INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

ProQuest Information and Learning
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
800-521-0600



Downloaded from SHAREOK. Persistent Handle URL: https://hdl.handle.net/11244/362

UNIVERSITY OF OKLAHOMA
GRADUATE COLLEGE

IMPACT OF ELECTRONIC MAIL COMMUNICATION IN A WORLD-WIDE K-12 SCHOOL SYSTEM EVALUATED ON THE BASIS OF EMPLOYEE ATTITUDES AND PERCEPTIONS

A Dissertation

SUBMITTED TO THE GRADUATE FACULTY

in partial completion of requirements for

the degree of

Doctor of Philosophy

by

ROBERT W. GAHAGAN

Norman, Oklahoma

2001

UMI Number: 3023444

UMI®

UMI Microform 3023444
Copyright 2001 by Bell & Howell Information and Learning Company.
All rights reserved. This microform edition is protected against
unauthorized copying under Title 17, United States Code.

Bell & Howell Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

© COPYRIGHT BY ROBERT W. GAHAGAN

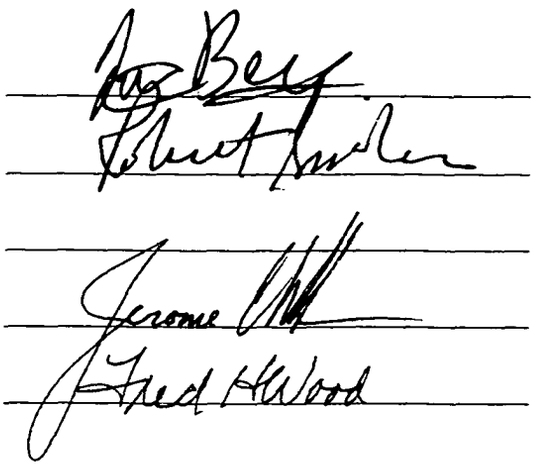
2001

All Rights Reserved

IMPACT OF ELECTRONIC MAIL COMMUNICATION IN A WORLD-WIDE K-12 SCHOOL SYSTEM EVALUATED ON THE BASIS OF EMPLOYEE ATTITUDES AND PERCEPTIONS

A Dissertation APPROVED FOR THE
GRADUATE COLLEGE

BY



ACKNOWLEDGMENTS

Many people have helped me through this endeavor and deserve a sincere thank you:

I would like to particularly thank Dr. Fred Beard who with patience and perseverance has guided me through this dissertation. I would also like to thank my doctoral committee: Dr. Robert Swisher, Dr. Jerome Weber, Dr. Fred Wood, and Dr. Jay Smith for inspiration and guidance in getting started.

Numerous individuals have been directly involved in providing inspiration and technical expertise. I would like to thank Phyllis Smith, Dr. Jerry Ledlow, Dr. Cebrun Gaustad and the entire overseas OU cohort group for their inspiration, expertise, and support during this long process.

My family, Rob, Molly, Kelly and Erik, and especially Mary Ann who pushed me along and listened to all of the trials and tribulations of a doctoral student.

The many friends and colleagues around the world, who have helped in a multitude of ways.

The Department of Defense Schools that has been my professional home for the last thirty years.

Thank you All!

TABLE OF CONTENTS

SECTION: PAGE NUMBER

TITLE i
ACKNOWLEDGMENT iv
TABLE OF CONTENTS v
LIST OF TABLES ix
LIST OF ILLUSTRATIONS xi
ABSTRACT xii
Chapter
I INTRODUCTION 1
Summary 4
II REVIEW OF LITERATURE 6
Building Collegiality and Collaboration 6
Summary 12
E-mail and its Role in Organizational Communication 12
Summary 18
E-mail Communication and Media Richness 18
Summary 29
Electronic Mail Study 29
Summary 29
III THE RESEARCH PROBLEM 31
Statement of the Problem 31
Research Questions 32
Definition of Terms 33

IV RESEARCH DESIGN 36
General Methods and Procedures 36
Research Population and Setting 37
Background on Research Site 37
Organizational Structure of the Research Site 37
Early E-mail History in the Organization 38
Sampling Frame, Selection and Sample Size 40
Pilot Study 41
Survey Instrument 42
Survey Procedure 48
Treatment of Data 49
Assumptions 51
V FINDINGS 52
The Sample 52
Survey Response Data 54
Survey Data Analysis 55
Research Questions 59
1. Do Organizational Members Use E-mail to Collaborate with Peers 59
2. To What Extent Do Organizational Members Believe that Use of E-mail to Communicate with Non-organizational Members is Important? 63
3. Which Category of Organizational members uses E-mail More? 65
4. Is There a Relationship between Frequency of E-mail Use and Communication between Individuals Separated by Multiple Layers of the Organization? 67
5. Is There a Relationship between Frequency of E-mail Use and an Employees' Belief that They are Factually Informed about Important Organizational Issues? 72

6. Which Category of Organizational Member has the Most Favorable or Unfavorable Attitude towards the Use of E-mail in Accomplishing Job-related Work? 76
7. Are Employees Concerned about Possible Organizational Constraints in Using E-mail to Contact others Outside the Organization? 79
8. Are Organizational Members Concerned with the Richness of the Medium when using E-mail to Communicate? 81
Comments from Survey 80
E-mail's use in Collaboration and Networking 83
Communication between Layers of the Organization 84
E-mail as a Communication Medium 84
VI CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH 83
E-mail's Role in Collaboration and Network Building 87
Conclusions on E-mail's Use to Collaborate with Peers and the ..... Importance of this Collaboration 87
Conclusions on the Importance of E-mail Communication with those outside the Organization 89
E-mail's Role in Organizational Communication 91
Conclusions on the Category of Organizational Members that uses E-mail more than other members 91
Conclusions on a Relationship between Frequency of E-mail Messages sent per day and Communication between Individuals Separated by Multiple Layers of the Organization 93
Conclusions on a Relationship between the Frequency of E-mail Messages Sent per day and the Employees' Belief that They are Factually Informed 92
Conclusions on the Category of Organizational Member that has the Most Favorable or Unfavorable Attitude towards the Use of E-mail in Accomplishing Job-related Work 96

Employee Attitudes towards E-mail as a Communication Medium 98
Conclusions on Employee Concerns regarding Possible Organizational Constraints in Using E-mail to Contact others Outside the Organization. 99
Conclusions on Organizational Member's Concern for the "Richness" of E-mail when using E-mail to Communicate 100
Summary 102
Limitation of the Study 104
Recommendations for Future Research 106
APPENDIX A - SURVEY FORM 108
APPENDIX B - INTRODUCTORY LETTER 114
REFERENCES 115

LIST OF TABLES

1. Population Sample Characteristics 54

2. Survey Scale and Variable Characteristics: Mean. SD, and Scale Reliability Estimates 57

3. Frequencies and Percentages of Positive Responses, Mean, SD, and Median for use of E-mail in Collaboration 61

4. Frequencies of Positive Responses and Percentages, Mean, SD, Median of E-mail Use to Communicate With those Outside the Organization 64

5. Median Scores for Numbers of E-mail Sent and Received per Day and per Week by Job Category 66

6. Correlation Analysis of the Amount of E-mail Sent per Day and Communication between Organizational Layers 68

7. Test for Equality of Mean on the Number of E-mail Sent per Day and Interactions with a Supervisor 71

8. Correlation Analysis of the Amount of E-mail Sent per Day and being Factually Informed 73

9. Test for Equality of Mean on the Number of E-mail Messages Sent per Day and being Factually Informed 75

10. Frequencies and Percentages of Positive Responses, Mean, SD, and Median Scores of Respondent's Attitude Towards E-mail Use 77

11. Contingency Analysis Relating Job Category and Attitude towards the Use of E-mail 79

12. Frequencies and Percentages of Positive Responses, Mean, SD, and Median on Concern for Organizational Constraints 80

13. Frequencies and Percentages of Positive Responses, Mean, SD, and Median on E-mail Richness 82

LIST OF ILLUSTRATIONS

Figure 1

Media Richness Scale 21

ABSTRACT

This study explores the impact of electronic mail (e-mail) communication in the overseas Department of Defense Dependents School system. Employees' attitudes and perceptions on the use of electronic mail to communicate and develop collegial interactions both inside and outside the system are documented through a survey instrument and data analysis. This research study addresses three general areas of electronic mail usage in the school system. The areas of study include e-mail's role in building collegiality, collaboration, and communities of learners; e-mail's role in flattening organizational communication; and, the employee's attitudes and perceptions towards the use of e-mail as a communication medium. The findings demonstrate considerable use of e-mail in networking, collaboration and in communication between layers of the organization. E-mail use in collaboration after training or workshop experiences was not as evident. A number of respondents preferred e-mail to other forms of communication but many believed they needed to adapt their writing to accommodate their audience. The resulting information will be useful in establishing and revising e-mail policy and can be used to aid in the design of training models and operations that maximize the use of this new communication technology.

IMPACT OF ELECTRONIC MAIL COMMUNICATION IN A WORLDWIDE K-12 SCHOOL SYSTEM EVALUATED ON THE BASIS OF EMPLOYEE ATTITUDES AND PERCEPTIONS.

CHAPTER I

INTRODUCTION

Electronic mail (e-mail) has become an integral part of personal and organizational communication. E-mail has given individuals the opportunity to connect to friends, colleagues, organizations, and information in a way not seen since the invention of the telephone. Unlike the interruptive nature of a ringing telephone that demands attention, e-mail is not immediately intrusive. In fact, part of e-mail's attraction was that it is passive or "asynchronous." In other words, you do not need to receive the message in real time. Messages are sent, received, and read at the receiver's or sender's leisure. E-mail had been reported to be an efficient way to conduct organizational business and a convenient way for employees to stay connected with colleagues and friends. Computers with e-mail connections and capabilities were found in schools, libraries, homes, and organizations around the world. E-mail addresses had become the link that connected people and organizations. E-mail addresses

were often exchanged instead of a telephone number during the initial meeting of people.

E-mail was defined as being an asynchronous, electronic interchange of information between persons, groups of persons, and functional units of an organization. For purposes of this study, e-mail was further defined as an electronic telecommunication mechanism providing for the creation, distribution, consumption, processing, and the storage of this information.

The popular press reported the volume of e-mail messages transmitted around the world has nearly doubled each year (2000). With the proliferation of e-mail exchanges came concerns on how e-mail was used to convey information within organizations. A number of these concerns were focused on how an organization used e-mail to communicate with employees, how they networked individuals for collaboration and peer interactions, and how e-mail was used to keep employees informed. Did employees actually use e-mail to connect to colleagues and build networks of people with common interests and needs? Did employees and employers use e-mail to correspond, share, and transmit information between layers of the organization? What were the users' attitudes towards e-mail when using and choosing a medium to transmit information both from inside and outside the system?

This study was designed to explore the impact of e-mail on organizational communication in the Department of Defense Dependents Schools (DoDDS). This school system has schools and an organizational

infrastructure located around the world. DoDDS is an American public school system located in 19 countries around the world. At the time of this study, it served approximately 100,000 students and was staffed with approximately 12,000 employees. These employees, with the exception of some host-country support staff, were all United States citizens. Where professional certification was required, they were certified educators and operate under the auspices of the North Central Association of Schools and Colleges (NCA). This unique segment of federal public education consisted of approximately 190 elementary, middle, junior high, and high schools and their related administrative offices.

This study investigated the impact of the recent implementation and use of a system-wide, e-mail network through a survey instrument that asked and recorded the employees' attitudes and perceptions towards their use of e-mail. The research explored the e-mail experiences of employees in a school system that was attempting to change from a bureaucratic, industrial age, scientifically managed administrative model to a system promoting collaboration, cooperation, and an exchange of information between organizational layers. This systemic change developed and supported a new communication paradigm. This paradigm involved moving the system toward a networked, information age system that supported school change, collaboration, and communities of learners through information sharing. This study addressed the use of e-mail by both the organization and the employees

to build cooperation and collaboration in the school system. E-mail's use to "flatten" or encourage vertical communication between employment strata in the organization were investigated. The study also explored the user's attitude towards the use of e-mail as a communication medium.

This research was limited to the e-mail format and addressed the Internet only as an electronic channel for the conveyance of e-mail messages. Information sharing on the World Wide Web was not part of this study.

Employee perceptions and attitudes towards e-mail and its use in collaboration and organizational communication were evaluated through a survey instrument. Through this instrument and the resulting statistical analysis, this study explored the impact of a significant advancement in communication technology on the way employees and the organization communicated.

Summary

From an internal mandate from the school system's leadership, as well as an endorsement by the President of the United States to create a global village through opportunities provided by network connectivity, electronic mail was destined to be a critical component in the organization's communication process. The increased role of e-mail in developing this global village raised questions of how to utilize this global connection to communicate with employees in the system and with others around the world. Added to this communication challenge, came the ultimate challenge of how to best use this

connectivity to provide improved educational opportunities for the students and teachers.

Along with this recently installed e-mail network had come questions that required answers if the full potential of e-mail was to be realized. This study provided exploratory data helpful in formulating and implementing e-mail policies in a school system or an organization.

As had been stated before, questions such as the following deserved serious contemplation and exploration: Does the introduction of e-mail change how the employees of a large, worldwide, K-12 school system communicate both organizationally and personally? Have employees used e-mail to build collaboration and communities of learners in the organization? Have new communication patterns developed both horizontally and vertically as a result of e-mail's introduction into the organization. Have employees perceived e-mail as a factor in the system's desire to flatten the organizational hierarchy and empower schools and individuals in decision making? What are the employees' attitudes towards e-mail as a communication tool as it was used in organizational and personal communication?

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of the literature review in this section was to present studies on three areas of e-mail usage: The first area reviewed summarized the literature on e-mail's role in building collaboration in organizations and networking communities of learners in schools. This included the building of learning communities and the use of e-mail to increase an employee's active involvement in the educational process. The second area presented studies on e-mail's role in organizational change and the potential for the flattening of the organizational structure to promote inter-level communication. The third area reviewed literature that defined and classified e-mail's properties as a communication medium and qualified its effectiveness as a communication tool.

Building Collegiality and Collaboration

Accompanying the expansion of e-mail connectivity in school systems had come pressures to use the e-mail medium to build collaboration, collegiality, and networks of teachers, administrators, students, and parents. A number of studies explored e-mail's role in building collaboration in schools and its role in maintaining communities of learners in schools.

Collaboration and the building of collaborative networks among and between workers and parents was an important goal in the school improvement process. For example in Charlotte, North Carolina, Bruns Avenue Elementary school's parents and teachers successfully used an e-mail network to plan and execute an immediate response to the school board's plan to eliminate the magnate school concept–students choose the school they attend by subject emphasis–and the German language immersion–subjects taught in German most of the day–program (Y. Olshausen, Principal, Personal Interview, October, 2001). Computers and computer networks have provided organizations with a technology that has the potential to develop and encourage collaboration among connected individuals and to build alliances of concerned individuals. Through e-mail networks, organizations can promote exchanges between and among work peers, training groups, curricular departments, and support personnel.

K-12 educators–who spend a large part of their day working in classrooms with children–are largely isolated from their peers in the school environment. Educators are given few opportunities throughout their day to work collaboratively with their peers. Many do not have the skills to work in teams and are reluctant to encourage collaboration (Wagner, 2001). Numerous articles had appeared in educational journals on the potential for e-mail to connect teachers, students, and communities. One study suggested receiving e-mail can effect employee attitudes towards the organization by

increasing their informational and emotional connection (Sproull & Kiesler, 1991).

"Work teams" seemed to be the new buzzword not only in business and industry but also in schools. Research supported the effectiveness of the organized teams and cooperative work groups at all levels of the organization. Electronically mediated teams were becoming more important in organizations (Guzzo & Dickson, 1996).

