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ELECTRONIC MAIL: A USEFUL COMMUNICATION TOOL FOR THE COLLEGE STUDENT

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ABSTRACT

Describes an exploratory survey of e-mail use pattern and attitudes towards e-mail among students at the California State University. On average students sent three and receives four messages per day. The results indicate that students felt that e-mail use was useful in the classroom to communicate with their instructors and classmates. They also felt that e-mail would be an appropriate medium to send brief messages and lengthy assignments. Students were comfortable with their keyboarding skills and were confident about using computers and found the system use-friendly. Ratings on computer anxiety was found to be positively correlated to e-mail use ($r.=.47$, $p<.05$) as well as system user-friendliness and e-mail use ($r=.38$, $p<.05$).

Keywords: Electronic mail; E-mail; Communication apprehension; Computer anxiety.

INTRODUCTION

Electronic mail (e-mail) is the result of the coming together of computer and communications technologies. The price/performance ratio of powerful microcomputers and the cost/benefit ratio of electronic data communications have propelled the widespread growth of e-mail. Research institutions and individual researchers in the scientific community were among the early and prolific users of e-mail. In the present decade educational communities have explored the potential uses of e-mail for not only research but also for college administration and classroom instruction. Universities are trying to gain a competitive edge with campus wide communication networks by connecting computers in dormitory rooms, faculty and administration offices, classrooms, libraries, and laboratories and also by linking to local, national and international networks.

Electronic mail is a collection of computer programs that facilitate the exchange of electronic documents via a computer. An electronic mail document, also known as a file, contains only text-based characters without any sound or image components. The documents are exchanged at very high speeds from one computer processable storage location to another storage location on another computer. The storage locations are called “electronic mail boxes”. Four main components are essential in order to establish an electronic communication: a computer, a modem, communication software and access to a network.

Electronic mail has the potential to support four major user groups in academic settings: teachers, researchers, students and administrators. The importance of using computer mediated communication technologies for instructional purpose is gaining new proportions. For instance, e-mail has been found useful in communicative writing (Miyao, 1996) and in teaching graduate courses (Powers and Mitchell, 1997; McLellan 1997). The primary reason for this has been the Internet, which represents an array of technologies that could be incorporated in the college curricula. Some of these are: one to one e-mail, group e-mail, electronic chat rooms, listserves and the World Wide Web.

In the college curriculum the use of electronic mail can augment traditional instructional process. Some of the benefits that can accrue to the instructional process as documented by D'Souza (1992), Hawley (1996), Dowden and Humphries (1997), Topper (1997) are: 1) personal attention to students with specific learning disabilities or other socio-economic constraints; 2) faculty can address individual student concerns without taking up valuable class time while maintaining a student-centered class; 3) instructors can (i) reply to queries and requests from students regarding course content; (iii) provide advice and guidance to students; (iii) provide feedback and assist students in solving home-work/class-work problems; (iv) accept home work attached to e-mail messages and return results; (v) allow students to form special interest groups and supervise them; (vi) can establish electronic groups to work on class projects; (vii) notify individual students or an entire class of their absence in emergency situations; and 4) students can notify instructors of emergencies and absences on examination dates.

Besides augmenting the traditional instructional process, e-mail can enrich a student's learning experience by opening a plethora of opportunities for them. For example, Couples et all (1996) recount their experience of teaching political theory for students at distant locations. The courses were fully Internet based, i.e. students could take the course from anywhere if they had access to the Internet. Some of the implications of virtual learning are: (1) the student's learning environment extends beyond the confines of a traditional class room, distance learning becomes possible, and working students can achieve a comfortable balance between work and school; (2) students can gain access to information resources that go beyond text books, audio, video and educational software. They can also access various kinds of databases and libraries to obtain relevant research material.

USES OF ELECTRONIC MAIL

In the context of electronic mail several factors, which can hasten its acceptance and influence its use have been identified in the literature. Some of these factors are discussed in the next few sections.

Enabling Skills

Individuals lacking the basic skills required for e-mail use may not be in a po-

position to make a fair assessment of e-mail and may be inhibited from using it.

