Student Perceptions of Asynchronous versus Synchronous Communication in a Technology-Enhanced Learning Environment

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ABSTRACT

The modern university must be capable of effectively teaching students who attend class in the traditional sense and those who learn from distant locations via technology. This places new challenges on instructors who design courses to fit within this hybrid environment. One of these challenges is determining how students prefer to communicate with the instructor and with student peers. The available options range from rich synchronous communication media to text-based asynchronous interaction. This paper describes an empirical research project that addresses these questions. A survey was created and administered to 220 undergraduate business students. The results of this survey indicate that students prefer to communicate in-person with the instructor and with student peers by a wide margin over email or the telephone. These results have useful implications to instructors involved in distance education.

INTRODUCTION

Modern university education is at a crossroads. New web-based tools and the recent availability of sufficient bandwidth for rich-media communication via the Internet have combined to open exciting possibilities for instructors. These possibilities allow the creation of courses where students can virtually "attend" class without actually being physically present in the room when class takes place. These classes can even be offered to distant parts of the world without any extra effort. In addition, technology allows instructors to assign virtual group projects and substitute virtual office hours for traditional face-to-face meetings that have characterized the college experience. These new opportunities open the door for many modes of teaching that, in the past, were simply not feasible.

University education is also firmly rooted in the past. Many instructors eschew technology-based teaching because they feel that software and the Internet are not a substitute for the traditional lecture and personal interaction. They feel that the classroom experience has value and content that cannot be digitized or transmitted electronically. These instructors prefer the old methods and are not swayed by the promise of technology. Thus, the crossroads exists between the traditional teaching methods and the new technologically enhanced ones.

Added to this mix is the complicating factor of economics. Higher education is becoming a commercial venture where universities and corporations are vying for the lucrative life-long learner market. This market requires flexible, on-demand learning that is tailored to the needs of working adults. E-learning is the ideal vehicle for this market. Many universities realize this and are aggressively working to capture this market. Since distance education through the "virtual university" is cheaper than traditional education, there is tremendous pressure to adopt the technology necessary to implement it (Daniel, 1996).

As a result of this dichotomy, university instructors currently are forced to work in a grey zone between the traditional teaching methods and technology-enhanced ones. This condition will likely exist until the modern methods are fully debugged and incorporated into the university culture. Until that time, a number of interesting questions should be investigated to make the transition as smooth as possible. One such question concerns undergraduate student preferences in communicating with the instructor and other students. There are a wide range of options available. On one end of the spectrum are the rich-media synchronous methods such as face-to-face conversation and video conferencing. On the other end of the spectrum are lean-media asynchronous methods best characterized by email and bulletin boards. Other options, such as telephone and instant messaging, lie somewhere in between.

The research project described by this paper was undertaken to explore the communication preferences of undergraduate students. The intent is to empirically determine how students prefer to communicate with the instructor and with other students. This is an important question because instructors designing and teaching classes for a dual audience (i.e., traditional and remote) need to know the best way to communicate with both groups of students. It also impacts the types of group projects that are assigned and the modes of communication that are setup to service students in these classes.

RESEARCH BACKGROUND

There are several lines of research that are pertinent to questions concerning student media preferences. These research findings are summarized below. After reading this section, it should be clear that the research literature, albeit thorough and rigorous, provides little help answering the question stated above. Instead, existing research provides inconsistent and conflicting results concerning student media preferences. This inconsistency emphasizes the need for the current research project.

One of the oldest lines of research into media preference involves media richness theory. This theory was developed around the notion that people behave rationally and will select different media for different communication tasks based upon the characteristics of the media (Daft & Lengel 1984, Daft & Lengel 1986). The four relevant media characteristics considered by the theory are: (Graveline, et al., 2000)

*   Feedback capability - speed of feedback,
*   Availability of multiple cues - number of available communica tion channels,
*   Language variety - types of language available (e.g., text, oral),
*   Personal focus - level of individual attention content in the message.

According to the theory, rich-media is best for equivocal communication. That is, an ambiguous exchange of subjective or potentially conflicting viewpoints (Daft & Lengel, 1986). In this usage, *rich-media* is generally defined as multi-channel, synchronous communication with wide language variety and high personal focus. Lean-media, which is normally asynchronous and single-channel, is best for situations where the communicator is seeking to transfer known facts to another or to request facts for specific questions (Daft & Lengel, 1986).

