Chapter XI
Infrastructure for Videoconferencing

Mohua Bose
University at Albany / SUNY, USA

Sal DeAngelo
Schenectady City School District, USA

ABSTRACT

Due to the increases in connectivity capacities prevalent in our nation's schools, educational administrators are utilizing a variety of resources in their classrooms, including interactive videoconferencing. For videoconferencing to be successful, however, planning for technological infrastructure must occur prior to program implementation. It is important for both schools and providers to be aware of the infrastructure requirements needed in order to provide students with knowledge and learning via videoconference experiences. The purpose of this chapter is to identify the key components of the technological infrastructure needed to support videoconferencing within K-12 in the schools, such as connectivity needs and essential hardware requirements including computers, cameras, audio essentials, and operating controls; in addition, the chapter provides, in easy-to-read language, an overview of many of the key technical terms used in the videoconferencing literature, and provides teachers with a graphical display of use.

INTRODUCTION

Educational technology has advanced greatly in the recent years with the advent of the Internet. Born in the 1970's, the Internet gained momentum in the early 1990's with the dawn of the World Wide Web (WWW). As reported by the National Center for Education Statistics, there has been a marked increase in school connectivity and access from 1994 to 2001 (Kleiner & Farris, 2002). In 1994, only 35% of the public schools had access to the Internet, whereas in 2001, access had increased to 99%. Similar statistical increases were noted by the National Center for Education Statistics on instructional room or classroom access to the Internet (Kleiner & Farris, 2002). While in 1994, only 3% had instructional room access, in 2001, 87% of the public schools had instructional room access to the Internet.

Changes also have occurred in the types of Internet connections. In 1996, dial-up connection was the most frequently-used mode in three-fourths of the public schools (Heaviside, Riggins, & Farris, 1997); but by the turn of the twenty first century, T1/DS1/Cable and broadband lines were used in the majority of the schools (Kleiner & Farris, 2002). These lines provided for significantly-faster Internet connections than the dial-up connections.

Due to these increases in connectivity capacities, school administrators are supporting utilization of a variety of medium in their school classrooms, especially since both financial and safety constraints in schools have led administrators to seek alternative solutions to field trips. Administrators also know that that when external resources are used in the classroom, they tend to trigger student interest and curiosity in the content area. As a result, teachers and administrators have been attempting to use different multimedia resources within their classroom instruction to be able to keep the students cognitively engaged (Jonassen, 2002), yet provide them with access to external resources.

One of the more promising multimedia modes utilized by educators in schools is the use of videoconferencing. According to Penn (1998), videoconferencing entails two or more groups of individuals located at different locations, who are able to connect via telephone or Internet to transmit video and audio data. This media allows educators to bring content into the classroom, directly from an expert in the field who is located at a distant setting. Schools that have connections available can link to content providers who provide educational resources via videoconferencing. This provides students not only rich content in a non-traditional format, but according to research, creates authentic and interactive learning opportunities and leads students to think at a higher cognitive level (Gerstein, 2000; Jonassen, 2002; Newman, Barbanell, & Falco, 2004; Silverman & Silverman, 1999). In addition, there are several other advantages to using videoconferencing, such as having access to an expert without having to leave the school building, as well as eliminating student travel time and costs (Pachnowski, 2002).

Videoconferencing allows the schools to connect to various professionals in the real world without actually having to go out of the classrooms; however, it requires considerable preparatory arrangements in infrastructure to enable a teacher to actually conduct videoconferences. The importance of infrastructure cannot be overlooked. Infrastructure requirements can be both the enablers and limiters to a school's ability to videoconference. If a district/school's infrastructure is robust and properly configured, videoconferences can be delivered to any classroom with predictable scheduling systems and quality. A district that does not have a robust backbone, or has an infrastructure which is constrained, will be limited significantly in its the ability to deploy videoconferencing as part of an integrated curricula approach to teaching and learning. The objective of this chapter is to discuss the infrastructure requirements needed to be able to conduct successful videoconferencing.