Keyboard expertise, computer experience and e-mail experience have been found to be significant factors (Fulk, Schimitz and Steinfield, 1990; Schmitz and Fulk 1991). Electronic mail use was found to be directly linked to experience with the medium and knowledge mastery (Fulk, Schmitz and Steinfield, 1990). Schmitz and Fulk (1991) found that medium expertise had a direct relationship to medium usefulness. A negative relationship between a lack of computer experience and e-mail experience was supported by their data. Trevino & Webster (1992) and Schmitz and Fulk (1991) argue that the ease of use and computer skills are directly related to e-mail usage. This leads to:

Question 1: Whether students with experience of computer, keyboard and e-mail experience will be inclined to use e-mail more than others.

Computer Anxiety

Fear of the computer can limit its use and can be an obstacle to productivity gains (Igbaria and Parasuraman, 1989; Parasuraman and Igbaria, 1990; Igbaria and Chakrabarti, 1990). Igbaria and colleagues argue that demographic variables, such as age, education and organizational level; personality traits, such as trait anxiety, math anxiety and external locus of control and cognitive style such as feeling-thinking and intuitive sensing have been found to be directly related to computer anxiety and attitude toward microcomputer use.

Prior studies in the area of computer anxiety and computer use have uncovered some interesting findings which can serve as a basis for positing a relationship between computer anxiety, system interface and e-mail use. For instance, quality of the software system, management support, computer training and experience have been found to be positively related to e-mail use and negatively related to computer anxiety (Igbaria and Parasuraman, 1989; Parasuraman and Igbaria, 1990; Igbaria and Chakrabarti, 1990).

In a more recent study by Elasmar and Carter (1996) about e-mail use in the college curriculum the issue of computer anxiety was examined. These researchers found a negative correlation between computer anxiety and intent to use e-mail. They argue that computer anxiety can be a barrier to e-mail adoption. Further evidence of support for this issue can be found in a study conducted by Appelbaum and Primmer (1990). They define a term called "Cyberphobia" to describe the presence of certain conditions of fear. They are: fear of change, fear of loosing the status of power, fear of interacting with computers, fear of the impact of computer on society, fear of isolation, fear of failure and fear of job displacement. Besides these symptoms, the presence of certain physical conditions such as sweaty palms, dizziness, shortness of breath and a racing heart beat are argued to lead to the fear of using a computer. This raises the following two questions.

Question 2. Does computer anxiety affect students' e-mail use ?

Question 3. Does system user-friendliness affect students' e-mail use ?

Communication Apprehension

Electronic communication offers the possibility of increasing the volume of communication from lower levels to higher levels in an organization (Sproull and Kiesler 1991; Tyran et all, 1992). Sproull and Kiesler (1991) argue that electronic communication can alleviate employee reluctance to talk, which may arise from communication apprehension, evaluation apprehension, gender, position and title. These researchers found that e-mail was used to communicate, negotiate, solve problems or say something negative to individuals who were in higher positions in the organizational hierarchy. D' Souza (1991) examined the issue of communication apprehension in a classroom environment. In this study, e-mail was used to communi-cate matters relating to the course, subject, class discussions and term papers. D'Souza (1991) found that the e-mail system helped the shy or the passive students overcome communication anxiety, which can be present in a classroom. Students sent e-mail to communicate with the instructor and classmates and expressed themselves both positively and negatively. Elasmar and Carter (1996) found that students sent more e-mail messages to fellow students than faculty for pleasure-based conversations.

Question 4. Will students who are apprehensive in communication situations perceive e-mail to be useful?

Communication Etiquette

Patterns of responsiveness and communcation etiquette can be considered as aspects of social behavior capable of influencing the perception of communication media and use. Communication cannot be considered successful if senders and receivers do not share the same definition of responsiveness in a communication situation (Markus, 1987). Huber and Daft (1987) found fast communication to be rich communication and that it depended on being able to keep up with scheduled meetings and returning phone calls in a timely manner. Markus (1987) noted that face to face communication can fail if the receiver dodges face to face meetings or refuses to answer phone calls even though the features of the medium may be considered most appropriate for the communication situation at hand. In the case of e-mail in academic settings, e-mail may not be useful to students if members of the faculty never check their e-mail messages or ignore messages from students or do not have access to e-mail at all. Hence, in selecting a medium of communication it is important to determine if the recipients are also likely to use the medium. Topper (1997) conducted a study to compare discourses in face to face meetings and e-mail posting to a discussion list. His findings suggest that unlike face to face conversation, an e-mail conversation can only take place when an opening message is responded to by another participant i.e., giving access to the "virtual floor". As Markus (1987) aptly remarks, a common definition of responsiveness can result in a

critical mass of users which is very essential for e-mail adoption and use. This gives rise to the following question.