Computers are able to link kindred souls for companionship, information, and social well being. Through electronic computer connections, spatial distance had been removed. Employees were able to network at home, the office, and they could collaborate with others around the world.

Problems with e-mail usage and communication had also been noted. Wellman, et al. (1996) wrote about a dichotomy in computer supported social networks. They suggested networked groups have the potential for more participation, more ideas being offered. less central leadership, and more creativity. However, they warned, there were social costs to involvement in computer mediated communication. Such things as participants having the option of remaining distant, participants feeling freer to "flame" and become upset and use inappropriate language at others because of the weak "virtual" ties, all can detour collaboration. Distance and the asynchronous nature of e-mail does not allow for instant questioning, rebuttal, nor is the ability to repair social damage and fix misinterpretations easily accomplished when using e-

mail. Some individuals believed that in these computer virtual communities, human relations cannot be as intimate, strong, and affect-laden as relations can be in real communities (Rheingold, 1997). E-mail can provide the connection to others, but can also have the potential to allow individuals to isolate themselves. Other studies suggested that just the creation of work groups with little direction or definition of task can often lead to problems.

An answer is perhaps, the designing of tasks that take advantage of group interdependence and have a positive effect on the outcomes they have achieved (Wageman, 1995). Research exploring collaboration in student cooperative work systems in higher education were on the rise. Lentini's (1995) study of engineering workgroups using e-mail at Cornell University suggested that, as we become more familiar with the technology, we will better utilize its capability for supporting change and improvement. Users need training in communication and information seeking in order to effectively use these systems. Programs and technologies need to be able to respond to change and the changing needs of individuals. Leidner and Jarvenpaa (1995) concluded in their examination of learning styles and technology that computer technology can effectively be applied to constructive, cognitive, collaborative, and sociocultural models of learning.

Most of the traffic on the Internet was e-mail–people or organizations connecting to other people or organizations. From this worldwide Internet connectivity had come a number of applications that had at their core the

building of collaboration in schools. Examples of e-mail's use in networking and learning situations included such things as the following: (a) discussion groups–utilizing a facilitator to moderate discussions, subscribers unite with a common interest; (b) online projects such as National Geographic's "KidsNet" brings individuals, and in this case, young students electronically together with a common goal; and (c) teacher to teacher collaboration–sharing experiences with others outside your immediate location (Odvard, 1995). The Arab-Israeli conflict moderated by the University of Michigan was another example of projects involving students and teachers coming together electronically. "Keypals" was an e-mail initiative, which connects classes and teachers, especially at the elementary level, with other classes around the world. Examples in education's professional journals of the increased use of e-mail in education to create both student and teacher learning communities were becoming common. Use of e-mail in teacher training institutions was also becoming a key to connecting people. Paula Parson (1997) in the Journal of Adolescent and Adult Literacy described her efforts to provide meaningful e-mail experiences by connecting future teachers to practicing teachers through e-mail.

Partee (1996) concluded that e-mail used as part of the teaching strategy in the classroom can connect students and teachers as never before. Students can contact the teacher for additional help and clarification and the teacher can contact the student about personal matters or problems. Moeller

(1995) concluded that research has shown collaborative learning can contribute significantly to student learning. Duin and Archee (1996) called for a critical examination of the effects of advanced technologies (including e-mail) on global collaboration and decision making. Increased collaboration using emerging technologies, he believed, would result in the creation of an entirely new ecology. Peha (1995) found in his investigation of how technology was transforming K-12 education that e-mail was the most popular tool at all grade levels. Sharing of common interests with others located away from the site, electronic bulletin boards, and file transfers of information were also given as popular uses of computer-mediated communication (CMC).

Private enterprises have begun to fund educational networks. Peter Copen (1995) described how I*EARN (International Education and Resource Network) had linked students and teachers in 1,000 schools in 25 countries. This network had brought international student exchanges and improved cultural awareness to students. He believed that though the network maybe small now, by applying the technology it has the potential of having teachers and students take up the challenge to build a creative future.

Kimbal (1995) suggested that to promote growth and participant involvement, on-line groups that are formed to support professional development need structure in order to be successful. She suggested that "collaboration facilitators" adopt guidelines when working in the virtual learning environment. These guidelines should identify the purpose of the

network, define roles, create an ambience that nourishes conversation, provide feedback and summaries of discussions, maintain an open flow and interaction of information, and support and recruit new members.

Summary

The literature reviewed on school reform and organizational change has identified work teams, collaboration, and cooperative work groups as positive tools to use to bring about change in schools and organizations. Change can be explored and discussed much faster through e-mail connectivity than through conventional media.

With this increased connectivity to others and organizations, however, can come the potential for isolation and uncontrolled e-mail responses. E-mail has the potential to build inclusive, collaborative, cooperative networks of individuals and organizations. Education and classroom teaching in particular can be an isolating experience. Connecting peers, subject colleagues, students, and parents though e-mail provides opportunities for the building of these learning communities. This proliferation of e-mail connectivity provided a challenge to all participants to take advantage of the technology and use it to improve education and educational experiences.

E-mail and Its Role in Organizational Communication

The second phase of this literature review examined current studies on e-mail's role in organizational change and the flattening of organizational communication. "Flattening" as it was being used in the current literature

referred to the removal of administrative layers and an increase in the communication and the information exchange that took place between subordinates and supervisors in the organization.

When A Nation at Risk was released in 1983, it sounded a warning for educators and the nation. In an alarming way, it declared that education in the United States was in trouble and was in need of systemic reform. Subsequent to this illuminating document being published, numerous studies and reform initiatives have been argued, piloted, explored, and instituted in the nation's schools. There was a call for a major paradigm shift in the way that students are educated. As with most paradigm shifts, it takes years and multiple events to launch lasting reform in schools. Several external forces, however, coincided with this call for educational reform and helped move innovative pilot programs and some enlightened attempts at structural reform along the road of change.

U.S. businesses, too, were finding that organizational reform and the re-engineering of government agendas (Barzelay, 1992) and initiatives were necessary in order for them to compete in an increasingly global economy. In addition to the pressures for reform and change felt by business and industry caused by competition, the personal computer (PC) was also dictating change in the ways they connected to customers and employees. Computers were now also changing how organizations communicated internally and externally and how they gathered information to keep their businesses current in a rapidly

changing world. The old scientific model of a structured, striated, top-down, management could no longer keep organizations on the cutting edge in a changing global economy.

A review of the past organizational structure of large organizations–to include most schools–revealed a central management structure with the centralized decision making body at the top of the organization's composition (Spring, 1994). In this hierarchical, layered, management structure, major decisions and policy statements were sent down the organizational pipeline to the workers. In schools, for example, superintendents gathered information, made decisions, passed them on to an assistant superintendent who in turn passed them on to the school principal, assistant principal, and finally to the teachers. There was little information flow directly from upper management to the workers. There was even less upward flow of communication between the worker (teacher) and the central office. From this old paradigm of the scientifically managed worker, organizations were being thrust by need, technology and competitiveness into a new networked, revolution (Drucker, 1988).

An article in The Distance Learning Resource Network suggested to change a paradigm–which was described as a change in the way we think, what we value, and how we do things–requires the following steps be taken: (a) mobilize commitment, (b) develop a shared vision, (c) foster a consensus among employees, (d) revitalize the institution, and (e) monitor and adjust

strategies (DLRN, n.d.). All of these recommendations are tasks well supported by e-mail connection and a networking of colleagues and the organization.

We had entered what was known as the "information age." Mobilization to accept new technologies and improve the way we communicate was underway. Information and rapid access to information provided a key to successful operations. Our old paradigm of the "top down" organizational structure and management no longer was keeping us competitive in the world of education or business. Improved communication and increased cooperation within the organization were being identified as steps to change and they were instrumental for true reform.

Some futurists proclaimed that, in fact, the "information age" was already over and the "communication age" was replacing what we had just begun to explore in a not very productive way (Betts, 1994). For schools, this slow transition process from "scientific management" to the "information age" and on to the "communication age" was being propelled by the actions of people. These people were developing a vision of the organization that included precepts like cooperation, collegiality, and forecasting what students will need to be able to do in the twenty-first century in order to lead lives as productive, global citizens. Computer-mediated communication, the Internet, and e-mail had become important components in this transition process. E-mail was viewed as the catalyst in organizational change (Stillman, 1996).

According to Binning (1996) the progressive steps in change were as follows: (a) with the installation of technology in the school comes first the "champions"–described as those interested in the technology as an end-in-itself. Next come (b) the "professionals"–those who act as the agents in the implementation of the technology and the change that it will bring to the organization.

Stillman (1996) described e-mail as the organizational glue that could be instrumental in bringing about change in organizations. This change in the ways schools did business and in the way people communicated and taught could be promoted and enhanced by a comprehensive plan for the use of technology and in particular, computer-mediated communication in the organization. Researchers again proclaimed e-mail's democratizing effects and cited evidence that it was flattening the organization (Garton & Wellman, 1993) by promoting team work and increasing the amount of involvement employees had in the decision making process in the organization.

Information was no longer the privilege of the top managers but was available to all connected to the network. Knowing this, organizations needed to adjust how they communicated with their employees it was maintained (Hequet, 1995). Sproull and Kiesler (1991) reported that "status imbalance" could be reduced in computer communication both in style of communication from subordinate to superior and in the behavior about which the subordinate was complaining.

Some, however, cautioned against jumping on the technology bandwagon too quickly. Douglas Noble (1996) suggested education had been taken in by technology before and it had failed to meet expectations. He advised that marketing often pushed education into areas that lead educators away from sound educational practices. Swanson (1993) suggested that organizations need to establish computer-mediated communication policies. These policies should establish organizational boundaries for use of CMC or e-mail. Organizations should, however, first consider and thoroughly understanding the extent of e-mail use in the organization, understand its use as a communication medium among employees, and understand the organization's cultural implications. Orlikowski, Yates, Okamura and Fujimoto (1994) suggested that dynamic organizations implementing e-mail have a responsibility to provide institutional support to advance experimentation, reflection, and changes in the uses to allow for the evolution of the medium. Shaffer (1997) believed that e-mail had replaced the layers of middle managers that frequently blocked communication. Now, he reflected, e-mail allowed anyone to move information through the organization to the highest levels and expect a response. As a result, he suggested organizations should reinvent leadership styles and behaviors. They should also look at systems and practices that communicated what was important or not important in the organization.

In a more holistic approach to e-mail systems, Kling and Jewett (1995) proposed that researchers and promoters of e-mail communication needed to employ what they termed an "open, natural system model" for organizations. In their proposal, they suggested that the open, natural system look at all the social ecology of telecommuters. This social ecology included work-related tasks within the group or organization and also the outside world of users, including family and friends. It was the natural, open system that would have the tendency to humanize the workplace in which we all spend a good part of our lives. E-mail networks had provided opportunities for direct communication between and among employers and employees.

Summary

E -mail's ability to flatten organizational communication and promote an exchange of ideas both horizontally and vertically were explored. Trends in industry and education to promote work teams and develop a shared vision were seen as goals well supported by e-mail networks. The future of many organizations including the public schools depended on their ability to incorporate change. Part of this change was taking advantage of the potential that technology and computer-mediated communication could offer. The paradigm shift emphasizing how communication in a school system was conducted and how schools attempted to institute and promote systemic change could all be enhanced by comprehensive e-mail policies.

E-mail Communication and Media Richness

The third area of interest in this study was the user's perception of e-mail as a communication medium. E-mail networks began in the 1960s and 1970s as a rapid communication link for the Department of Defense and a number of research universities under the name of Advanced Projects Research Agency net (ARPAnet). This was the forerunner of the Internet. This network soon spread to other government agencies and additional colleges and universities around the world. This modest research network, coupled with the widespread use of the personal computer (PC), had expanded to connect schools, businesses, governments, and individuals throughout the world. E-mail channels were estimated to have transmitted 25 billion messages in 1995 (Greengard, 1995). In the year 2000, there were 144 million people (52.0%) in the United States alone connected to the Internet, up from 106 million in July of 1999, a 35 percent annual growth rate (Nielsen, 2000). E-mail was considered the fastest and most efficient way to send messages. E-mail was described as the postage stamp of the technology age. E-mail services could be used for short, telephone type, messages as well as longer messages and documents. Because e-mail was asynchronous, it could eliminate the telephone tag phenomenon that often occurs with telephone calls. By being accessible and retrievable in a mailbox, it provided the option of receiving correspondence when you have the time or opportunity to "pick-up" the message. Because the computer stored e-mail addresses in a searchable

database there was no need for manual searching of telephone numbers in a desktop file. E-mail was not intrusive. Messages did not demand to be opened immediately like a ringing telephone demands to be answered. E-mail could also provide a "hard-copy" as well as an "electronic copy" for personal and organizational records

With all of these seeming advantages, information obtained from research on "media richness" concluded that electronic mail did not provide the same richness as other forms of communication such as face-to-face meetings or even the telephone with its verbal cues. Despite this apparent weakness, e-mail had become an essential player in organizational communication. What made e-mail so popular despite the identified weaknesses? Early research and several recent studies that define and classify e-mail as a communication medium helped to answer that question. In a comprehensive look at e-mail and its use as a communication medium, it was necessary to review briefly the early literature on one specific aspect of communication theory–media richness. A number of early studies speculated on the quality of various communication media. In those studies, we can find information that applies to electronic mail.

Robert Lengel and Richard Daft (1986) originally proposed a media richness theory to answer questions about how organizations processed information and the quality of the medium used in that communication. Media richness, as they proposed it, ranked different communication media on a

linear continuum. The media richness continuum ranged from what they described as a rich medium such as direct communication or face-to-face interaction, through to telephone conversations, and moving to the non-interactive forms of media such as voice mail, e-mail, and letters all located on the less rich end of the continuum. A medium, according to the richness theory, was judged on the amount it possesses of four criteria: (a) feedback, (b) multiple cues, (c) language variety, and (d) personal focus. The more the medium has of these qualities, the higher it ranks on the richness scale.

Figure 1

Media Richness Scale

Face-to-Face	Telephone	Written, Addressed	Electronic Mail	Unaddressed Documents
High	←	Media Richness	→	Low

Daft and Lengel (1986) suggested that both ends of the continuum had utility but that one should choose his or her communication medium depending on the data being transmitted and the number of individuals involved. The goal was to choose the medium that most reduces ambiguity between sender and receiver. In their ranking system, the richness scale was fixed and differences in the personalities of those using the medium and the organizational setting in which it is used or circumstances of its use were not considered. Although their original studies dealt with more traditional forms (letters and telephones) of communication, they would contend that e-mail

ranked on the "low" side of the communication continuum in media richness. These early lab studies, it should be noted, dealt with the communication properties of the medium rather than the perceptions of people and circumstance under which they might take place.

Daft, Lengel, and Trevino (1987), in a later field study of upper and mid-level managers, further explained that the selection of an organizational communication method had two influences which come into play–"uncertainty" and, what they term, "equivocality." As they describe it, the phenomenon of uncertainty had been with organizations for a long time. They maintained that organizations are able to deal with traditional uncertainty by gathering more information to alleviate uncertainty. Equivocality, on the other hand, means ambiguity and this was something that had come with the increased use of computer generated communication like e-mail. Equivocality, as they described it, often gave multiple and conflicting interpretations of a message and that, they maintained, could lead to confusion, disagreement, and lack of understanding. They hypothesized that managers choose a medium other than e-mail if the chance for equivocacy (ambiguity) in the message was high.

Trevino, Lengel, and Daft (1987) elaborated on the media richness theme in an exploratory study involving managers in organizations. They suggested that media choices are based on "symbolic interaction properties." In other words, people choose a particular medium not because of some static characteristic of the medium itself, but make their choice to use or not to use a

medium based on its ability to reduce the degree of ambiguity in the message. This need to reduce ambiguity was coupled with a consideration for the immediacy of the need to communicate the message to the receiver. They maintained that there are numerous reasons to choose a particular communication medium and those would include such situational determiners as, content of the message, organizational culture, symbolic factors, managerial level, and willingness to accept ambiguity in the message. In media richness theory, they concluded, that one chooses the most efficient medium that one can for the level of task ambiguity.

