

# Chapter 3.17

## One-to-One Video-Conferencing Education

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### INTRODUCTION

Technologies have become a critical component affecting teaching and learning effectiveness. Technologies enable informal computer-mediated interaction among instructors and students, for example, through electronic mail or bulletin boards. The Internet has changed the dynamics of teaching and learning by enabling distance direct personal tutoring, whereby a tutor (a private or personal instructor) provides personal additional instruction and attention to a student. The cost of video-conferencing using standard personal computers and off-the-shelf software involves a low set-up cost and very low usage fee (local phone charges). Its low cost can lead to a proliferation of its use. Students are no longer physically constrained in their quest for tutors.

It is important to research the factors that may facilitate or hinder learning via Internet video-conferencing capabilities.

A case study was conducted, through multiple data collection methods, with two tutors and three students in Singapore. The impacts of four critical factors (system characteristics, mode characteristics, social presence, and media richness) on the effectiveness of teaching and learning were studied. This study helps to fill a gap in knowledge that arises because prior studies tend to concentrate on big virtual classroom settings.

### BACKGROUND

Earlier studies on the use of information technology for education have focused on student usage

of learning software, or on group interactions. For example, Sankar et al. (1997) investigated two different ways of delivering lectures with video-conferencing, without any instructor-student interaction. There are very few studies on one-to-one distance education. Graesser and Person (1994) found that the quality of student questions was correlated with grades in one-to-one tutoring sessions on mathematics. It was found that collaborative problem solving, prompt question answering, and clarity of explanation using examples contributed significantly to learning effectiveness (Graesser et al., 1995). Hume et al. (1996), studying one-to-one tutoring effectiveness, found that hints encouraged students to engage in active cognitive processes that promoted long-term retention and deeper understanding. Chi (1996) found that certain types of interaction between tutors and students, during one-to-one tutoring sessions, could produce deep learning.

The body of literature on one-to-one distance education motivates this research effort in two ways. First, like all the existing studies, this study seeks to identify factors that may enhance the effectiveness of teaching and learning in such an environment. In this study, effectiveness is measured by asking instructors to indicate their perceived ability to teach and asking students to indicate their perceived ability to learn via distance education, relative to traditional face-to-face education sessions. Second, while the results of all the existing studies alluded to the importance of

communication between the tutor and the instructor, this issue has never been directly investigated. Therefore, this study focuses on identifying factors that may impact the communication process between the instructor and the student, thereby affecting distance learning effectiveness.

One-to-one distance education is examined in the context of desktop video-conferencing because the economy and prevalence of desktop video-conferencing facilities are likely to make it a dominant mode of distance education in the future (Rhodes, 2001). Table 1 presents four critical factors that can affect the success of using desktop video-conferencing facilities for education.

### **System Characteristics**

Every desktop video-conferencing facility has both hardware and software components. A digital camera and a video card (in some products) are needed to capture images. A microphone, a sound card, and speakers are needed to capture and project voices. Many windows are needed to display the captured images (of the tutor or the student), the chat window, and other applications such as Word. In addition, the software should facilitate document sharing. Bandwidth limitations on the Internet and processing speed could lead to grainy pictures and a lack of synchronization between video and audio signals (Tackett, 1995), thereby affecting teaching and learning effectiveness.

*Table 1. Factors affecting teaching and learning effectiveness*

<b>Factor</b>	<b>Key aspects of factor</b>
System characteristics	Hardware, software, and bandwidth
Mode characteristics	Usefulness, challenge, attractiveness, and clarity
Social presence	Sociability, warmth, and personal focus
Media richness	Multiple cues and interactivity

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