Question 5. Do students feel that their instructor is responsive to their e-mail messages?

The Need to Overcome the Constraints of Distance and Time.

Geographic distances can encourage the use of electronic mail because of its asynchronous nature. Face to face communication is not possible when people are geographically apart. Telephone conversations can take place across geographical distances but can be constrained by time zones. Written memos and documents which are not restrained by time and distance can be slow (Sproull and Kiesler, 1991). In academic settings, teaching schedules of instructors are of a limited nature. Apart from the class meeting times and office hours that instructors have to maintain, they are free to spend the rest of their time to pursue their research activities. Similarly, the campus life of a student is also varied. Students can be in classes in different parts of the campus or they may be in the library or if they are working students they may find it difficult to meet the instructor in person. Reaching professors personally or by phone can be difficult. Therefore this raises the following two questions:

Question 6. Can e-mail be useful to communicate with people whose working hours are different?
Question 7. Can e-mail be used for not only brief messages but also for submitting projects and assignments?

Critique of the Literature

A review of the literature in the area of e-mail use shows that there was considerable interest in computer-mediated communication technologies in general and e-mail in particular from the late eighties. During this period e-mail was a novelty and business organizations and research communities were among the early adopters of this technology. Researchers from diverse backgrounds have brought their understanding of theories and concepts to bear on the issues of e-mail use and impacts and have raised several interesting questions. Some of the studies have been seminal works and cited in this study. E-mail has been and will continue to engage the attention of researchers as business organizations and educational institutions continue to accept and adopt and use it extensively.

Deloughry (1996) reports that campus computer use is increasing, but not as fast as in the previous years. *The Chronicle of Higher Education* in its Seventh Annual campus computing survey found the adoption rate of high technology tools for college instruction has slowed. Although technology centers serving faculty are common, most institutions have few formal rewards for faculty use of technology. The California State University, which is the site under investigation more or less fits this description since it was only in the late 1996 that it has been making its transition into the world of widespread electronic communication.

An obvious point that needs mentioning is that, in the face of growing digital communication in the business world it is very

important that students become familiar and competent in using electronic communication tools. An e-mail system would be the first port of entry for students to receive and produce digital information. Therefore, in the light of the above mentioned issues, it is worthwhile exploring the factors that lead to the adoption and implementation of e-mail in this particular University.

PURPOSE OF THIS STUDY

This study is an exploratory survey of e-mail use patterns and attitudes toward e-mail among students. As part of a campus-wide transition to computer mediated communications, the administration of the California State University on the west coast had just implemented an e-mail system and given access to e-mail to students and faculty. This meant that anyone with a computer account or access to the campus e-mail system could send and receive messages to any other member on the network. Students were assigned e-mail addresses at the time of registration and members of the faculty received these addresses along with their class rosters. By exploring student attitudes and use of e-mail, the study hopes to shed some light on the factors that may influence e-mail use in a college curriculum. Results from this study can help administrators in their implementation process.

METHODS

The purpose of this survey was to collect data about students' e-mail use patterns and their perception of e-mail usefulness in the college curricula. The study was conducted during the spring semester in 1997. Subjects consisted of undergraduate and graduate students. The subjects studied were students enrolled in one section of Introduction to Microcomputers CIS 260, two sections of Introduction to COBOL programming CIS 280 and one section of a course in Telecommunication at the graduate level CIS 555. Students were given usernames and passwords at the beginning of the semester to access the University's electronic mail system. Students could access the system from either the campus computers or from their home computers.

A paper and pencil questionnaire was distributed to every student in the class on the day of the final exam and was collected right away. Every student volunteered to answer the questionnaire. This gave a response rate of 100%. In all, 131 students responded to the survey. Table 1 summarizes the composition of the students in the sample.

Table 1: Sample Composition.

Course	Students
CIS 260 Introduction to Microcomputers	33
CIS 280 Introduction to COBOL	67
CIS 555 Telecommunications	31
Total	131

A review of literature in electronic mail use resulted in the selection of the study variable of e-mail use in the class room.