In other, more recent, attempts to classify and categorize the e-mail medium, some of the very qualities that others had identified in e-mail communication as positive and that seemed to make it attractive as a communication medium were called into question (Spears & Lea, 1994). E-mail's perceived ability to equalize status and role, to democratize groups, and to subsequently, empower and liberate users was perhaps only perceived they suggested. In actuality, they maintained, it could do the opposite by bringing such things as status and the social role of the participants into a more prominent, influential role in group dynamics. They suggested, "The faceless nature of communication in CMC may often reinforce the bureaucratic or hierarchical dimensions of interaction for this reason" (p. 452).

On a more positive note for e-mail, later empirical studies such as Markus (1994), based on observations in organizations, as opposed to

empirically generated laboratory experiments, began to question the original media richness findings regarding the quality of computer-mediated communication. Markus found that the more a medium such as e-mail has been adopted for use, the more it was accepted by others. Kim (1994) concluded that electronic mail users perceived e-mail to be more effective, useful, and convenient than face-to-face communication.

In a meta-analysis investigation of some of the early studies of computer-mediated communication and interpersonal effects, Walther, Anderson and Park (1994) concluded that the e-mail (a cues-filtered-out medium) can acquire the same interpersonal attributes as face-to-face communication but it takes longer to establish. Others argued that according to recent studies, e-mail was perhaps a richer communication medium than initial studies had indicated. Kydd and Ferry (1997) found that e-mail had an average richness of 53.324 (S.D. = 25.386) on their 100 point scale. E-mail's mid-range ranking suggested to them that media selection was perhaps more often governed by subjective decisions such as familiarity with using e-mail than media richness.

Traditional forms of communication such as letters and memos and even face-to-face communication within an organization can often be confusing. E-mail, the relatively new organizational communication medium, added its own tendency for confusion. As has been stated, the ambiguities of e-mail and the lack of visual and tonal cues had added to the incrimination of e-mail as a poor

communication medium. Numerous journal articles warned of the pitfalls of e-mail usage. Suggestions were made that you could not send the same e-mail to all people, as different people interpreted messages differently. They also suggested that effective managers needed to look closely at what had been described as the "narrow emotional band" of e-mail. The computer screen did not convey emotion so an increased awareness of the choice of words used was in order (Hequet, 1995). It was suggested this lack of emotion was one reason for the use of emoticons: those little smiley faces [:-)] or frowns [:-(] that were so popular in the slang that had developed in e-mail communications (Burbules, 1996).

Several recent studies had also tended to call into question the early empirically derived conclusions on the media richness continuum. Building on grounded research, the social theorist's interactive studies gave a clearer picture of where e-mail fit in the communication world. One proposed solution to increasing the richness of e-mail was through the use of "accommodation theory" (Street & Giles, 1982). Accommodation theory, which had its beginning in oral communication, suggested communicators must adapt their communication style to accommodate their audience. This theory had been expanded to include electronic mail. Using accommodation theory, an effective author would analyze the audience and then would choose the exact words that have meaning for the sender and the readers. Doing so would enrich the message and aid the comprehension of the message.

Analysis of the audience and a careful choice of words were then valid endeavors in e-mail communication if we were to increase the effectiveness of its use. Yet, for most of us the attractiveness of organizational e-mail was in its free form and lack of adherence to the structured grammatical presentation style of the traditional letter. It was e-mail's tendency to be non-personal, short, and often lacking social clues that made it easy to use to share information with others in an organization.

Another study explored the properties of e-mail and proposed that we do not always make rational choices when selecting a communication medium nor do we always study contingencies of the situation before engaging a certain communication medium. This theory presented by Fulk (1993) and others was called "social information processing" or "social influence theory." Their research was based on the premise that social interactions in the workplace help create shared meaning. It was this shared definition, formulated in the workplace, which also influenced the pattern of media selection for communication. Studies had shown (Schmitz, 1987, cited in Schmitz & Fulk, 1991) that when supervisors used computer-mediated communication it was more likely that subordinates would also choose that medium. Schmitz and Fulk also proposed that not only was social influencing a factor but also media choice was sometimes made with ambiguity in mind. The reason for this ambiguity being to benefit a political agenda through purposely being ambiguous. In another move away from the strict media richness concept and

a comparison of the media attributes, Ngwenyama and Lee (1997) proposed what they term "critical social theory" (CST). Building on the critical social theory of Juegen Habermas (1979, 1984, 1987, cited in Ngwenyama and Lee) they concluded that from a critical socialist's perspective–as opposed to the positivists, experimental methods perspective–media richness was defined in terms of everyday people assessing the validity or rightness of what was being communicated in the first place. They maintained the very lack of social cues that has relegated e-mail to the poorest side of the media richness scale were not critical to its communication richness. They conceded that social cues can contribute to communication richness but were not absolutely necessary for rich communication to occur.

Sproull and Kiseler (1991) described two levels of communication that technology affects: The first level looked at and anticipated technical problems such as connection, costs, work efficiency, and justification of the technology. The second level described effects, which were more concerned with how people spend time with the new technology, changes in interdependence, social habits and how people interact differently within the organization. This second level of effects was the area of concern in this study.

E-mail was the medium of choice in many organizations, it provided hard and electronic copy, it eliminated the telephone-tag played by mobile employees, and it provided for work groups and social connections. On the opposite side of the list of attributes were potential concerns. E-mail was often

the communication medium of choice for people who work together yet did not like each other. E-mail was often used to send messages to subordinates and colleagues located across the hall thereby hindering direct communication. E-mail, because once sent was unrecoverable, was often blamed for "flaming" (users reacting without thinking in an inappropriate manner) that occurred in interpersonal communication. Yet, e-mail could be the glue that connected millions of people into virtual communities.

Summary

E-mail with both its good qualities–speed, ease of use, and globalality, as well as its bad qualities–chances for ambiguity and its unemotional nature, had grown to the point where some were calling the exchange of e-mail the "writing revolution." More people were writing more people than ever before in the history of communication. Computer Supported Social Networks (CSSN) that are used to connect individuals socially were being proposed and planned by several organizations. E-mail had important implications for organizations. It had the potential to increase organizational communication by speed, effectiveness, and frequency of interaction. It had the potential to assist in organizational change. It had the potential to build collegiality in organizations and it has the potential to change the way people were educated.

Electronic Mail Study

A study entitled "The Impact of Intra-District Communications Using Electronic Mail on the Fullerton School District" by Judy Marilyn Lieb (1995)

explored the use of e-mail in a small California school district. Using a survey instrument, interviews, and e-mail usage logs, Lieb arrived at a number of interesting conclusions. Lieb's findings are summarized as follows: (a) direct connection to e-mail makes a difference in the amount of mail sent: (b) District office personnel used e-mail more than schools; (c) Electronic mail use varied widely; (d) Electronic mail users felt they received more information that was factual; (e) Most electronic mail users do not use e-mail to get information from employees they supervise; (f) Most electronic mail users did not use e-mail for personal matters; (g) Electronic mail did seem to "flatten" the organizational hierarchy; (h) Subordinates generally had more positive attitudes about the use of e-mail than did superiors; (i) Access to e-mail from home tended to increase use; (j) Electronic mail users who thought e-mail was easy to use tended to use it more and in more varied ways.

The Lieb study recommended further research on e-mail usage in other school districts and assessment of e-mail's role in networking with those outside the organization.

Summary

The ambiguities and the ephemeralness of e-mail helped it remain a difficult medium to qualify. E-mail was written; yet, its language typically simulated oral speech patterns. E-mail was rated low by some on its ability to overcome ambiguities. Others maintained that through a process of carefully choosing words and accommodating for differences in audiences, e-mail could

achieve and overcome or at least compensate for its lack of cues and body language. The recommendations from literature for effective e-mail use in organizations suggested establishing policies that consider employee and organizational needs. These policies would include several important practices: (a) change leadership practices to better use the power of e-mail, (b) provide training on the subtleties and power of collaboration of e-mail communication, and in addition, (c) encourage and promote experimentation and flexibility in the system.

CHAPTER III

THE RESEARCH PROBLEM

The research literature focusing on change and strategic planning in the nation's public schools had indicated that a relationship exists between the degree of communication among school staff, above school level personnel, parents and students, and the successful school. The collaboration that was fostered by increased communication went a long way in creating the "educational community" and the successful school. This emphasis on active communication, it was suggested, would bring about meaningful improvements in student learning opportunities and help build a community of active, involved individuals in the nation's schools. E-mail and the increased potential for expanding communication and expanding connectivity to a "greater" community had presented new problems but also provided solutions to help solve school improvement issues.

Statement of the Problem

The purpose of this study was to explore employee use of the recently implemented e-mail system within the DoDD Schools. Employee use of this e-mail system for collaboration and exchange of information and their attitudes

and perceptions toward its use were explored. Whether individuals collaborate with peers and others by using the new technology, if vertical communication between the administrative layers in the organizational structure change, and if people interact differently when using the e-mail medium to communicate with others are questions of interest when building a networked community.

Three broad areas of e-mail usage were addressed in this study: (a) e-mail's use in building collaboration among and between colleagues, (b) the attitudes and concerns of respondents regarding the use of e-mail to communicate and gather information between layers of the organizational structure, and (c) the users' attitudes towards the use of e-mail as a communication tool.

Research Questions

Eight specific research questions that relate to the three general topics described above are as follows:

1. Do organizational members use e-mail to collaborate with peers? Do they believe it is important to do so?
2. To what extent do organizational members believe that use of e-mail to communicate with non-organizational members is important?
3. Which category of organizational member uses e-mail more?
4. Is there a relationship between the frequency of e-mail use and communication between individuals separated by multiple layers of the organization?

5. Is there a relationship between the frequency of e-mail use and an employees' belief that they are factually informed about important organizational issues?
6. Which category of organizational member has the most favorable or unfavorable attitude towards the use of e-mail in accomplishing job-related tasks?
7. Are employees concerned about possible organizational constraints in using e-mail to contact others outside the organization?
8. Are organizational members concerned with the "richness" of the e-mail medium when using e-mail to communicate?

Definitions of Terms

The following operational definitions were used throughout this study:

Above School Level Employees: Educators and administrators located in district, area, and Washington D. C. headquarters offices. To include all directors, superintendents and assistants, education specialists and personnelists, finance, clerical, and other support staff.

Asynchronous: This term refers to e-mail's ability to function without having to be on line at the time to receive messages as they are stored on a server machine until you open your mail box. E-mail also provides mechanism for the creation, distribution, consumption, processing, and the storage of this information. What was not included in this study was the use of the Internet (other than as part of the electronic pipeline), the FAX, nor the electronic

bulletin boards which broadcast information to large audiences with little active participation.

Computer-Mediated Communication (CMC): This term refers to the use of a computer to generate, transmit, and store electronic messages.

Computer Supported Social Networks (CSSN): This term refers to computer networks linking individuals, groups, and organizations for social contact. Three forms of CSSN are developing: Virtual communities linking individuals with common interests, individuals seeking social support, and work communities developing around cooperative work groups or interests.

Electronic mail (e-mail): For the purposes of this study, the definition of e-mail was as provided in a RAND report (R25) which described e-mail as, "being an asynchronous; electronic interchange of information between persons, groups of persons, and functional units of an organization".

Electronic: Messages travel over telecommunications systems at the speed of electricity with the potential for almost instant connectivity.

Local Area Network (LAN): Computers located in an office or school that are connected electronically.

Media Richness: Richness has been defined in the literature in terms of four objective characteristics. A rich medium is one that allows for communication of multiple cues through multiple channels, language variety, immediate feedback and a high degree of personalness (Daft and Lengel, 1986). Various types of media are located on the richness scale in a linear

continuum with "face to face" being considered the richest and e-mail one of the poorest. The goal for communicators was to choose a communication medium that reduced message ambiguity.

School Level Employees: Educators directly involved in local school operations to include administrators, teachers, and education specialists.

Virtual Communities: Groups of communicating individuals, connected by computer networks, who share common interests and are separated by time and space.

CHAPTER IV

RESEARCH DESIGN

General Methods and Procedures for the Study

The population in this study consisted of elementary and secondary level teachers, specialists, school administrators, district and headquarters curriculum specialists, headquarters administrators, and support staff. Respondents were selected from the DoDDS's electronic mail directory of employees. A self-administered survey questionnaire was used to gather information from respondents. Because some survey questions represented potentially sensitive topics, respondents were assured of the anonymity of their responses in both a cover letter and on the title page of the survey document. An electronically distributed survey was considered but rejected because of the large electronic file size necessary for the survey and the possibility of recipients not being able to open the electronic file.

Printed surveys were mailed to respondents through the U.S. Military and U.S. Postal systems. Although a list of recipients was maintained, no attempt was made to code the surveys to track those who responded and those who did not respond. Because of the mailing distances involved and the use of two mailing agencies, 45 days was allowed for responses to be returned. Responses received after the deadline were accepted. Two electronic follow up

messages were sent to remind individual that the established deadline for return of the survey was approaching. One follow up was sent after the return deadline was reached to assure recipients that surveys were still being accepted.

Research Population and Setting

This research was conducted in the Department of Defense Dependents School System (DoDDS). The DoDDS system is an organization mandated by public law to provide an American style education and curriculum to school age children living in overseas locations. The clientele for this system consists of U.S. Military, State Department, other U. S. Government employees, and U.S. affiliated contractors living outside the United States and its territories. It has been operating elementary and secondary schools on U.S. military bases and posts overseas since 1946.

Organizational Structure of Research Site

The DoDDS organizational structure began in the Office of the Undersecretary of Defense, Office of Military Affairs for Health and Welfare located in Washington D.C. and the Pentagon. The umbrella organization was the Department of Defense Education Activity (DoDEA) which had responsibility for domestic, military funded schools located in the U.S. as well as the overseas segment (DoDDS) on which this study was based. The immediate director of the schools and the management function of the organization were located in Arlington, Virginia with approximately 350 above

school level employees. The next layer in the organizational structure was located outside the continental U.S. and services three separate overseas areas through area offices. The first, in Okinawa, Japan, services 50 schools in Japan and Korea. A second, housed in Europe, services 109 schools located in Europe and the Middle East to include Germany, Italy, Spain, Holland, Belgium, Bahrain, England, Iceland, Turkey, and the Portuguese Azores. A third area office serves the 15 schools located in Bermuda, Cuba, and until recently, the Panama Canal Zone. Each of these area office's responsibilities were further divided into district offices that served each school in their individual districts with personnel, financial, educational guidance, and other operational support functions. All components of DoDEA and DoDDS were connected electronically through a computer-mediated communication system.

Early E-mail History of the Organization

A Dependents Schools regulation from November 1993 relayed the purpose of the organization's e-mail to employees: "The electronic mail system will be used to support both the administrative and educational programs. It is intended that authorized users will have a convenient access to the electronic mail system in order to facilitate timely communication and to deliver an effective education program" (DS. REG.,1400). Beginning in the 1994/1995 school year the approximately 7,000 teachers in the system were gradually provided e-mail post offices. As of May 1998, there were 11,861 mailboxes listed in the organization's e-mail database. During the

implementation period, e-mail was promoted as a means of connecting employees involved in the School Improvement Process (SIP) and other educational initiatives. E-mail was envisioned as a follow-up contact forum to be used during and following the implementation of new system-wide education programs. In addition to these focused educational goals for e-mail, many of the organization's service type functions were using e-mail for administrative tasks. Service components such as, personnel management (personnel actions, travel orders, legal information, etc.) and finance were being moved from scaled down regional overseas offices (part of the downsizing and flattening of the system) to the Washington D.C. area headquarters. These relocated services relied heavily on e-mail to conduct business.