Based upon media richness theory, one would expect that students would prefer to communicate with the instructor using a synchronous, rich-media because these conversations tend to be more equivocal and

rely on multi-channel interaction. On the other hand, the theory would predict that students prefer lean-media asynchronous interaction with other students in class because these communications tend to be geared more toward factual exchange (e.g., the date of the next test or the chapters that are assigned). This prediction is upheld by several studies (Graveline, et al., 2000; Toland, 2002); however, not all research confirms the theory. Media richness theory has been shown to produce inconsistent empirical results (Markus, 1994; Ngwenyama & Lee, 1997; Rice, 1992).

Research by Rao (1995) modifies media richness theory somewhat and concludes that tasks with a high socio-emotional component are sensitive to media differences while those that are emotionally neutral and task oriented are not sensitive to media differences. This conjecture implies that students would likely select a rich synchronous media for instructor communication, but would select a medium based upon convenience or habit to interact with other students. Thus, communication with other students might be synchronous or it might be asynchronous, depending upon the individual student's habits or the convenience of technology at the moment. This is at odds with media richness theory which concentrates on the characteristics of the media, not the convenience of the communicator.

A number of research projects have been devised to directly study the effectiveness of email communication as compared to face-to-face communication. The results of these projects found that face-to-face communication is generally more effective than email in all situations (Daly, 1993; Siegel, et al., 1986; Wilson, et al., 1997). Other studies, however, have come to the opposite conclusion and imply that email has taken over for face-to-face communication as the medium of choice between students and instructors (Berge, 1997; Sherry, 2000). These studies use email as a proxy for asynchronous lean-media and use face-to-face communication as the surrogate for synchronous rich-media. This is a valid substitution because face-to-face communication is the standard by which all synchronous interaction is judged. Likewise, email is an asynchronous medium that is one of the most widely used in education (Le & Le, 2002).

Finally, a group of researchers have argued either for or against asynchronous communications for a variety of valid reasons. Cornell (1999) states that asynchronous media are superior because they support a flexible constructivist approach by allowing students to progress at their own pace. Westera (1999), on the other hand, points out that asynchronous communications allow students' public speaking skills and assertiveness to be used less and potentially diminish. Barnard (1997) counters this by suggesting that asynchronous communication makes it more likely that timid, thoughtful students will contribute more and that domineering students will have less opportunity to direct the flow of discussion. Berge (1999) pointed out that asynchronous communication is more convenient for both students and teachers while others have noted that the asynchronous email medium reduces contextual clues and allows writers to act more irresponsibly than they would in face-to-face synchronous conversations (Sproull & Kiesler, 1986).

Taken together, this montage of research indicates a lack of closure on the topic. Clearly, there are many facets to the problem of asynchronous versus synchronous communication, but for the teacher attempting to design a course that includes both local and remote learners, the lack of direction from the literature is not helpful. What is needed is a crisp, simple experiment to empirically determine undergraduate student preferences in an actual teaching environment. The project described by this paper attempts to fill this void.

THE RESEARCH STUDY

Two research questions were developed for this study. The two questions, converted to a form suitable for a survey instrument, are shown below.

Q1: Given the choice of talking to an instructor in-person, on the telephone, or via email, I would prefer to communicate ____.

Q2: Given the choice of talking to other students in-person, on the telephone, or via email, I would prefer to communicate ____.

Table 1: Results of Student Media Preference Survey

Survey Question	N	In Person (%)	Telephone (%)	E-mail (%)	No preference (%)	Chi-Sqr. Sig.
Preferred way to communicate with the instructor	220	70.9	1.8	20.5	6.8	< .001
Preferred way to communicate with other students	219	63.5	6.4	16.9	13.2	< .001

These research questions met the criteria of being simple and direct. The intent of these questions was to determine 1) do students have a preference in the medium chosen for communicating with the instructor, 2) do students have a preference in the medium chosen to interact with other students, and 3) are the preferences the same. As with some of the prior research summarized above, email was chosen as a surrogate for asynchronous media, in-person was chosen as a proxy for synchronous media, and the telephone was selected to represent mediums that fall in between to two extremes.

A survey instrument was developed to include these two questions. The questionnaire gave the respondent four distinct answer possibilities: in-person, telephone, email, and no preference. The 'no preference' option was included to accommodate those students who are equally willing to use any of the three modes of communication.

The questionnaire was administered to students currently attending classes in a college of business administration which is part of a state supported university. The college only offers undergraduate education and has approximate 1,100 students enrolled. Students taking classes in the college are best described as "traditional," meaning that they are typically in the eighteen to twenty-four year old age group and are working toward their first degree. All students in the business program have at least rudimentary Internet and computer skills, as this is a prerequisite for all business courses. Consequently, the results of this research should not be skewed by students who are averse to using email because they do not understand the technology. In addition, all students and instructors in the college have active email accounts supplied by the university. Most of the students actively use these accounts to communicate with their instructors and other students.

