A Wireless Rural Education and Learning System Based on Disk Oriented MPEG Streaming Multimedia

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ABSTRACT

The Internet is enabling us to address some educational challenges, bringing learning to students instead of bringing students to learning. It is allowing for the creation of learning communities that defy the constraints of time and distance as it provides access to knowledge that was once difficult to obtain. This is true in the classroom, on the college campus, and in the corporate training rooms. In this paper, we describe the design of a Rural Education and Learning System in a wireless multimedia environment which runs on a cost-effective computer system. The education system may be classified as a multiple clients and a single server system where each client runs in a class-room where students are free to select the subject of their choice. The client is also facilitated with VCR operations and guaranteed data delivery by using the MNSP (Multimedia Network Service Platform) at the server and at the clients end. The system has been implemented in 5, 10, 20 classroom environments with 50 different subjects teaching materials. It has been observed that the response to each of the user’s requirements, like subject material requirement retrieval and VCR operation, etc., are quite good. We have also made a field trial in a five-classroom school in a rural area, which has been quite encouraging.

Keywords: rural education; education on wireless multimedia; multimedia support for education; VCR-based education

INTRODUCTION

The purpose of an educational system is to give students the life skills necessary to enable them to lead happy, productive, and useful lives. This means they must develop communication, social, vocational and study skills, learn the essence of their culture, and get a good working knowledge of mathematics and science. In general, a high school student should be well prepared either for college, trade school, or entering the job market or the military. He/she should also have knowledge of his/her culture and the social and family skills necessary to live a satisfying life (Duane, 2000).

A rural education and learning system helps to develop human resources in rural areas. The rural youths are trained as promoters and technicians in rural well-being. Living and working in their communities, students gain the system as they begin to study a number of disciplines. The
disciplines include service to the community, mathematics, language, science and technology.

An excellent education is essential to each of us as an individual and to our children. It is only through education that we can achieve all that we are capable of achieving and have as happy and fulfilling a life as possible. Education is necessary to gain economic independence, philosophical value systems, and cultural appreciation.

Multimedia in Education

We have been experiencing a tremendous growth in distributed multimedia applications in the recent years. The term multimedia refers to a related set of data in multiple media forms with at least one of the forms being continuous media (Thomas, 1990). A multimedia application involves synchronized processing and transfer of such multimedia data. A distributed multimedia application requires transfer of multimedia data between two or more stations. Such multimedia communication poses quite a few challenges to the network designer (Neil, 1994).

Multimedia elements (videos, animations, simulations, etc.) can significantly increase the quality of educational material. However, only a small number of educational documents are actually enriched with multimedia elements. One reason for this situation is the high effort usually required for the production of multimedia material, another being that the current Internet technology is focused on the distribution of discrete media (Boyle, 1997).

Multimedia repositories, libraries, and databases offer the potential to the students providing access to a wide variety of interconnected information resources. However, in order to realize this potential, multimedia systems should provide access to information and activities that support effective knowledge construction and learning by students. The advantages of multimedia courseware are often considered to be self-evident (Martha, 1995). Nevertheless, we need to establish which media are most effective and, more importantly, what type of students benefit most.

There has been a very rapid expansion of educational multimedia since the early 1990s. The driving factors have been the advent of widely available multimedia computers, the impact of hypertext and hypermedia, and the explosive growth of the World Wide Web. The rapid expansion in these activities has led to an increasingly urgent need for the development of a sound theoretical base (Tom, 2001).

DEVELOPMENTS IN THE WIRELESS MULTIMEDIA SYSTEMS

In a typical distributed multimedia environment, multiple, remotely located users (either on a wired or wireless environment) participate in a joint work or design project demand for resource sharing, multimedia data integration, local intelligence and autonomy, graphical-interfaces and vendor independence (Venkataram; 1998).

Wireless multimedia (Ellen; 1997) involves real-time processing of continuous media streams at low power consumption and low cost. Some of the developments in the wireless multimedia systems are:

- New developments in wireless technology will continue to have a significant impact on our lifestyles by enabling mul-
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