A DoDDS Electronic Bulletin Board was created to provide information and administrative materials to these offices and to the employees they serve. This bulletin board provided such items as current information from the service organizations, current curriculum initiatives, and general organizational information such as "safety" and "security" issues.

The research population of interest in this study was made up of DoDD school personnel whose names appear in the 1999 Worldwide Electronic Mail Directory. For the purposes of the study, individuals listed in the directory were categorized into two job-related levels, "school level" and "above school level." These two categories were then divided as follows: (a) "school level" includes classroom teachers, specialists (media specialist, speech therapist,

etc), and school administrators both principals and assistant principals at both the elementary and secondary level, and (b) "above school level" which includes district and headquarters curriculum specialists (Language Arts, Math, Computer, etc.), district superintendents and assistant superintendents and headquarters personnel (administrative directors at both the regional, and Washington DC headquarters level and curriculum specialists). Support staff at both levels (secretaries, business managers, computer support personnel, administrative personnel specialists etc.) are included in the "above school level" category because of their support function.

Sampling Frame, Selection, and Sample Size

Survey participants were selected from the approximately 11,000 names that appear in the DoDDS employee worldwide e-mail directory. This alphabetical listing includes individuals and organizations.

Systematic sampling procedures (Nth number) were used in selecting participants from the alphabetical listing of 11,000 employees and organizations (Wiersma, 1995). Initially, a sample size of 300 was selected. Using Cohen's power table, assuming the research statistics should be computed at least at the moderate effect size of 0.50 with an N of 300, the power statistic was > 0.995 (in Kiess, 1989, p. 504). However, a preliminary review of the electronic database identified a number of names listed in the e-mail database of individuals who were no longer with the organization. In order to compensate for the apparent datedness of this listing, over sampling

was conducted in order to maintain the approximate sample size of 300. An over sampling size of 370 was selected. This was 70 more than required for statistical significance at the 0.50 level for 300 participants.

Using the systematic sampling method, the sampling interval for this study was set at 1/30. From the first 30 individuals on the list, one name was randomly selected and every thirtieth name that followed was in turn selected for inclusion in the sample. Since school and office e-mail addresses were a part of the e-mail directory but not a part of the study, they were eliminated from the selection process. If the thirtieth name was that of an organization, the next employee name on the list was selected rather than an organization. A complete "a to z" selection from the alphabetical database was made using the sampling fraction. A final sample size of 370 was achieved after elimination of organizational addresses and the complete "a to z" sampling completed. Three hundred and seventy surveys were sent to those randomly selected individuals

Pilot Study

Before preparation of the final survey form, a pre-testing of the survey questions for ambiguity and clarification of meaning was conducted. The survey instrument was piloted in a local DoDD, grades 7 through 12, high school. Thirty employees were randomly selected to receive the sample survey. Twenty-seven surveys were returned. Respondents represented teachers, school administrators, and those considered as support staff. In addition to

completing the questionnaire, the respondents were asked to report concerns or problems encountered while completing the survey. If respondents had concerns with the wording of the questions, redundancy in the questions, question order, inadequate or confusing response procedures, or any other aspect of the questionnaire that they perceived to be ambiguous or confusing were to be reported. This information was then used to modify survey questions and instructions to reflect more clarity and focus. A number of survey questions were revised or eliminated in an attempt to control any ambiguity and confusion in the final questionnaire. The survey format was also modified in order to clarify and expand the procedures outlined in the survey.

Survey Instrument

The survey instrument was a self-administered mail questionnaire containing 46 items (Appendix A). The survey was designed using methods outlined in Dillman's (1978) Mail and Telephone Surveys: The Total Design Method. The goal of the Total Design Method (TDM) is to increase overall response rate for mail surveys by incorporating features in the survey that have been tested to increase response rates. Items such as an attractive cover design, well-defined sections delineated by subject, demographic questions located at the end of the survey, and a back page dedicated to a single open-ended question were incorporated in the survey design. This last survey item, an "open-ended" statement, was written as follows:

Is there anything else you would like to tell me about your use of e-mail in the organization and as a communication medium? If so, please use the space below for that purpose. Any comments that you think would be helpful to better utilize e-mail communication would be appreciated.

In TDM terms, this opportunity for open response was expected to provide respondents with an intangible reward of being able to freely express themselves and thus increase their willingness to respond.

The first page contained the title, a graphic, and a short paragraph explaining the project and return dates. The second, third, fourth, and fifth pages of the survey contain four major sections.

Section one included the following: (a) questions on the frequency of e-mail use and communication between employees in different layers of the organization, (b) questions on the frequency of use of e-mail and the belief that employees are factually informed, (c) questions on the frequency of e-mail use to gather or receive organizational information.

Section two addressed the following: (a) questions on collaboration with peers and its perceived importance, (b) questions on the respondent's attitude towards the use of e-mail to contact and collaborate with others outside the organization.

Section three included the following: (a) questions exploring the respondent's attitude towards the use of e-mail, (b) questions relating to concern for organizational constraints in the use of the e-mail system, (c)

questions relating to the e-mail user's concern for media richness when using the e-mail medium.

Section four included the following: (a) questions asking for information on a respondent's job or position in the organization, (b) questions regarding the respondent's degree of expertise on the use of e-mail. (c) the amount of e-mail sent and received per day and per week.

A six-point linear, numeric scale was used in 38 of the 45 closed response questions on the survey. Nine questions addressed the frequency of use with a 1 through 6 response indicating "often" and "never" respectively. Twenty-nine questions used a scale of agreement or disagreement ranging from 1 "agree" to 6 "disagree." A six-point scale, as opposed to a five- or seven-point scale, was used to eliminate the possibility of a "middle of the road" neutral response being chosen. Intermediate points are not labeled to avoid varied interpretations of what would have been the intermediate terms used. Research has also shown that the labeling of intermediate values was no more effective than using a simple numeric scale (Alreck & Settle, 1995). Three questions applied to supervisors only, respondents other than supervisors were directed to record a 6 on the scale which would be a "disagree." Confusion over these instructions and subsequent responses required the elimination of these three survey questions from the study.

Items in the survey were designed to answer the eight research questions. Multivariate scale scores, the analysis of univariate scales, and

frequency and percentages of responses are used to answer the research questions. In terms of this multivariate and univariate design, four items are designed to measure e-mail's use in collaboration with peers: "I use e-mail to keep in contact with others with like interests or responsibilities," "I use e-mail to contact subject area/grade level or work colleagues," "I use e-mail to ask workshop trainers for additional information," and "I use e-mail to contact fellow participants of workshops or training I have attended."

Four questions explored the respondents' attitude towards collaboration: "I believe it is important to build a network of e-mail colleagues," "E-mail is an effective tool to build collaboration among colleagues," "I communicate with my peers more through e-mail now than I did before it was installed," and "I believe e-mail correspondence should be used to provide follow-up collaboration to workshops or training I have attended."

Three survey questions were used to measure the organizational member's belief that e-mail communication with those outside the organization was important: "I would like to use organizational e-mail to contact relatives who have e-mail addresses," "I think it is important to be able to use e-mail to contact friends at other locations in the organization," and "I think it is important to be able to keep in contact with others outside the organization through e-mail."

To determine which category of organizational member used e-mail more than another and record the average frequency of that use, four

questions asked respondents to record their average daily and weekly use of e-mail to send messages and how many e-mail messages were received on a daily and weekly basis.

To determine if there were relationships between the frequency of e-mail use and actual communications between layers of the organization, the following items were used to assess this interaction: "My supervisor uses e-mail to communicate with me," "I use e-mail to contact my direct supervisor," "If I have concerns about organizational directives, I use e-mail to get answers from those above my supervisor," " I use e-mail to brainstorm or generate ideas with my supervisor when solving an organizational problem," "I would use e-mail to alert my superintendent or division chief to concerns that I have," "I would use e-mail to alert my supervisor to an organizational problem." The three questions which related specifically to a supervisor's use of e-mail to contact employees were as follows: "I use e-mail to give directions to employees I supervise," "I would use e-mail to gather information from employees I supervise," and "I would like to receive e-mail alerts about organizational problems from people I supervise." These three survey items were dropped from the study due to confusion in response instructions and the recording of answers.

To determine if a relationship existed between the frequency of e-mail use and an employee believing he or she was factually informed about important organizational issues, the following statements were used: "I receive

organizational information about my job through e-mail," "I use the DoDDS electronic bulletin board to get organizational information," "I believe I am better informed about organizational matters because of e-mail communication," "I would like to see more organizational communication using e-mail to keep me informed about work issues," and "I feel I am a more effective employee because of my use of e-mail to communicate."

To determine which category of organizational member had the most favorable or unfavorable attitude towards the use of e-mail, respondents indicated their job category and were asked to respond to the following questions: "E-mail is a useful tool to gather information from others," "I believe the use of e-mail is very important for me to succeed in my job," and two negatively stated questions, "I often feel overloaded by the number of e-mail messages I receive," and "I believe e-mail has a negative impact on my performance."

Respondents' possible concern for organizational constraints on their use of e-mail to contact others outside the organization were accessed through responses to the following questions: "I am concerned about the privacy of my e-mail," "I believe the organization has encouraged the open use of e-mail," and "I would feel uncomfortable if I used e-mail at work for other than official business."

Possible concern for the "richness" of the e-mail communication medium was determined through responses to the following questions: "I prefer to send

a letter rather than an e-mail message for important organizational business," "I prefer to use the telephone rather than e-mail for most organizational matters," "Because of the lack of visual, auditory, and social cues inherent in e-mail, I am concerned about other understanding my e-mail messages," and "I believe when I write an e-mail, I need to adapt my writing style to make up for the lack of visual, auditory, and social cues inherent in e-mail."

Survey Procedures

The survey packets were sent through the U.S. Military and U.S. Postal Service. Packets included an introductory letter, the survey instrument, and a stamped, addressed envelope. The confidentiality of the respondents' answers to the survey was stressed in both the introductory letter (Appendix B) and the introductory statement on the survey itself. This was done to promote candid responses and encourage a higher return of the survey forms.

Because of the distances involved (worldwide) and the mail traveling through a variety of postal systems, extra time was allowed for the surveys to be returned. Two weeks after the initial mailing of the survey, a follow up e-mail was sent electronically, this to encourage completion of the survey in a timely fashion. A second electronic reminder was sent three weeks after the initial mailing that again reminded respondents of the importance of their survey to the study and thanked them if they had already completed and returned the survey. A final appeal was sent electronically stating that

although the return deadline had passed, returns would continue to be counted.

Treatment of Data

The returned surveys were collected, numbered consecutively as received, and filed in binders. The survey responses were entered into a Microsoft Excel spreadsheet. The Excel results were then transferred electronically to the statistical analysis program SPSS 10.0. The data columns were labeled and coded. The SPSS program was then used in the statistical analysis of the data.

Data synthesis and analysis was preformed using the survey responses. The summarized responses can be used to provide information on which to develop organizational policy and guidelines on use of e-mail in this type of organization. From an epistemological point of view, the knowledge gained from this study was seen as subjective in nature and was based on the experiences and insights of individuals as opposed to empirically based knowledge. Reliability analysis of scales was conducted using the Cronbach's alpha test of reliability. The survey data was processed to determine multivariate mean score for each research question when appropriate. The mean, median and frequencies and percentages of univariate responses to each question were also noted, recorded, and interpreted when appropriate. Cross tabulation of results was performed to identify relationships when associations were being investigated. Correlation analysis was also used when the

direction and strength of a relationship was being investigated. Both Pearson's r and Spearman's rho were conducted for correlation analysis. However, Pearson's r results are presented in all cases. The t test was conducted to provide probability estimates of mean differences in populations.

It should be noted that correlation was used to show the degree of interrelationship among variables in a given population. The interpretation of the strength of that correlation is often a subjective determination. Williams (1962) believes the psychological implications of a correlation and not just the statistical implications are often important. Psychological significance can come from just the identification of a relationship. It is not always the strength of the prediction but the psychological implications in the numbers that provide support to the factors being considered in the study (p. 137). The t test was used to calculate the probabilities of differences in sampling mean being attributable only to sampling error.

The close-ended questions on the survey instrument facilitated the coding process. Codes for all response categories consisted of numbers. All demographic items on the questionnaire were pre-coded. Pre-coding appears on the survey form. Pre-coding for demographic questions 39 through 41 was as follows: (39 and 40) 1 = teacher secondary, 2 = teacher elementary, 3 = school administrator, 4 = headquarters/district educator, 5 = headquarters/district administrator, 6 = support staff. Question 41 which asks about the respondent's degree of expertise in using e-mail was coded as

follows: 7 = novice, 8 = basic understanding, 9 = expert. Codes for data and the variables from the questionnaires were entered directly into the computer. Following data entry, the data were cleaned by printing out the frequencies of all survey variables and then searching for erroneous entries, outliers, and possible typographical mistakes made in entry.

Assumptions

It was assumed that by emphasizing the confidentiality of responses participants in the survey process were candid in their answers. This confidentiality was stressed and reiterated in the introductory letter, the opening survey statement, and the follow-up e-mail reminders. Although the study was conducted in a unique school system, it was believed the finding will be relevant to other school systems and organizations with similar structures.

CHAPTER V

FINDINGS

The findings from this study are presented in several sections. First, characteristics of the sample population are shown. Next, basic survey scale variables and reliability of scale estimates are presented. Then, descriptive analyses of the survey question variables are described, the analyses used to answer the research question presented, and statistical results of the analysis are shown. Descriptive frequency and percentage tables, correlation analysis, tests of mean differences and contingency tables of data are presented when appropriate.

The Sample

As described earlier, survey participants were selected from the more than 11,000 names that appear in the DoDDS Worldwide E-mail Directory. The overall response rate was 55% (204 out of 370). There were 70 surveys returned as "undeliverable." These were subtracted from the total sample for the purposes of calculating overall response rate. With these removed from the statistical calculation, a corrected response rate of 68% (204 out of 300) was achieved. As has been stated, no attempt was made to select the sample by strata (job description) as definitive data on the actual numbers of

individuals in each category in the population was not available. A check for potential bias was conducted following procedures recommended by Armstrong and Overton (as cited in Beard, 1995). Early respondents (first 25% of those who responded) and late respondents (last 25% of those who responded) were tested for significant differences between means scores on six representative survey variables. The selected scale means for "early" and "late" respondent comparisons included the following: "E-mail to contact others with like interests" (early, 2.40/late, 2.41), "e-mail to contact work colleagues" (early, 2.6/late, 2.4), "contact workshop participants" (early, 3.6/late, 3.5), "communicate with peers more" (early, 2.2/late, 2.1), "more effective employee" (early, 2.7/late, 2.5)," concern for e-mail privacy" (early, 3.2/late, 2.8). Mean scores for early and late respondents were not statistically different; therefore, excessive bias due to non-response was not evident. The final sample size of 204 gives a power value > 0.99 at the .05 level and a power level of >.52 at the .20 level (Kiess, 1989).

Table 1
Population Sample Characteristics

Population Sample	Number of Respondents	Percent of N
Teacher/Specialist-Elementary	60	29.4%
Teacher/Specialist-Secondary	50	24.5%
School Administrator	52	25.5%
Headquarters Education Specialist	12	5.9%
Headquarters Administrator	10	4.9%
Support Staff (all)	20	9.8%
Total	204	100.0%

Survey Response Data

Three broad areas of the respondents' e-mail usage were explored by using the responses from the 45 survey questions. These areas included the following items: (a) collaboration among colleagues, (b) communication between layers of the organization, and (c) attitudes and concerns of respondents regarding the use of e-mail to communicate and gather information. These three broad areas of the investigation were further divided into the eight specific research questions. These questions and the variables from the responses are statistically explored in the following section.

