High-End High School Communication: Strategies and Practices of Students in a Networked Environment

Barry J. Fishman
School of Education and Social Policy
Northwestern University
Evanston, IL 60208
(708) 467-2405
bfishman@covis.nwu.edu

ABSTRACT

This paper describes a study of the design of computer-based communication and media space environments that support highly interactive school-based learning communities. The two basic questions posed in this research are: (1) How are media space tools used by students in these classrooms, both in terms of the structure of communications activity and the surrounding physical and temporal constraints of the environment?; and (2) What are possible explanations for student behaviors and attitudes with regard to media space tools? The answers to these questions will provide insight for the design of next-generation media spaces for educational settings.

KEYWORDS: Media Spaces, Education, Communication, Design

INTRODUCTION

Classrooms are like islands, isolated from each other and the world beyond their boundaries. Students enter an enclosed space and for the next forty to ninety minutes, all interaction is confined to the individuals contained within the classroom walls. More often than not, the instructional strategies employed in classrooms also isolate students from one another. Communication is comprised of back-and-forth exchanges between teacher and student, and only rarely from student to student. This dissertation studies the deployment of highly-interactive computer-based communication tools designed to break the boundaries that exist in classrooms, with the goal of elaborating principles for the effective design and implementation of these environments in school settings.

The high school classrooms involved in this study have been augmented with a suite of highly interactive communication tools, including electronic mail, Usenet newsgroups, asynchronous multimedia notebooks, remote screen-sharing, and desktop video teleconferencing. In the CHI community, this combination of tools has come to be known as a *media space* [3, 1]. Media spaces enable individuals or groups to work together, even when they cannot be temporally or spatially co-located. This makes it possible for students to collaborate both with their distant peers and with experts outside the classroom. It is argued that classrooms equipped with media space technologies will become the norm over the next decade, thus making it important to understand student behaviors and attitudes with respect to the use of these communication technologies.

Two basic questions are asked in this research: (1) How are media space tools used by students in these classrooms, both in terms of the structure of communications activity and the surrounding physical and temporal constraints of the environment; and (2) What are possible explanations for student behaviors and attitudes with regard to media space tools? The answers to these questions are intended to provide guidance for the design of next-generation implementations of classrooms where highly interactive communication tools are used to link students as peer collaborators to professional communities, teachers, and other students both within and beyond the walls of the school.

BACKGROUND TO THIS WORK

At CHI '94 in Boston, a panel entitled "Media Spaces and Their Application in K-12 and College Learning Communities" [5] presented three different educational projects that employed varying configurations of media space technology to enhance learning environments. An important result of this panel was the recognition that the needs of school environments are significantly different than the white collar settings in which most media space research is conducted. Each of the three projects represented on the panel employed a different solution (both technological and pedagogical) to the problem of cross-classroom and beyond-school communication, but there was little empirical evidence to support any of the approaches presented.

In a search for past research to inform the question of media space application in classrooms, two distinct, but related, literatures were identified. The first body of research is comprised of studies describing the use of various communication tools in educational and work settings, primarily in terms of message flow over time [6]; studies of the classroom as a work environment enabled by

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communication tools [9]; and studies of "communicative economies" of workplace activity [8]. The second literature is from communication research, and it provides several theory-based explanations for why students behave as they do with respect to mediated communications. The theories that are predicted to provide explanatory power in this project are: Information richness theory [2]; and social influence theory [4]. Information richness refers to the extent to which a communication tool allows you to give and receive timely feedback, transmit a variety of different cues beyond the spoken message (i.e., non-verbal cues), and to tailor messages to your own or other personal circumstances. Social influence theory refers to the extent to which your use of and attitudes toward various communication tools are affected by the behaviors and attitudes of those people who are close to you. A number of other factors related to characteristics of the student population will also be evaluated for their influence on communication tool use and attitudes towards communication tool use.

METHODOLOGY

The setting for this research is fourteen science classes at two Chicago-area high schools, composed of six teachers and approximately 300 students. These students and teachers are all participants in the Learning Through Collaborative Visualization Project (CoVis) [7]. Each CoVis classroom is equipped with six workstations connected to the Internet via a broadband ISDN network, and each classroom has three Cruiser desktop videoconferencing stations [see 3].

This research will be conducted over the course of the 1994-95 school year using a combination of qualitative and quantitative methodologies. Descriptive information about student communication tool use will be gathered using an observational technique called shadowing [8, 9]. Computer logging of media space tool use will provide automated measures of use for those tools, and self-report data will be used to gauge use of non-computer-mediated tools in the classroom (i.e., handwritten or printed notes, telephone, and face-to-face communication). Longitudinal surveys will be used to measure independent and dependent variables for use in testing the theoretical explanations. The dependent variables are: amount of communication tool use and attitudes towards communication tool usefulness. The independent variables are: information richness; communication tool expertise; social influence; and a variety of student characteristics including written and oral communication apprehension, gender, academic self-concept, experience with computers, and academic level in school.

The data from this research will be analyzed using multiple regression techniques, which will produce a list of factors that have an impact on how students adopt and come to think about the various components of the CoVis media space suite. Furthermore, this list should be ordered according to the strength of each factor's effect on communication tool appropriation, providing a rough guide to potential trouble spots for implementers. The observational component of this research will provide insight into the everyday activities of the CoVis classrooms, to aid in interpreting the survey data.

CONCLUSION

This research project proposes to study the communication practices of high school students in an environment enhanced with media space tools. How do students in such a setting appropriate and utilize media space technologies that range from electronic mail to desktop videoconferencing? Using a combination of "bottom-up" observational and "top-down" theoretical approaches, the nature and structure of communication activity in CoVis classrooms will be analyzed in order to better understand how media-space tools can be used to support inquiry-based classrooms where the use of highly-interactive communication tools is key to work and learning. The principal product of this work will be a set of heuristics to guide future design of media spaces for learning environments.

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