The method of selection for the sample was to administer the instrument during class to sections in the following areas: accounting, computer information systems, management, finance, and marketing. These five areas represent all the majors offered in the degree program. The classes selected also included students from the freshman to the senior classification. Thus, the sample represents a good cross-section of students attending the college. Participation in the survey was totally voluntary and anonymous so, technically, participants self-selected. Two hundred twenty usable surveys were returned. The data from these instruments were coded into SPSS and were analyzed using basic frequency analysis and the chi-square goodness-of-fit statistic. The results of this analysis are shown in Table 1 below.

Table 1 indicates that the answer to the first research question is that students do have a preferred medium when talking with the instructor - they prefer face-to-face communication. The answer to the second question is that they also prefer face-to-face communication when interacting with other students. Both of these results are significant at or below the .001 level for the chi-square goodness-of-fit test. These results, and their relevance to practicing instructors, are discussed in detail below.

DISCUSSION

The results in table 1 support the notion that students prefer the rich-media, synchronous communication provided by face-to-face interaction by a wide margin over the asynchronous lean-media offered by email. This is true for both the instructor (70.9% prefer in-person) and for other students (63.5% chose in-person). Email comes in a distant second with 20.5% preferring the asynchronous medium for the instructor and 16.9% selecting it for other students. Communication via telephone for both questions rated last with only 1.8% selecting it as the media of choice for the instructor and 6.4% for students. This was below

the 'no preference' frequency for both questions, and was a surprising finding given that cell phones are becoming more popular and cell phone use is increasing dramatically.

The data also show two other interesting patterns. First, students must genuinely prefer the rich-media synchronous experience of talking directly to other people over the technology aided substitutes. This is true despite all the problems that face-to-face communication causes by requiring both parties to physically be present in the same place at the same time. This supports media richness theory concerning the instructor, but goes against the theory concerning other students. It is also somewhat counter-intuitive given the busy schedules of the students and the limited office hours provided by instructors. From a course design standpoint, this finding indicates that instructors should include more office hours for local students and more media-rich synchronous options for remote learners to satisfy this need.

A second intriguing finding is that the ranking of preferences for both questions are identical and the actual frequencies for each media type are also very close. Evidently, students have a distinct pecking order for communication media and this order is unchanged regardless of who they are talking to or what they are talking about. Again, this goes against media richness theory and also contradicts some of the socio-emotional theories. The only part of the comparison of frequencies between the two questions that was as expected is that telephone preference among students is favored more than student-to-instructor telephone usage. However, the actual frequencies involved are still quite low (1.8% for instructor and 6.4% for student) and each are less than half of the 'no preference' option. Again, from a course design perspective, this suggests that instructors should continue to provide the asynchronous tools for students, but should also enhance the availability of the synchronous rich-media to provide a more conducive learning environment for both local and distant learners.

CONCLUSION

University education is in the process of evolving from the traditional lecture-based methods to more technology-enhanced virtual methods. This allows universities to service both a local audience of students in the classroom and distant learners around the globe. One problem this creates is determining the preferred way for students to communicate with the instructor. There are a variety of possibilities ranging from lean-media asynchronous methods such as email all the way to rich-media synchronous methods like face-to-face interaction. A related problem is to ascertain how students prefer to communicate with each other so that group projects and class discussion can be supported effectively. An examination of the literature concerning media selection preference revealed numerous theories, but few conclusive results. Because of this, an empirical research study was devised to address these questions.

A total of 220 undergraduate students participated in the research study. Analysis of the data from the survey indicated that most students prefer to communicate in-person with the instructor (70.9%) and with other students (63.5%). Only about one-fifth of the students said they preferred to use email to communicate with others. The remainder of the students said they either preferred the telephone or had no preference. In summary, these results indicate that students do have strong media communication preferences and they overwhelmingly prefer the rich-media synchronous methods as represented by face-to-face interaction over asynchronous methods.

Instructors designing courses for a mixed audience that includes both local and distant learners should bear these results in mind. Specifically, the instructor should attempt to increase the amount of time available for face-to-face communication with local students. This could be done through extended office hours, study sessions, or any other way that makes the instructor more available. At the same time, the instructor should add as many rich-media synchronous options as possible for distance learners. These media options should allow communication both with the instructor and between groups of students. Finally, email is still an important tool, but it should not be the only communication medium available to remote students.

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