Survey Data Analysis

The survey questionnaire variables were first statistically explored to document multivariate scale responses. Scale reliability coefficient scores are presented to establish scale reliability statistics for each survey area. Univariate scale scores for individual survey questions are presented when appropriate. Also presented are the respondents' e-mail usage statistics reported by mean and median scores for the number of e-mails sent and received per day and per week.

Survey questions 1 through 38 requested–through a six-point linear, numeric scale–the participants' use of and attitude towards e-mail. Questions 39 through 41 requested categorical or nominative data from each respondent. Questions 42 through 45 ask the respondents to give open ended, numerical estimates of the amount of e-mail sent and received both per day and per week. Question 46 was an optional open response question asking respondents to write about any issue or problem that they encountered while using e-mail. The number of responses to this question was encouraging. A brief qualitative analysis of several of the major points of the respondents' comments are presented for each general research area.

The basic scale and variable characteristics and scores for scale reliabilities are reported in Table 2. Four scales: "Use of e-mail to collaborate with peers," "communication with those outside the organization," "the relationship between the amount e-mail use and communication between

layers of the organization," and "the amount of e-mail use and being factually informed," all had acceptable reliability coefficient scores, which for this study were those > .70 (Peterson, 1994). The reported findings were consistent with results from the pilot study.

Three scales–"attitude towards e-mail," "concern for organizational constraints," and "concern for the richness of e-mail"–all had reliability coefficient scores < .70. These findings, too, are consistent with the pilot survey results. The re-wording, modification, and substitution of questions in these three scales were performed after the pilot study was conducted in an effort to achieve higher reliability coefficients on these questions. The pilot study was not, however, conducted a second time to verify the validity of the changes. As can be seen, these coefficients remained low. Individual variables from these three research questions will be reported using only the descriptive statistics and not the multivariate scale scores. These variables do add value to the study by providing additional qualitative insight into respondent's attitudes toward e-mail use.

Table 2

Survey Scale and Variable Characteristics: Mean, SD, and Scale Reliability Estimates

Scales:	M		Alpha
1. Use of E-mail to Collaborate with Peers	2.61		.81
2. Communicate with Those Outside Organization	2.28		.78
3. Relationship Between Use and Communication Between Layers	3.41		.85
4. E-mail Use and Being Factually Informed	2.76		.71
5. Attitude Towards Use of E-mail	2.93		.35
6. Concern for Richness of E-mail	3.90		.66
7. Organizational Constraints	2.92		.08
E-mail Use	M	SD	Mdn
8. E-mail Sent/Day	9.34	12.44	5.00
9. E-mail Received/Day	14.04	17.95	10.00
10. E-mail Sent/Week	44.03	62.44	25.00
11. E-mail Received/Week	68.74	83.24	50.00

Note. n = 204. Scale 1-6.

Responses to the four questions asking respondents to record their average use of e-mail to send and receive information on both a daily and

weekly basis were found to have an extremely wide range of values. Graphing of these responses demonstrated extreme ranges with outliers. The number of e-mail messages transmitted and the skew and kurtosis for each are as follows: (a) sent per day 0-90 (skew = 3.16, kurtosis = 13.79); (b) received per day 0-180 (skew = 4.89, kurtosis = 37.84); (c) the number sent per week, 0-450 (skew = 3.57, kurtosis = 17.92); (d) received per week 0 - 650 (skew = 3.24, kurtosis = 15.65). As is shown, skew and kurtosis numbers were significantly above those (< = 1.0) needed for normal symmetric distribution. Distributions of this type with extreme floor and ceiling effects are highly disruptive in measures based on distribution symmetry and prohibit the use of a number of statistical procedures (Alreck & Settle, 1995).

A recognized test to check for normality of these variables, the Kolmogorov-Smirnov test of normality, was conducted to establish the asymptotic significance of these variables. The significance scores for each of the four "send/receive" variables were < .001. Scores less than .05 are not considered normal distributions and require non-parametric techniques (SPSS Base 10.0 Application Guide). Due to these extremes in the e-mail usage statistics, it was decided to use only the "number of e-mail messages sent per day" for all measures requiring frequency of e-mail use statistics. The sent per day scores were found to display a more normal symmetry than the extremes found in the other three choices. The number of e-mail messages "received per day" and the e-mail messages "sent and received per week" numbers will be

used only to represent data in the informational summaries of survey responses. The numbers of e-mail messages sent per day were collapsed and re-coded for use in tests to explore relationships.

Research Questions

1. Do organizational members use e-mail to collaborate with peers? Do they believe it is important to do so? This research question has two distinct components: (a) the organizational members' use of e-mail to collaborate with peers, and (b) organizational members' belief that it is important to build this collaboration. The amount of e-mail use in collaboration (1 = "often" to 6 = "never") and respondent's attitude (1 = "agree" to 6 = "disagree") towards the relative importance of e-mail's use in the collaborative process are presented. Multivariate mean scores and univariate analysis of survey items with individual variable mean scores and the percentages of positive responses are used in answering this research question. Four survey items are used to answer the "use" element of the research question: "I use e-mail to contact others...," "I use e-mail to contact ...work colleagues," "I use e-mail to ask workshop trainers for additional information," and "I use e-mail to contact fellow workshop participants...." the multivariate composite scale mean for the "use" scale was 3.05 indicating a moderate, midrange use of e-mail for those purposes.

The four items assessing the respondents' attitudes regarding the importance of making the collaborative e-mail contact: "I believe it is

important to build a network...," "E-mail is an effective tool to build collaboration...," "I communicate more now through e-mail...," and "I believe e-mail correspondence should be used to provide follow-up collaboration to workshops...." registered a composite scale mean of 2.18 indicating firm agreement with the importance of collaboration using e-mail.

A univariate analysis of the four items used to explore use and the four items used to determine attitude towards e-mail for collaboration are shown in Table 3. Analysis of the original six-point (1to 6), survey item, linear response scale indicated a distribution displaying a floor effect in those linear scales. Because of the asymmetry due to this floor effect, the six-point response scale was re-coded into a simple, "agree or disagree" and "often or never" for all percentage statistics (Alreck & Settle, p. 317). The frequency of positive responses and the percentages of positive responses that are shown in Table 3 are from this collapsed "often-never," and the "agree-disagree" survey response scale.

Table 3

Frequencies and Percentages of Positive Responses, Mean, SD, and Median, Scores for Use of E-mail in Collaboration.

Variable: E-mail	Frequency of Positive Responses	M	SD	Mdn	Percent Responding Positively
Usage:					
1. To Contact with Others with Like Interest	162 (Often)	2.27	1.54	2.00	79.0%
2. To Contact Work Colleagues	157 (Often)	2.48	1.63	2.00	77.0%
3. Ask for Information from Workshop Trainers	88 (Often)	3.93	1.72	4.00	43.1%
4. To Contact Fellow Workshop Participants	110 (Often)	3.51	1.61	3.00	53.9%
Attitude:					
5. Important to Build a Network of E-mail Colleagues	170 (Agree)	2.16	1.30	2.00	83.3%
6. Believe E-mail is an Effective Tool for Communication	171 (Agree)	2.20	1.26	2.00	84.0%
7. Communicate More with E-mail Now Than Before Use of E-mail	165 (Agree)	2.23	1.60	1.50	81.0%

8. Used for follow up from workshops attended	185 (Agree)	2.12	1.14	2.00	90.0%

Note. n = 204. Scale 1 - "often" to 6 "never" and 1 - "agree to 6 "disagree". %'s for positive responses.

In addition to the two composite, multivariate, mean scale scores ("use" = 3.05, "attitude = 2.18), a univariate analysis of the eight items used to assess the respondents' use and attitude towards e-mail as a collaborative tool was preformed. When asked about e-mail's use to "keep in contact with others with like interests or responsibilities," 79.4% reported "often" with a mean score of 2.27. Seventy percent recorded on the "often" side of the collapsed scale (mean = 2.48) when responding to a question about their "use of e-mail to contact colleagues." In exploring whether e-mail was used to "contact fellow participants of workshops they had attended," only 53.9% indicated "often" and displayed a mean score of 3.51, representing the "never" side of the six-point scale. Only 43.0% (mean = 3.93) responded positively to the question regarding their "use of e-mail to ask a workshop trainer for additional workshop information."

Continuing the univariate analysis, four questionnaire items explored the respondents' perceptions of e-mail usage in the collaboration process by recording their attitudes on the "degree of importance" of e-mail to contact peers. As is shown in Table 3, 83.8% of the respondents "agreed" and indicated through the item mean (2.16) that e-mail was an effective tool to build

collaboration. Of the 204 respondents, 83.3% believed that it was important to build a network of colleagues. When asked about a possible increase in peer communication, 80.9% of all respondents agreed that they "communicated with peers more now through e-mail than they did before its implementation." The four survey items assessing "attitude" all registered item mean scores less than 2.23 indicating "agreement" with those statements.

Over all, the midrange, composite, scale scores, the univariate scale scores and the percentages of positive responses indicated e-mail was used in the collaboration process and users believed this type of collaboration was important. However, its use in "workshop" situations was not seen as often as indicated by the lower percentages of positive responses and the higher variable mean scores for those items.

2. To what extent do organizational members believe that use of e-mail to communicate with non-organizational members is important? Multivariate analysis of the three items used to answer this research question produced a composite scale score of 2.28 indicating agreement with the concept of using e-mail to contact others outside the immediate work area.

A univariate analysis of those three item scores, which addressed the use of e-mail to contact others not directly associated with work, are found in Table 4. As most in the sample population live outside the United States–some in remote locations–this contact can be an important consideration and

can provide the connection and new sources of information needed for personal satisfaction and their job.

Table 4

Frequencies of Positive Response and Percentages, Mean, SD, and Median on Use of E-mail to Communicate with Those Outside the Organization

Variable: E-mail to...	Frequencies Responding Positively	Scale M	SD	Mdn	Percent Responding Positively
1. Contact Relatives...	160 (Agree)	2.29	1.70	2.00	78.4%
2. Contact Friends in Organization...	176 (Agree)	2.19	1.32	2.00	86.3%
3. Contact Others Outside Organization...	169 (Agree)	2.36	1.48	2.00	81.4%

Note. n = 204. Scale 1-6.

Mean and median item scores show moderate agreement with the three statements regarding using e-mail to contact those not directly connected to work situations. Of the 204 respondents, 78.4% agreed that it should be used to "contact relatives with e-mail addresses." "E-mail use to contact friends" had 86.3% responding positively. The concept of using organizational e-mail to contact friends and relatives outside the organization was often considered beyond the limits of organizational e-mail. This was an area of concern to

many organizations, yet can be critical point in encouraging e-mail use and in establishing a positive organizational e-mail culture.

3. Which category of organizational member uses e-mail more? Median frequencies of the number of e-mail messages sent and received by job category are presented. Survey respondents were asked to record their use of e-mail to send and receive messages on a daily and a weekly basis. The results of these open-ended questions are shown in Table 5. These scores do not demonstrate normal distribution symmetry. Median scores are shown because they better represent the distribution when asymmetrical results are reported (Alreck & Settle, 1995). The median scores for the four areas, sent and received per day, and sent and received per week do display wide distribution ranges as follows: sent per day 0-90, received per day 0-180, and sent per week 0-450, received per week 0-650 all with extreme outliers.

Table 5

Median Scores for Numbers of E-mail Sent and Received per Day and per Week by Job Category

Job Category:	Sent/Day Mdn	Rec./Day Mdn	Sent/week Mdn	Rec./Week Mdn
1. Tea./Specialist Elementary n = 60	2.00	3.00	8.50	15.00
2. Tea./Specialist Secondary n = 50	3.00	5.00	15.00	30.00
3. School Administrator n = 52	10.00	20.00	50.00	100.00
4. Headquarters Education Specialist n = 12	15.00	15.50	67.50	70.00
5. Headquarters Administrator n = 10	22.50	25.00	112.50	122.50
6. Support Staff (all) n = 20	9.00	10.00	42.50	50.00
Total n = 204				

Headquarters administrators, which included headquarters directors, area chiefs, superintendents, and assistant superintendents, recorded the

highest median scores for all categories of e-mail sent and received per day and per week. They were followed closely by school administrators, which included principals and assistant principals. Elementary teachers recorded the least amount of e-mail usage.

4. Is there a relationship between frequency of e-mail use and communication between individuals separated by multiple layers of the organization? Three survey items were directed at supervisors only, "I use e-mail to give directions to employees I supervise," "I use e-mail to gather information from employees I supervise," and "I would like to receive e-mail alerts from people I supervise," were dropped from the study as item responses indicated confusion created by the survey instruction, "if it did not apply, indicate by using a 6 which was a "disagree."

In the multivariate analysis of the six remaining questionnaire items used to answer this question, a composite mean scale score of 3.4 was produced which indicates near midlevel use and agreement–lower scores indicating more use and agreement. Bivariate analysis provided further information to clarify this finding.

Pearson's product moment correlation coefficient r was calculated to explore the theoretical bivariate relationships between the "amount of e-mail sent per day" and the respondent's "attitude towards its use for contact between organizational layers." The correlation values r involving relationships between the amounts of e-mail sent per day and those questions

regarding communication between layers of the organization are summarized in Table 6. The relationships were shown to be negative which in this analysis was interpreted–because scale scores are reversed (smaller numbers indicating more agreement) –as a positive correlation between use (often/never) and attitude (agree/disagree) and the number of e-mail messages sent per day

Table: 6

Correlation Analysis of the Amount E-mail Sent and Communication Between Layers of the Organization

Variable:	Number of E-mails Sent per Day
1. My Supervisor Contacts Me	-.21*
2. Use to Contact Supervisor	-.38*
3. Get Answers from Above Supervisor	-.26*
4. Brain-storm with Supervisor	-.33*
5. Alert Supervisor/Division Chief. to Concerns	-.35*
6. E-mail to Alert Supervisor to Problems	-.22*

Note. n= 204. *All Sig. p<.01(two tailed).

Correlation coefficients however say nothing about the percent of the relationship in the bivariate analysis. A better indicator of the proportion of variance that the two measure share was the significance of r^2.

The bivariate correlations between "the number of e-mail messages sent per day" and the six variables assessing e-mail interactions with supervisors and their degree of shared variability (r^2) are presented: (a) "My supervisor contacts me...." (r = -.21), an r^2 of .04 indicates a low positive correlation and a low percentage of shared variance, (b) "I contact my supervisor...." (r = -.38), an r^2 of .14 indicates the variables share 14 percent variance, (c) " I get answers from above supervisor...." (r = -.26), an r^2 of .06 indicates a low percentage of shared variance, (d) "I brainstorm with supervisor...." (r = -.33), an r^2 of .10 indicates shared variance, (e) "I would alert supervisor or division chief to concerns...." (r = -.35), r^2 = .12, (f) "I would alert supervisor to problems...." (r = -.22) r^2 = .05. Although all bivariate correlation scores and the amount of shared variance were in the low range, a relationship between the number of email message sent per day and e-mail communication with the respondent's supervisors was identified.

Spearman's rank correlation test was also conducted because the scale scores are ordinal in nature (Alreck & Settle, 1995). A review of these rank correlation scores was conducted. They were found similar to the results from the Pearson's product moment correlation. Pearson's product moment was used in subsequent correlation analysis because of its robustness in testing for linear relationships (Toothaker & Miller, 1996).