Based on this a questionnaire was developed to determine the biographic profile of the students and their perception of e-mail usefulness. Section one contained items to determine the biographic profile of the student such as year in school, major, ethnicity, age, gender, work experience, job level, computer experience, computer ownership and access to the Internet. Section two contained items to measure the student's perception of e-mail use in general; e-mail use regarding this particular instructor and the student's keyboard skills and system user-friendliness. In section 2 questions 1 through 5 were used to measure the student's e-mail use such as using a site for accessing e-mail, number of messages sent and received per day, frequency of using e-mail, and initiating an e-mail conversation. Following these questions, statements describing the conditions of student environment were stated and students were asked to express the extent of their agreement to these conditions. Responses to these statements were captured on a Likert scale ranging from (1) Strongly Disagree, (2) Disagree, (3) Agree, (4) Strongly Agree.

A frequency distribution was done for all the study variables in order to obtain descriptive information about the entire sample. A Pearson correlation analysis was done in order to determine a linear relationship between some of the variables and e-mail use.

RESULTS.

About 16% of the students had on the average five years of computer experience, 91% of the students owned a computer and 75% had access to the Internet. While 16% of the students had on the average five years of work experience, more students had a maximum of three years of work experience. Only a few students had more than three years of work experience.

Table 2: Biographical Profile

Computer Experience	16%
Computer Ownership	91%
Internet Access	75%
Work Experience	16%
SITE	
Home	41%
School	31%
Work	12%
More than one site	15%
GENDER	
Male	54%
Female	46%
Other	39%
MAJOR	
Information Systems	50%
Finance	11%
AGE	
18-28	79%
29-39	16%
40-49	4%

A total of 41% of the students accessed e-mail from home while 31% accessed from school, 12% said that they had access

from work and 15% said that they used more than one site as a point of access.

About 54% of the student sample consisted of male students and 46% of the sample were female students. While Information Systems Majors accounted for 50% of the sample other Majors such as Management Science, Finance, Accounting, Management and Economics accounted for more than 11% of the sample. A total of 79% of the students were between the ages of 18 to 28, 16% were between 29 and 39 and 4% of the students were between 40-49.

Table 3 summarizes the findings of student's general e-mail behavior. On average students sent three messages per day and received four messages. When asked how frequently they attend to their e-mail messages on a scale of 1 to 4 (1=Never, 2=Once, 3=two to four times, 4=Five times or more), the mean response was 2.14 indicating at least once a day. When asked how often they initiate an e-mail conversation on a scale of 1 to 4 (1=Never, 2=Occassionally, 3=Often, 4=Very often), the mean response was 1.99 indicating that they occasionally initiated e-mail conversations

Table 4 summarizes the student's perceptions of e-mail usefulness as a communication tool. Students were asked to rank the extent of their agreement on a scale of 1 to 4 (1= Strongly Disagree, 2=Disagree, 3=Agree, 4=Strongly Agree) to the condi-

Table 3: Communication Pattern Among Students

	CIS 260	CIS 280	CIS 555	All
Number of messages sent per day	1.39	2.88	4.26	2.82
Number of messages received per day	1.82	3.14	6.68	3.68
Frequency of attending to e-mail on a working day	1.88	2.04	2.6	2.14
Frequency of initiating e-mail on a working day	1.79	1.99	2.19	1.99

Table 4: Perception of e-mail as a Communication Tool

	Mean	Stand. Dev.
I found e-mail to be effective to communicate with this instructor.	3.0	.78
I found e-mail to be effective to communicate with fellow students	3.0	.85
E-mail should be used only for brief messages	2.5	1.0
E-mail is useful for communicating with people whose working hours are different from mine	3.0	1.0
E-mail is useful for overcoming inhibitions in face to face communication	2.0	.76
On the whole I would consider my keyboard experience to be good	3.0	.63
In general I am anxious when I have to use computers.	2.0	.93
The e-mail system I use is very user-friendly.	3.0	.65

1=Strongly Disagree, 2=Disagree, 3=Agree, 4=Strongly Agree

tions that affect them. The results indicate that the students were in agreement with the question of using e-mail to communicate with the instructor; as well as with people whose working hours were different from theirs; to the question of their keyboard experience being good and the question of system user-friendliness. Students were in disagreement as to the question of using e-mail to overcome inhibitions in face to face communication; to the question that asked them if they were anxious in using computers and to the question of using e-mail for lengthy assignment versus brief messages.

