Chapter 1.20
Security and Privacy
in Distance Education[1]

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INTRODUCTION

Many applications and tools have been developed to support the design and delivery of distance learning courses. Unfortunately, many of these applications have only cursory provisions for security and privacy, such as authentication based only on user id and password. Given the increased attacks on networked applications and the increased awareness of personal privacy rights, this situation is unacceptable. Indeed, electronic services of all kinds, including distance learning, will never be fully successful until the users of these services are confident that their information is protected from unauthorized access and their privacy assured.

In the literature, there are few papers dealing specifically with security and privacy for distance education. El-Khatib, Korba, Xu and Yee (2003) discuss security and privacy for e-learning in terms of legislative requirements, standards and privacy-enhancing technologies. Korba, Yee, Xu,

Song, Patrick and El-Khatib (2004) investigate how security and privacy can promote user trust in agent-supported distributed learning. Yee and Korba (2003, 2004) discuss the use and negotiation of privacy policies for distance education. Lin, Korba, Yee and Shih (2004) describe the application of security and privacy technologies to distance learning tools. Yee, Korba, Lin and Shih (2005) present an approach for using context-aware agents to implement security and privacy in distance learning. Holt and Fraser (2003) discuss the psychological and pedagogical motivation for security and privacy.

This chapter provides an overview of security and privacy requirements and solutions for distance education. To provide context for the requirements, the "Background" section examines a set of tools typically employed in the authoring and delivery of course material. The "Security Requirements" section discusses security requirements and solutions. Likewise, the "Privacy Requirements" section discusses

privacy requirements and solutions. Following these, the "Future Trends" section presents some likely future trends in this area. The "Conclusion," "References" and "Key Terms" sections follow the "Future Trends" section.

BACKGROUND

This section provides an overview of some of the major tools used in distance education and their purposes. The security implications of the use of these tools are addressed in the sections following the description of the tools.

Distance Education Tools

Distance education practitioners typically employ software tools that provide the following functionality:

Administration Tool

The purpose of this tool is to manage the administrative information of an institute/organization that relates to distance education. This information is very sensitive, as it relates to personal information. Examples of administrative information include the student's marks, address, date of birth, tuition fees still owing, and so on.

Courseware Authoring Tools

Most courseware for distance education is designed to be Internet accessible. As a result, there is a demand for rapid multimedia course development tools and many such tools have been developed. A highly desirable feature of such tools is the ability to take portions of existing courseware from different courses or the same course and recombine them to produce courseware for a new course or to improve courseware

effectiveness. From the security point of view, courseware-authoring tools should incorporate copyright protection for the courseware that they produce (see copyright discussion below).

Course Content Delivery Tools

After an online course has been designed, it requires proper tools to deliver it. These tools allow students to synchronously or asynchronously access online courses through the Internet. Since students may have different kinds of computing devices, different tools are available for different platforms.

Synchronous and Asynchronous Communication Tools

Some tools are designed for supporting synchronized activities between instructors and students. A typical example is a video conferencing tool designed for activities such as face-to-face visual and voice communication. This requires synchronization between the communicating parties. Other tools are designed only for supporting asynchronous activities between instructors and students. A typical example is online course delivery that can be done at the student's convenience, without the synchronous online presence of the instructor.

Multimedia Lecturing Tools

Video and slide-show synchronization tools improve slide presentations. They allow for synchronized instructor explanation of the course slides while students are browsing through them. Asynchronous instructor explanations are also possible, where such explanations are pre-packaged and triggered by the page the student has reached.

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