As was stated, the "amount of e-mail sent" was correlated with all variables relating to communication between layers of the organization

(supervisors). To explore the significance of mean differences in the relationship between a quantitative amount of "e-mail sent" (0 to 5 and 6 to 50) and the respondents' use of e-mail to interact with their supervisors, the "t test" was conducted. The t test was used to calculate and classify the probability that a difference between sample means can be described as significant or attributable only to sampling error (Williams, 1992. p. 83). A higher t score and lower significance score (< .05) indicated mean differences are not attributable to sampling error. "E-mail messages sent per day" deviates the least from normal symmetry and it was used in all tests involving, the "frequency of use of e-mail" in this study. "Sent per day" was re-coded into two categories: category 1 equals 0 to 5 and category 2 equals the 6 to 50 e-mails sent per day range. The overall range for "sent per day" as was stated was 0 to 90, however, 98.0% of the "sent per day" responses distribute in the 0 to 50 range. This re-coding and collapsing of the numbers allowed statistical operations to be used when required in the analysis of data. Table 7 categorizes and summarizes these probabilities.

Table 7

t Test for Equality of Means on the Number of E-mail Messages Sent per Day and Interactions with a Supervisor

Variable:	Sent per Day	M	t score
1. My Supervisor Contacts Me	0-5	2.33	3.74*
often/never)	6-50	1.54	
2. Use to Contact Supervisor	0-5	3.39	7.69*
(often/never)	6-50	1.61	
3. Get Answers from Above	0-5	3.88	3.75*
Supervisor (agree/disagree)	6-50	2.90	
4. Brain-storm with Supervisor	0-5	4.83	7.01*
(agree/disagree)	6-50	3.31	
5. Alert Supervisor/Division	0-5	3.98	7.99*
Chief to Concerns	6-50	2.18	
(agree/disagree)			
6. E-mail to Alert Supervisor to	0-5	3.15	5.13*
Problems (agree/disagree)	6-50	2.04	

Note. $n = 200$. *$p < .05$.

The probability value meets the criterion for significance ($p < .05$) on the six variables. The results from the correlation analysis and the significance levels of mean differences demonstrated there was a positive relationship between the amount of e-mail messages sent per day and the amount of

communication (often - never) between layers of the organization and respondent's agreement with the hypothetical statements (agree - disagree) about "vertical articulation with their supervisor through e-mail."

5. Is there a relationship between frequency of e-mail use and an employees' belief that they are factually informed about important organizational issues? The multivariable mean scale score of 2.76 indicates that employees believe they are factually informed about organizational issues.

Variables from the two frequency and three attitude questions further illustrated the respondents' use of e-mail and being informed. A large percentage of respondents (82.8%) stated that "they do receive organizational information through e-mail." Only 34.3% indicate that "they use the organization's electronic bulletin board to access that information." Respondents did indicate that they are "better informed" on organizational matters through the use of e-mail (86.8%). A correlation analysis of the variables associated with the "number of e-mail messages sent per day" and "being informed" was performed. The amount of "e-mail sent per day" was negatively correlated with the variables surveying the respondents' use and attitude towards the use of e-mail and being factually informed. Because of the reverse scale (1 = agree or often and 6 = disagree or never) this can be expressed as a positive relationship. The bivariate analysis of correlation and the subsequent r^2 scores of common variance are as follows: "I receive organizational information..." (r = -.21**, r^2=.04), I use the electronic bulletin

board..." (r = -.13*, r^2=.01), "I believe I am better informed..." (r = -.18**, r^2 =.03), "I would like to see more organizational communication using e-mail...(r = -.00, r^2 =.00), and "I feel I am a more effective employee..." (r = -.21** r^2 =.04).

Table 8

Correlation Analysis of E-mail Sent and Being Factually Informed

Variable:	E-mail sent per day
Use:	-.24**
1. Receive Organizational Communication	
2. Use the Electronic Bulletin Board	-.13*
Attitude:	-.18**
3. Better Informed	
4. More Organizational E-mail Information	-.00
5. More Effective Employee Through E-mail	-.21**

Note. n = 204. *p. < 0.05 level (two tailed). ** p. < 0.01 level (two tailed).

Correlation analysis demonstrated low correlation with the amount of e-mail sent and the variables assessing use and attitude. Converted correlation scores are positive and identify low relationships and low coefficients of determination (r^2) except on one item variable. "I would like to see more organizational communication using e-mail to keep me informed about work issues" expresses no relationship (.00).

A t test analysis of the "number of e-mails sent per day" and the respondent's "attitudes towards being informed" was conducted to verify probability of the relationships identified in the correlation analysis. The t - test results from the two "use" and the three, "attitude towards e-mail" questions, and the "amounts e-mail sent per day", are shown in Table 9.

Table 9

t Test for Equality of Means on Number of E-mail Messages sent per Day and being Factually Informed on Organizational Matters

Variable:	Sent per Day	M	t
Use:			
1. Receive Organizational Communication	0-5	2.49	4.65*
	6-50	1.61	
2. Use the Electronic Bulletin Board	0-5	4.63	3.56*
	6-50	3.76	
Attitude:			
3. Better Informed	0-5	2.40	3.17*
	6-50	1.84	
4. More Organizational E-mail Information	0-5	2.57	.505**
	6-50	2.47	
5. More Effective Employee Through E-mail	0-5	2.79	3.27*
	6-50	2.16	

Note. n = 200. * p < .05 significance level. ** p = .614.

The results from the t tests demonstrated that differences in mean scores between low e-mail senders (0 to 5) and high senders (6 to 50) was significant in four areas. Only the mean difference between high and low e-mail senders and "receive more organizational e-mail information" was not found to be

significant. Therefore a positive relationship between the amount of e-mail sent per day and five of the six variables assessing "being informed" was established.

6. Which category of organizational member has the most favorable or unfavorable attitude towards use of e-mail in accomplishing job-related work? A reliability analysis of the scale scores on the four questions designed to explore the respondents' attitude towards use of e-mail was found to be low (.35). Because of this finding, univariate scores are presented to provide insights into the complex issue of the respondents' attitudes and perceptions on the use of e-mail in the organization. Table 10 provides descriptive scores for attitudes towards e-mail. Two questions, "overloaded by e-mail," and "e-mail has a negative impact" were stated as negative questions. Higher scale scores demonstrated disagreement with each of the statements. "I often feel overloaded by e-mail" displayed a slight agreement with the statement at a median score of 3.0 and 65.2% of the 204 respondents agreed that they were overloaded by e-mail. "Negative impact on work performance" registered a high median score of 6.0 indicating general disagreement with that statement.

Table 10

Frequency and Percentages of Positive Responses, Mean, SD, and Median Scores of Respondent's Attitude towards E-mail Use

Variable: E-mail -	Frequency of Positive	M	SD	Mdn.	Percent of Positive Response
1. E-mail is a Useful Tool to Gather Information (Agree)	193	1.67	.999	1.00	94.6%
2. Important for My Success (Agree)	161	2.29	1.49	2.00	78.9%
3. I Often Feel Overloaded by E-mail* (Agree)	133	2.94	1.65	3.00	65.2%
4. E-mail Has a Negative Impact on My Work Performance* (Agree)	10	5.44	.795	6.00	9.3%

Note. n = 204. Scale 1-6. *Stated in the negative, higher scale score indicates disagreement.

To provide more specific insight into the question of an employee's attitude towards e-mail use, a cross tabulation (Table 11) between the respondents' "job category" and the statement, "I believe e-mail is very important for me to succeed in my job" was conducted. This was the only statement that would meet the requirements for a valid cross tabulation and

chi-square analysis. This statement does directly address the respondents' attitude towards e-mail and their succeeding in their job.

Of the 204 total number of respondents, school administrators' responses indicated a more favorable attitude towards e-mail use and succeeding in their job (23%). Elementary teachers were next (20.6%) with above school level and secondary teachers both at 17.6% responding positively in the cross tabulation. The differences in percentages were not however statistically significant.

Table 11

Contingency Analysis Relating Job Category and Attitude towards the Use of E-mail

Variable: E-mail		Job Categories				
		Above School	Teacher Secondary	Teacher Elementary	School Admin.	Total
1. Important to My Success	Agree	36	36	42	47	161
		17.6%	17.6%	20.6%	23.0%	78.9%
	Disagree	6	14	18	5	43
		2.9%	6.9%	8.8%	2.5%	21.1%

Note. n = 204. Chi-square 9.53, df 3, p < .05.

7. Are employees concerned about possible organizational constraints in using e-mail to contact others outside the organization? An organization's culture is often described, as "the way we do business." It is an important aspect and an integral part of all organizations. As was suggested by Orlikowski (1994), dynamic organizations have a responsibility to support a culture that encourages and promotes change and experimentation. Three survey questions asked respondents to characterize the organization's support of e-mail usage. Scale reliability tests of these three questions produced a very low alpha score (.07) and are reported as univariate scores to provide more insight into the respondents' perceptions and attitudes regarding the use of e-mail in the organization and possible perception of organizational constraints.

E-mail privacy was becoming one of the major issues in personal and corporate e-mail use. Table 12 summarizes responses to the three questions used to assess possible concern for organizational constraints in using e-mail to contact others outside the organization.

Table 12

Frequency and Percentage of Positive Responses, Mean, S D, Median on Concern for Organizational Constraints

Variable: E-mail	Frequency of Positive Responses	M	SD	Mdn	Percent of Positive Responses
1. Concern for E-mail Privacy (Agree)	127	2.95	1.66	3.00	62.3%
2. Encouraged Open Use of E-mail (Agree)	147	2.77	1.50	3.00	72.1%
3. Would Feel Uncomfortable with Other than Official Use (Agree)	126	3.04	1.66	3.00	61.8%

Note: n = 204. Scale 1-6.

Users (62.3%) did indicate a concern for privacy in their e-mail usage in contacting those outside the organization. Respondents also registered a median scale score of 2.92 indicating a slight concern for e-mail privacy.

Employees do believe the organization has encouraged the open use of e-mail (72.1%). From these qualified results, one could presume that the organization has attempted to encourage open use of the e-mail system in the early beginnings of its use in the organization.

8. Are organizational members concerned with the "richness" of e-mail when using e-mail to communicate? A composite scale mean score of 3.90 indicates moderate concern for media richness. The alpha score for this research question was .66 which was slightly below the goal for this research study which was set at >.70 and should be considered when interpreting the composite scale mean.

Media richness has been the subject of numerous studies. As the literature review on the subject of media richness pointed out, choice of a medium to use to communicate is often dictated by setting, circumstance and personal interactions of those involved in the exchange. Three survey questions explored employees' perceptions regarding the use of the e-mail medium to conduct organizational business. Table 13 outlines the univariate responses to those survey questions.

Table 13

Frequencies and Percentages of Positive Responses, Mean, SD, and Median Scores Regarding E-mail Richness

Variable:	Frequency of Positive Responses	M	SD	Mdn	Percent of Positive Responses
1. Prefer to Send a Letter for Important Organizational Information. (Agree)	66	4.18	1.51	4.50	32.4%
2. Prefer to Use the Telephone for Organizational Matters (Agree)	90	3.80	1.49	4.00	44.1%
3. Concern for Others Understanding My E-mail (Agree)	97	3.70	1.44	4.00	47.5%
4. Need to Adapt Writing Style When Using E-mail (Agree)	128	3.10	1.58	3.00	62.7%

Note. n = 204. Scale 1-6.

When asked "if they feel the need to send a letter rather than e-mail for important organizational matters," 67.6% of the respondents stated that they did not believe this was necessary. Of the 204 respondents, 55.9% did not agree with the statement regarding a "preference for using the telephone over

e-mail for organizational matters." More than half of the respondents, however, did indicate that they needed to adapt their writing style to accommodate for e-mail's lack of visual, auditory and social cues.

Comments from Survey

The last question (46) on the survey asked respondents to comment on any aspect of their e-mail use. A large number of respondents made comments that were pertinent to the research questions in the study. A number of illustrative examples are provided in the following sections.

E-mail's use in collaboration and networking

E-mail has made a profound impact on organizational communication. Most found e-mail to be a positive influence as seen in these examples:

"E-mail has changed our way of working. Our communication is immediate and it encourages more two-way communication. Keeping teachers informed and up to date is much easier with e-mail."

"At the school, I am able to quickly and efficiently communicate with other teachers (rather than walk to their room or to the teacher mail boxes). This saves time and enhances my job."

"I share info with colleagues via e-mail. I maintain communication with old students via e-mail – it keeps me up with college trends."

Others expressed concern over the use of e-mail:

"It is a double edged sword. I value it as a tool...however, I find it occupies far too much of my work time."

Communication between layers of the organization

Communication between organizational levels was seen as important to the organization:

"E-mail has been imperative for me, when dealing with supervisors and administrators from the states."

"I do like the ability to correspond with Arlington (headquarters) and the District Superintendents Office (DSO)."

"With e-mail, I communicate with administrators, specialists and conductors of workshops – letters of thanks, support, and requests for information."

Others expressed concern over the use of e-mail in exchanges with supervisors.

"I have received many messages from my administrator that I feel should have been addressed to me in person – not enough info. or too directive."

E-mail as a communication medium

Comments on e-mail training, privacy, and e-mail as a communication medium were recorded:

"E-mail protocol training is needed!"

"The major problem with e-mail is that it is instant, everyone also expects instant answers...."

"Staff development in e-mail utilization would be helpful...DoDDS needs a clear acceptable policy on e-mail usage."

"Others in DoDDS do not seem to understand basic e-mail etiquette...would like to see more standards regarding e-mail communication."

"Training in the use of e-mail is essential to the success of using it."

"While there is always the potential for misunderstanding in an e-mail message, the same can be said for a formal memorandum (letter) with several layers of coordination."

"We have, in my view, on the integrating of e-mail into the workplace...a large number of misdirected efforts underway."

"As a professional I believe I should be able to use e-mail in any correspondence as long as it is neither immoral or illegal."

"Our computer teacher has our e-mail passwords. I do not like the idea that someone can read our mail!"

"I believe in some DoDD schools, there is a problem with privacy. I know one school where all e-mail must go through the principal."

"Our training on e-mail...should be on going. DoD invests in the hardware but not in the training."

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Educational reformers continued to stress the importance of collaboration among and between schools and the community (Means, 2000). Collaboration, collegial interchanges, and the networking of organizations and individuals were seen as essential components in the educational reform process. E-mail was viewed by many to be a technical innovation that was a critical component in making, building, and maintaining these collaborative efforts. The volume of e-mail traffic on the Internet continued to expand. A rapidly increasing number of people seemed to have an e-mail address and were corresponding with an ever-widening circle of friends and colleagues via e-mail. However, in schools the question could be asked: Was there a meaningful exchange of information by e-mail and does the collaboration and information sharing via e-mail among and between colleagues, co-workers, and the administration actually occur? Classroom teaching which has been noted as often being a rather isolated job could benefit from the collegiality and sharing of "best practices" that e-mail collaboration can offer.

This research explored eight research questions on e-mail usage in a large public school system. Using the results from a survey analysis, e-mail's

use in collaboration and network building, its use in organizational communication, and its value as a communication tool were evaluated. The conclusions from that evaluation are presented in the following sections.

E-mail's role in Collaboration and Network Building

Conclusions on E-mail's Use in Collaboration with Peers and the Importance of this Collaboration The review of literature on organizational collaboration indicated collaboration was a desirable goal for today's organization. The survey of use and attitude towards e-mail collaboration in the DoDDS system indicated there was moderate use of e-mail (3.05) in collaboration and a high composite mean (2.1) on the importance of this process. Both scores indicating respondents felt this collaboration was important.

Univariate analysis of response frequencies reported 79% of the respondents indicated they used e-mail "often" to contact others with like interests and responsibilities. Of the 204 respondents, 77% entered a positive, 1, 2, or 3 response when asked, "if they used e-mail to contacted subject area, grade level or work colleagues." One survey question asked "if respondents thought it was important to build a network of e-mail colleagues," 83.3% answered positively with a, 1 (42.2%), a, 2 (24.0%), or, 3 (17.2%). Only 2.0% strongly disagreed with the statement regarding the "importance of building a network of colleagues." When asked if they thought, "e-mail was an effective tool to build this collaboration," 83.8% gave a positive 1, 2, or, 3 answer.