Correlations.

Total e-mail use was calculated as the sum of the number of messages sent and received per day. Using e-mail to overcome the constraints of time was positively correlated with e-mail use ($r = .33$, $p < .05$). Wanting to use e-mail to overcome the inhibitions in face to face communication was positively correlated with e-mail use ($r = .50$, $p < .05$). Students perception of their keyboard skill was positively related to e-mail use ($r = .43$, $p < .05$). The relationship between computer anxiety and e-mail use and system user-friendliness and e-mail use was also positively related. In the case of the former, $r = .47$, $p < .05$ and in the case of the latter, $r = .38$, $p < .05$.

DISCUSSION

On the whole an analysis of the results from the study reveals that the students felt that e-mail was useful in the classroom to communicate with their instructor and classmates. Further, they also felt that e-mail would be an appropriate medium to not only send brief messages but also lengthy assignments. Computer ownership and access to the Internet almost seems universal although only 16% of the students had some form of computer experience or work experience. The fact that on average students received at least three messages a day and sent four messages a day and attended to e-mail at least once a day and initiated e-mail conversation occasionally is very encouraging. Students were comfortable about their keyboarding skills and were confident about using computers and found the system to be user-friendly.

Perceiving e-mail as useful can hasten its use, adoption and implementation. Barriers to any of these can result in e-mail becoming a wasted technology. Sproull and Kieslter (1991) note that failure of e-mail use can result in "organizational ghettos that are information poor."

Lack of certain basic skills such as keyboard expertise and computer expertise can be barriers to use. The positive relationship ($r = .43$) between keyboard experience and e-mail use among the respondents is consistent with earlier findings by Schmitz and Fulk (1991). These researchers found keyboard and computer expertise to be significant factors that can influence use.

Computerphobia and anxiety have engaged the attention of researchers for quite some time. While anxiety can have a nega-

tive effect on e-mail use and while system user-friendliness has been thought to intervene in this process and reduce anxiety levels, the positive association between anxiety and e-mail use (r = .47) found in this study shows students who are not anxious about interacting with computers feel motivated to use e-mail. Further, they are quite satisfied with the system that they use and this feeling can also enhance e-mail use as evidenced by the positive relationship between system user-friendliness and e-mail use (r =.38). In the context of computer anxiety, results from this survey are contrary to findings of Parsuraman and Igbaria (1990) and Elasmar and Carter (1996). A possible explanation for this is that the majority of the students surveyed were Information Systems majors who expect to use computers in their careers. And so, a favorable attitude towards computers among them can be expected.

Although the students in this sample did not seem to be apprehensive in communication situations yet they perceived e-mail to be useful to overcome apprehensions. Evidence for this comes from the positive relationship between communication apprehension and e-mail use (r = .50). Results from this study are in support of the findings in the literature.

Patterns of communication responsiveness can influence media choice. If senders and receivers are not responsive to e-mail then a critical mass of users would not exist. And so, e-mail may not be useful. As Markus (1987) and Elasmar (1993) note senders and receivers must share the same definition of responsiveness in order to create a critical mass of users needed for system adoption. In the context of the present study, students felt that their instructor was responsive to their messages and so there was a shared understanding of e-mail responsiveness.

CONCLUSION

This study was an unobtrusive study of student perception of e-mail usefulness in classroom settings. The natural setting greatly enhanced the basis of external validity. In studies trying to explain communication patterns and behaviors field settings are more appropriate than experimental designs. The fact that the factors chosen for examination are deeply anchored in theory lends some protection to the problem of generalisation (Kidder & Judd 1986). Results from this study must be interpreted with caution due to the high level of computer literacy among the users in the sample. This could represent a biased estimate of the population. Further the entire gamut of social interaction cannot be captured by survey methods. The survey instrument captured perceptual data in which measurement errors in responses can place limitations on the study. Although, the survey results provide clear support for some of the questions in this study, they barely scratch the surface of what are important influences on media perceptions and use in this University. The factors that influence e-mail use in this University's School of Business and Economics are generalizable within the school. For instance, a completely different set of predictors can

emerge when Liberal Arts Majors are surveyed.

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