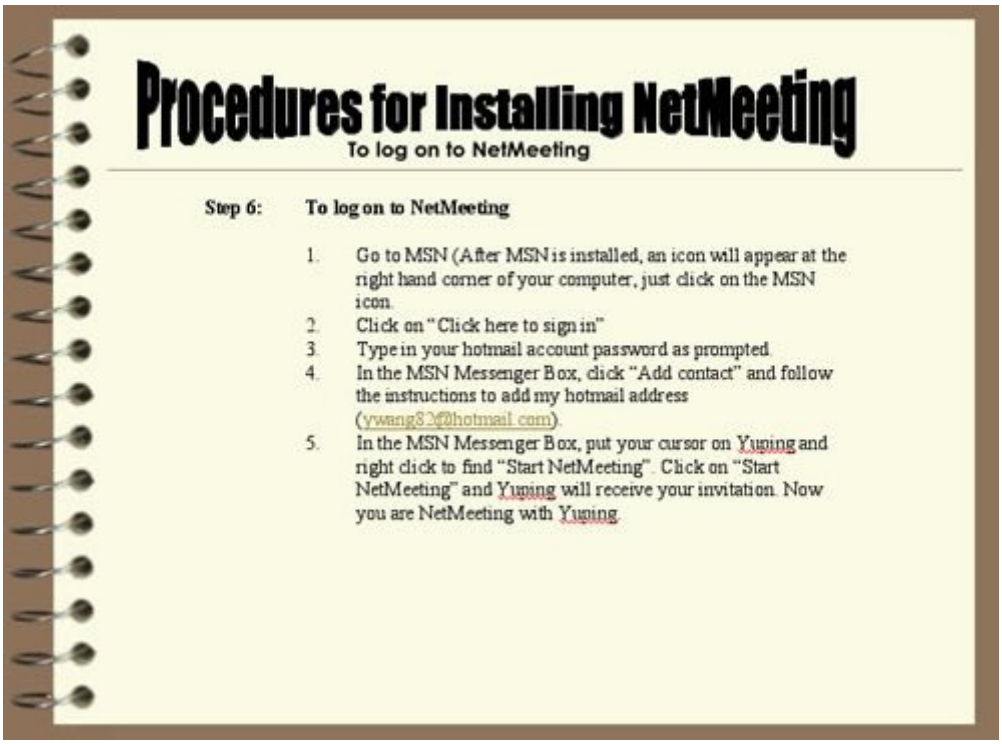

Figure 4 Manual for Logging on to NetMeeting (http://llt.msu.edu/vol8num3/wang/default.html)

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