The moderate scale scores and the high frequencies and percentages of positive responses indicated organizational members did use e-mail to make collegial and peer contacts through e-mail. The high composite scale score and the number of positive responses to the survey questions assessing the respondents' attitude towards making collegial and peer contacts also indicated that a large percentage of respondents did believe this contact and the building of this network of e-mail colleagues was important.

The survey asked several specific questions regarding the use of e-mail in training or workshop related sessions. Respondents were asked: "If e-mail should be used to gather more information from workshop or training sessions?" The frequencies and percentages of positive responses showed respondents agreeing (90%) that e-mail should be used for workshop and training follow up activities. When asked about their actual use of e-mail in a specific instance "to contact workshop trainers," only 43.0% "agreed" and indicated that they contacted trainers "often." When asked about actual use to contact fellow workshop participants, 53.9% indicated they made this contact "often."

It is evident by the item scores and the frequencies and percentages of positive responses that respondents do use e-mail to contact colleagues and peers. It is also evident that the respondents believe this building of a network of colleagues is important. It also appears, as has been stated above, that use of e-mail to contact workshop or training presenters and fellow workshop

participants is made less frequently. This use of e-mail to foster continued dialogue with workshop presenters and fellow workshop participants was an area that would seem to be of vital importance in a system with widely scattered facilities and employees. Research by Wageman (1995) suggested users needed training in communication and information seeking in order to effectively use these systems. The quality of these collaborative contacts and the actual amount of collaboration using e-mail in discussing curriculum and teaching matters, and finding ways to increase such activities would be an interesting follow-up research project.

Conclusions on the Importance of E-mail Communication with Those outside the Organization. Living and working overseas can often create a feeling of isolation. Communicating with those outside the organization or those located outside the direct influence of work can be important. Kling and Jewett (1995), as was described in the review of literature, suggested that in establishing open, natural, e-mail systems, organizations needed to use a more holistic approach to e-mail. What they described as the social ecology of the users must be considered when establishing e-mail policies. When one takes the user's social ecology under consideration, the holistic approach to e-mail policy would include not only work colleagues but also groups outside the organization including friends and family.

Three questions were used to assess the employee's attitude towards this open use of the organization's e-mail system. The composite scale mean of

2.5 indicated belief in the need to make these outside contacts. In addition, the univariate item median scores for the three questions relating to contacting those on the outside all indicated moderate agreement (2.0 mdn) with these three questions. The percentages of positive responses indicated (86.3%) they "would like to use e-mail to contact friends in the organization," and 81.4% indicated a desire to "use e-mail to contact others outside the organization." When asked to "agree" or "disagree" with a statement concerning contacting relatives, 78.4% indicated they would "like to use organizational e-mail to contact relatives." When asked about the importance of being able to contact others outside of the organization, 81.4% indicated that it was important.

Part of the attractiveness of e-mail was its ability to connect those located in a wide variety of geographic locations. The survey results indicated that respondents would like to use e-mail to correspond with friends and colleagues. The results from the survey also indicated employees believe it was important to maintain this contact not only with peers but also with those outside their immediate work place and outside of the organization. The relatively high number of "positive" responses would support the research question that this outside contact was important. Organizational policy that encouraged this contact through an open, natural system has a tendency to humanize the workplace (Kling & Jewett, 1995).

E-mail's Role in Organizational Communication

As was described in the review of literature, the move from the scientifically managed organization with organizational information flow from the top to bottom was gradually changing in schools. The school and its organizational culture–the way we do things around here–which supported communication, both up the system's chain of command as well as down is critical to building organizational collegiality and networked teams. E-mail had an important role in building this networked culture and then effectively making change happen.

Conclusions on Which Category of Organizational Member Uses E-mail More than other Members. It was noted in the review of literature that when supervisors are seen using an innovative approach to the job or using innovative communication tactics, subordinates are more likely to use the new process or medium. Survey questions relating to the amount of e-mail usage by respondents and their position in the organizational hierarchy were explored.

The Leib (1995) study found that district administrators were the most prolific e-mail users. The research on the DoDD schools further delineated the job categories and separated school level administrators from teacher and specialists at the elementary and secondary levels. The results of this further division provides evidence that administrators, both at school level and above, tended to use e-mail more than others in the organization. Median scores for the amount of e-mail sent per day in the "above school level category" indicated

that headquarters specialists (mdn = 15), headquarters administrators (mdn = 22.5), and support staff (mdn = 9) sent the most e-mail per day. This was followed at the "school level" by school administrators (mdn = 10). Elementary teachers and specialists (mdn = 2) and secondary teachers and specialists (mdn = 3) sent the least amount of e-mail. Similar median score ranges are found in the "e-mail received per day" category with headquarters administrators reporting a median score of 25 e-mail per day, school administrators at a median of 20 e-mail messages received per day, headquarters specialists at a median of 22.5 message received per day, and support staff at a median of nine messages received per day. Teacher, both elementary and secondary, again recorded the least amount of e-mail received per day at three and five messages per day respectively.

One possible explanation for more administrative use of e-mail but not explored in this study was that better access to an e-mail terminal has a positive effect on the frequency of e-mail use. Some of the teacher/specialists in this study did not have their own desktop access to an e-mail terminal at the time of this study. Lack of this direct access was noted in several of the respondents' comments to the last question of the survey asking for concerns on using e-mail.

It was interesting to note that when respondents were asked to classify themselves on their degree of e-mail expertise, 90% of the headquarters administrators, 66.7% of the headquarters specialists, 35.0% of the support

staff, 38.0% of the secondary teachers, 30.8% of the school administrators, and 11.7% of the elementary teachers considered themselves to be experts in the use of e-mail. A study involving e-mail usage and the respondent's perceived expertise on e-mail could possibly establish a connection, but was beyond the scope of this study.

Conclusions on a Relationship between Frequency of Use of E-mail and Communication between Individuals Separated by Multiple Layers of the Organization. As reported in the review of literature, a desirable feature of e-mail use was its potential to increase free and open communication between layers of the organization (Garton & Wellman, 1993; Sproull & Kiesler, 1991).

A multivariate scale mean of 3.4 indicated mid-range use and attitude regarding e-mail interchanges between layers of the organization. When respondents were asked about the frequency of contact by their supervisor via e-mail, 83.8% stated that they were contacted by their supervisor through e-mail "often." When asked about their uses of e-mail to contact their supervisor, 70.6% responded with "positive" rating on the re-coded scale. From these numbers, one could conclude there was a relatively frequent amount of interchange between supervisors and employees using e-mail. However, when asked about the "use of e-mail to collaborate or brainstorm with their supervisor," 63.0% indicated they "never" used e-mail to brainstorm with their supervisor. Of all the survey respondents, 62.7% indicated they would use e-mail to alert a superintendent or division chief to an organizational problem.

To answer the research question regarding a relationship between the amount of e-mail sent per day and e-mail exchanges between individuals, correlation analysis scores of the "number of e-mail messages sent per day" and the variables exploring "communication between layers of the organization" were positive. All of these r values were < -.47, p. < .002 and demonstrated moderate to low correlation. The t test for significance of mean differences was significant indicating differences in mean scores reflect actual differences in the user's attitude regarding the use of e-mail to communicate with a supervisor and amount of e-mail sent. Those who send more e-mail per day do have a better attitude towards the use of e-mail.

Interestingly, over half of all respondents, 52.9% indicated they would go above their supervisor to seek information. This statistic perhaps indicated a change in the "chain of command" ethic that was often in place in a "top down" system was taking place.

A positive relationship between the "amount of e-mail sent per day," the number of "e-mail exchanges between layers of the organization," and respondents' "attitude towards e-mail and that exchange" was supported by the statistical results. Those who send more e-mail do appear to have a better "attitude" towards its use in organizational communication.

Conclusions on the Relationship between the Frequency of E-mail Messages Sent per day and the Employees' Belief that they are Factually Informed. Sproull and Kiesler (1991) suggest that receiving e-mail can

influence an employees' attitude towards the organization by increasing their informational and emotional connection. The relationship between an employee's attitude about "being informed" and the "amount of e-mail sent per day" was explored. A multivariate scale mean of 2.7 indicated an overall positive attitude towards being informed through e-mail. Of the total sample, 86.8% recorded on the "strongly agree" side of the scale when asked if they were better informed through the implementation of e-mail. When respondents were asked about their use of the organization's electronic bulletin board, only 34.3% recorded "often" with a median scale score of 5.0 which indicates information was not being received by accessing the electronic bulletin board.

Survey respondents indicated they have a positive attitude towards e-mail and would like to receive more organizational information (79.4%). Respondents agreed (79.4%) that they are "more effective employees" through their use e-mail. Their relative agreement with this statement was also reflected in the univariate 2.0 median scale score.

A positive relationship between being informed and the amount of e-mail sent per day was established. Correlation analysis of the relationship between the five variables relating to being informed: "I receive organizational information...," I use the DoDDS bulletin board...," "I believe I am better informed..., and "I feel I am a more effective employee...," and the number of "e-mail messages sent per day" indicated a negative correlation which was interpreted as a positive correlation between the number of e-mail sent and

being informed (lower scale scores indicate more agreement). This correlation between the amount of e-mail sent and the low scale scores assessing the respondents' attitudes towards being informed indicated that those who send more e-mail do believe they are better informed through e-mail (lowers scale score indicated more agreement). The t test of mean differences between low e-mail senders (0 to 5) and high users (6 to 50) established significant mean differences in all but one variable used to answer this research question. The mean difference between low e-mail users and high e-mail users and the survey question "I would like to see more organizational communication...," however was found to not be significant. Correlation values were in the weak to moderate range but all significant at the p. <.01 level. All respondents in the 6 to 50 e-mail messages per day recorded lower scale scores indicating a relationship between the amount of e-mail sent per day and employees believing they are better informed on organizational matters. A relationship was established between the amount of e-mail sent per day and an employees' belief that they are better informed through e-mail communication.

Conclusions on Which Category of Organizational Member has the Most Favorable or Unfavorable Attitude towards use of E-mail in Accomplishing Job Related Work. The parameters of use and the communication culture that grows around its use are often affected by what Binning (1996) describes as the "champions." The champions are individuals or groups that are first interested in the technology and also the first to put it to use in their work.

This question of who are the champions and whether one category of employee had a more favorable or unfavorable attitude towards e-mail's use in the organization was explored.

A low reliability analysis score (.35) must be considered when reviewing the four item scores for this research question. Univariate descriptive statistics, however, indicated overall satisfaction with e-mail. A median item score of 1.0 indicated agreement with a statement regarding e-mail's usefulness as a tool to gather information. In addition, 94.6% of the 204 respondents indicated through positive responses that e-mail was a useful tool to gather information. When respondents were asked how they perceived the relationship between e-mail and success in their jobs, a large percentage (78.9%) indicated that it was important.

When delineated by job category, 85.7% of the above school level staff responded positively to this question indicating e-mail was important for success in their job. Seventy-two percent of the teachers and specialists at the secondary level agreed that "e-mail was important for success." Seventy percent of the teachers and specialists at the elementary level responded positively when answering this question. School administrators when asked "if they were better informed through e-mail," 90.4% of them responded that "they were better informed." The Lieb study in the Fullerton, California school district, found evidence that all e-mail users felt they were better informed on organizational matters through the use of e-mail.

The cross tabulation compared the percentages of positive responses from all respondents between their job category and the single statement regarding e-mail's importance for job success. That comparison of positive responses showed variations between job categories to be small. Of the 204 respondents, school administrators had the highest total with 23.0% responding positively when asked about e-mail's importance to success in the job. Elementary teachers had 20.6% responding positively. Positive responses were recorded by 17.6 % of the above school level employees. Positive responses were also indicated by 17.6% of the secondary teachers.

Attitudes towards e-mail and its importance to success in the job, delineated by job category, as has been stated, demonstrates rather consistent percentages of agreement among all categories. Schmitz (1987) concluded that when the supervisor uses CMC, subordinates are more likely to choose that medium.

Over all, 94.6% of the respondents indicated that e-mail was a useful tool to gather information. Feeling overloaded by e-mail was reported by 65.7% of the respondents. All four categories of employees–with little variation–indicated that e-mail was important to achieve success in their jobs.

Employee Attitudes towards E-mail as a Communication Medium

Attitudes towards e-mail and its use in the system as a communication tool can be critical to its success. As was reported in the review of literature, not all opinions on e-mail usage are positive. Rheingold (1997) suggests that

there are social costs to e-mail connections. Users can remain distant and can "flame" in relative obscurity. Stories of supervisors who no longer interacted with employees because it is easier to sit in their office and send e-mail directives or demands were not uncommon. All of these could affect attitudes towards e-mail's use as a communication tool in the organization. The employee's attitude towards the use of the e-mail medium to communicate are discussed in the following section.

Conclusions on are Employees Concerned about Possible Organizational Constraints in using E-mail to Contact others Outside the Organization. Organizational constraints in using e-mail to contact others outside the organization are imposed by many organizations. E-mail policy often restricted use to organizational purposes. Many organizations monitored use and employed programs that could screen for key words that might indicate other than "official use" e-mail. As has been stated, in this overseas organization, connection to other organizations, friends and relatives can be important. The variable scale median score (1 agree or 6 disagree) showed there was a moderate concern for privacy (3.0). About 62% percent of the respondents stated that they were concerned over the privacy of their e-mail. However, a large percentage of respondents (72.1%) believed the organization had encouraged open use of the organization's e-mail system. Over half (61.8%) indicated they would feel uncomfortable using organizational e-mail for other than official business. There seemed to be a conflict between what

respondents believe about the organization's promotion of open use and their feeling of being uncomfortable using organizational e-mail for other than official business-mail. This apparent conflict is an area of possible further study.

In summary, there was a concern for the privacy of organizational e-mail but most believed the organization had promoted an "open use" policy during the initial phases of e-mail implementation. Over half indicated they would feel uncomfortable using organizational e-mail for private matters.

Conclusions on Organizational Members Concern with the "Richness" of E-mail when Using E-mail to Communicate. E-mail, for some, was considered to be a weak communication medium devoid of visual, intonational and social cues. Robert Lengel and Richard Daft (1986) proposed the original "media richness theory" to answer questions regarding the quality of the communication when various media are used to convey information in an organization. Although e-mail was not part of their original studies, they would consider e-mail to rank low on the scale due to the potential in e-mail for confusion and lack of understanding between sender and receiver. They were concerned that the e-mail medium, unlike face to face interactions, possessed too much uncertainty and ambiguity to be considered a "rich" communication medium.

When respondents in this DoDD school study were asked if they preferred to send a letter instead of an e-mail for important organizational

issues, 67.6% indicated that they preferred to use e-mail. When respondents were asked if they preferred to use the telephone rather than e-mail for organizational matters, 55.5% of the 204 respondents stated that they preferred to use e-mail for those important organizational matters.

The composite scale mean of 3.9 indicates that there was concern regarding the richness of e-mail. The percentages of those indicating that they prefer to use e-mail rather than the telephone or a letter for organizational matters were near the fiftieth percentile. The mid-range percentages did indicate that a number of users were concerned about media richness and being understood when using e-mail.

Respondents in this study were asked specifically if they believed that they needed to adapt their e-mail writing style to make up for the lack of visual, auditory and social cues. More than half of respondents in this survey indicated they felt a need to adapt their writing style to accommodate their audience (62.7%). Accommodation theory suggests that communicators must adapt their communication style to accommodate their audience. Because the survey results also showed a need to adapt writing style, accommodation theory proposed by Street and Giles, which explores the communicator's need to adapt writing styles to accommodate the receiving audience, deserves to be investigated.

Other areas of study suggested that shared interactions in the workplace could help create a shared meaning. Therefore, the social influence

theorists concluded that e-mail richness improves as we become more social. Social influence theory as proposed by Fulk and others would perhaps provide insight into ways to improve e-mail and its "richness" when used in organizational communication.

Summary

E-mail was found to be by most respondents a useful tool to build collaboration among peer and other work colleagues. The respondents' attitude towards the use of e-mail for collaboration was positive and most indicated a willingness to use e-mail to build collaborative networks. The use of e-mail in specific workshop or training, follow-up, collaborative activities appears less developed. E-mail's use to maintain contact with presenters and participants of workshops and build a cadre of knowledgeable, interested people would be an important step in promoting educational reform and eliminating classroom isolation.

The use of organizational e-mail to contact relatives, friends and those outside the organizations was found to be important. This use of organizational e-mail for this purpose was perhaps more critical in the overseas location where e-mail connection and service was not always available in the home.

According to the survey results, administrators were the most prolific users of e-mail in organizational situations. Leaders who demonstrate and use

an innovative tool or concept can "champion" this innovation for others in the organization.

A positive relationship between the amount of e-mail sent per day and respondents' use of e-mail to communicate within layers of the organizational structure was established. "Flattening" of organizational communication through the use of e-mail and a willingness for employees to ask those "above" in the organizational hierarchy for information was evident. The survey results indicated employees do use e-mail to contact their supervisors. Those who send more e-mail per day had a more positive attitude towards e-mail and its use in information interchanges between layers of the organization. The amount of e-mail sent per day did correlate with a better attitude towards e-mail and also being better informed.

E-mail as a communication medium was also explored in this study. Respondents were concerned about the privacy of their e-mail, but many believed the organization had promoted open use of the e-mail system. Many respondents preferred to use e-mail instead of a letter or the telephone for most organizational matters but the percentages were near the fiftieth percentile range. Therefore, a number of respondents did believe they needed to adapt their writing style and were concerned over others understanding their e-mail messages.

As the review of literature highlighted, e-mail network guidelines and training should be developed to encourage employee access and involvement in

organizational issues. Participation in e-mail collaboration initiatives should be promoted and encouraged. Collaboration facilitators should be used to promote interchange and collaboration in the system.

Limitations of the Study

No study is without limitations. The goal of research is to minimize or eliminate limitations as much as possible in order to present reliable research data and conclusions. One of the first concerns of survey research is to achieve an acceptable response rate. This study did produce an excellent response rate with an adjusted 68% return rate for the surveys.

Another concern of survey research is the problem created when respondents fail to answer certain questions, which in turn produces missing data. The surveys questions used in this study were not subject to missing information. The 204 respondents answered all survey questions. However, confusion in answering three survey questions required their being dropped from the analysis.

Another concern is possible response bias created by respondents' concern for the anonymity of their responses. Participants' names did not appear on the survey and the surveys were not coded to track individual respondents. It appears that the responses received from this survey were not biased by fear of name disclosure.

In order for exploratory, descriptive research to be effective, a well designed survey that asks probing questions related to the employees'

perceptions and attitudes towards the use of e-mail is critical. To aid in the design of that survey, the survey instrument was piloted and reviewed for ease of read- ability, clarity of organization, and checked for question ambiguity before the final sampling took place.

Construction of survey questions that are free of error and bias is a difficult task. The greater the amount of bias and error, the less reliable and valid the survey results will be. Alpha reliability scores on two of the research questions were very low. A third was near the research goal of >. 70. Scale scores from the three low alpha reliability questions provide insights into the respondent's attitudes on the complex issue of e-mail usage, but are perhaps not generalizable to other organizations.

Survey responses using the six-point scale were found in many cases to exhibit "floor"effects with most responses recording on the positive side of the scale. In addition, the "scale/interval" survey statistic that recorded the amount of e-mail sent and received by the respondents displayed extreme outliers and therefore did not display the "normal" distributions needed for parametric analysis of the data. These asymmetric results created the need to conduct several non-parametric statistical measures and to recode selected variables to meet statistical significance on others. Three questions were directed at supervisors' use of e-mail to solicit information from employees, confusion over the survey instructions to use the scale number 6 or "disagree" if it did not apply, required these to be dropped from the study.

This study was designed to explore employee attitudes and perceptions of their use of e-mail to communicate with others. This study was not designed to test theory but as descriptive research project. The population of interest in this study represents a rather unique segment of the American school system and therefore the results are perhaps not generalizable to all school systems.

Another possible limitation to the study was the fact that the researcher is directly involved in the organization and this could possibly bias the results of the study. This involvement in the organization, however, does provide insight into the organization that would have been perhaps missed by an outside observer. This study's primary purpose was exploratory in nature.

Recommendations for Future Research

The potential for e-mail to build meaningful connections between and among those in the school community is exciting. The very nature of schools and teaching can build isolation and a tendency for teachers to withdraw into the classroom. For schools, there has been an inclination not to interact with their clientele–students and parents–in meaningful, inclusive ways. Further studies that explore how to best to use this e-mail connection and provide meaningful exchanges of information in the school community are essential for its success and the success of education.

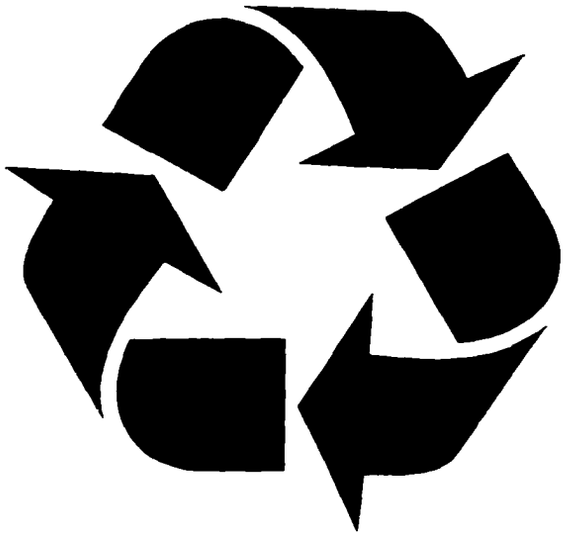
To be successful, e-mail must be all-inclusive and it must provide specific guidelines and encouragement for individuals to build the collaboration and networks of individual. These "humanistic" guidelines will

provide the impetus for the paradigm changes necessary for true school improvement and the networked school community. Further development of these e-mail guidelines to encourage collaboration and networking is needed. Exploration to define the role of networking in workshop and training experiences needs further research. The "network" or "collaboration" facilitator and their role in the process of guiding teachers, students, administrators and the community into increased collegiality and collaboration in the expanded school community will be important. Established guidelines and communication models for e-mail facilitators to become successful mentors should be instituted in the system. Accommodation theory and critical social theory and their relevance to better e-mail communication should be investigated. In order for e-mail to achieve the potential that has been highlighted in this study, further focused study is necessary.

APPENDIX A

SURVEY DOCUMENT

Electronic Mail Communication in a Worldwide K-12 School System



Please take a few moments to answer these questions about your use of e-mail(CC Mail) in the workplace. You are part of a very carefully selected sample, and your responses are extremely important. Identity of the participants will be kept strictly confidential. Your responses are strictly anonymous. Your participation is voluntary and there is no penalty for refusing to participate in the study. However your participation and opinions are valued and a crucial part of this study.

Please answer all questions, but if you wish to comment on any question or qualify your answer, please feel free to use the space in the margins. A self-addressed, postage-paid envelope is enclosed for your convenience. You can simply drop the questionnaire in the mail when you are done. A return date of 21 May, 1999 would be appreciated. Thank you for your cooperation on this project.

Robert W. Gahagan
Unit 30401, Box 2496
APO, AE 09131
University of Oklahoma

About Your Use of E-Mail as a Tool to Communicate and Gather Information

E- mail has become an important communication tool. The items below ask you about your use of e-mail to gather information and communicate with your superiors. colleagues or the employees you supervise. Please circle a number to indicate how **OFTEN or NEVER** you do the following. The Scale ranges from **1=OFTEN to 6=NEVER . If the questions is not applicable, circle** 6 **(never)**

		Often					Never
1.	I use e-mail to keep in contact with others with like interests or responsibilities.	1	2	3	4	5	6
2.	My supervisor uses e-mail to communicate with me.	1	2	3	4	5	6
3.	I use e-mail to contact my direct supervisor.	1	2	3	4	5	6
4.	I receive organizational information about my job through e-mail.	1	2	3	4	5	6
5.	I use e-mail to gather information from employees I supervise.	1	2	3	4	5	6
6.	I use e-mail to contact subject area/grade level or work colleagues.	1	2	3	4	5	6
7.	If I have any concerns about organizational directives, I use e-mail to get answers from those above my immediate superior.	1	2	3	4	5	6
8.	I use e-mail to brainstorm or generate ideas with my supervisor when solving an organizational problem.	1	2	3	4	5	6
9.	I use the DoDDS Electronic Bulletin Board to get organizational information.	1	2	3	4	5	6
10.	I use e-mail to ask workshop trainers for additional follow-up information.	1	2	3	4	5	6
11.	I would use e-mail to alert my Superintentent/Division Chief to a concern that I have.	1	2	3	4	5	6
12.	I use e-mail to give work assignments to employees I supervise.	1	2	3	4	5	6
13.	I use e-mail to contact fellow participants of workshops or training I have attended.	1	2	3	4	5	6
		Often					Never

Continued on Next Page

About your Use of E-mail to Contact Colleagues and Friends

Collegiality and sharing information is important in organizations. The items below ask you about your use of e-mail to communicate with your colleagues or friends and its use to gather information. Please circle a number to indicate how strongly you **AGREE** or **DISAGREE** with the following statements.The Scale ranges from **1= STRONGLY AGREE to 6= STRONGLY DISAGREE**

		Strongly Agree					Strongly Disagree
14.	I believe it is important to build a network of e-mail colleagues.	1	2	3	4	5	6
15.	I would use e-mail to alert my supervisors to an organizational problem.	1	2	3	4	5	6
16.	E-mail is an effective tool to build collaboration among colleagues.	1	2	3	4	5	6
17.	E-mail is a useful tool to gather information from others.	1	2	3	4	5	6
18.	I communicate with my peers more through e-mail now than I did before it was installed.	1	2	3	4	5	6
19.	I believe the use of e-mail is very important for me to succeed in my job..	1	2	3	4	5	6
20.	I believe that e-mail helps me be more effective in building collaboration among my colleagues.	1	2	3	4	5	6
21.	I believe that I am better informed about organizational matters because of e-mail.	1	2	3	4	5	6
22.	I would like to receive e-mail alerts about organizational problems from people I supervise.	1	2	3	4	5	6
23	I would like to use e-mail to contact relatives who have e-mail address.	1	2	3	4	5	6
24.	Using e-mail to send group mailings of information (listserves) to build collegiality is important.	1	2	3	4	5	6
25.	I would like to see more organizational communication using e-mail to keep me informed about work issues.	1	2	3	4	5	6
		Strongly Agree					Strongly Disagree

About Your choice of E-mail to Communicate with Others

The items below ask your opinion about your choice of e-mail to communicate with others and its usefulness in the communication process. Please circle a number to indicate how strongly you **AGREE or DISAGREE** with the following statements.The Scale ranges from **1= STRONGLY AGREE to 6=STRONGLY DISAGREE.**

		Strongly Agree					Strongly Disagree
26.	I feel I am a more effective employee/ teacher because of my use of e-mail to communicate.	1	2	3	4	5	6
27.	I prefer to send a letter rather than an e-mail message for important organizational information.	1	2	3	4	5	6
28.	I am concerned about the privacy of my e-mail.	1	2	3	4	5	6
29.	I prefer to use the telephone rather than e-mail for most organizational matters.	1	2	3	4	5	6
30.	Because of the lack of visual, auditory and social cues inherent in e-mail, I am concerned about others understanding information in my e-mail messages.	1	2	3	4	5	6
31.	I believe when I write an e-mail, I need to adapt my writing style to make up for the lack of visual, auditory and social cues inherent in e-mail.	1	2	3	4	5	6
32.	I think it important to be able to use e-mail to contact friends in other locations in the organization.	1	2	3	4	5	6
33.	I think it is important to be able to keep in contact with others outside the organization through e-mail.	1	2	3	4	5	6
34.	I believe the organization has encouraged the open use of e-mail.	1	2	3	4	5	6
35.	I often feel overloaded by the number of e-mail messages I receive.	1	2	3	4	5	6
36.	I would feel uncomfortable if I used e-mail at work for other than official business.	1	2	3	4	5	6
		Strongly Agree					Strongly Disagree

Continued on Next Page

E-MAIL TO COMMUNICATE WITH OTHERS CONT.

		Strongly Agree					Strongly Disagree
37.	I believe e-mail correspondence should be used to provide follow-up collaboration to workshops or training I have attended.	1	2	3	4	5	6
38.	I believe e-mail has a negative impact on my work performance.	1	2	3	4	5	6

ABOUT YOUR BACKGROUND

39. Please Identify the position that **best** describes the job you currently hold: (Please "X" one.)

Teacher/Specialist Secondary level	☐		1
Teacher/Specialist Elementary level	☐		2
School Administrator	☐		3
40. Headquarters/Area/District Office Educator	☐	"Headquarters/Area or District Office Educator" includes any certificated personnel above school level, i.e. curriculum specialist, education specialist	4
Headquarters/Area or District Administrator	☐	"Headquarters/District or Area Administrator" includes any superintendent, assistant superintendent or division chief at any level.	5
Support Staff	☐	"Support Staff" includes any supply, personnel, logistic, fiscal, technology and secretarial type positions at any level.	6

41. Please indicate your degree of expertise on the use of e-mail.

1. Novice	☐	7
2. Basic understanding of features.	☐	8
3. Expert	☐	9

42. Please indicate how many e-mails you **send** on the average per **day.**	☐	10
43. Please indicate how many e-mails you **send** on the average per **week.**	☐	11
44. Please indicate how many e-mails you **receive** on the average per **day**.	☐	12
45. Please indicate many e-mails you **receive** on the average per **week.**	☐	13

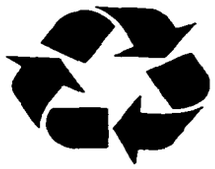
Continued on Next Page

ANYTHING ELSE?

46. Is there anything else you would like to tell me about your use of e-mail in the organization and as a communication medium? If so, please use the space below for that purpose. Any comments that you think would be helpful to better utilize e-mail communication would be appreciated.

Your contribution to this effort is very greatly appreciated. If you would like a summary of the results, please print your name and address on the back of the return envelope (NOT on this questionaire). We will see that you get it.

APPENDIX B
INTRODUCTORY LETTER



26 April. 1999

Dear Colleagues,

Electronic mail or e-mail has become an important communication tool in the workplace. This study, entitled - **Electronic Mail Communication in a Worldwide K-12 School System** investigates this use of e- mail in the workplace. Employee use, attitudes, and perceptions on its use as a communication tool will be documented and interpreted in order to better understand the dynamics of e-mail communication in the work environment.

As an employee of the school system, your input is extremely important. You are part of a very carefully selected sample and your candid responses are extremely important. Please take 10 - 15 minutes to answer these confidential questions about your use of e-mail (CCMail) in the workplace. Please answer all questions, but if you wish to comment on any question or qualify your answer, please feel free to use the space in the margins. Identity of the participants will be kept strictly confidential. Your participation is voluntary and there is no penalty for refusing to participate in the study. However your participation and opinions are valued and a crucial part of this study.

The results of the survey will provide insights and information for organizations planning or revising electronic mail policies, practices and training. This research study is being conducted under the auspices of the University of Oklahoma, Norman Campus and approved by the DoDDS Research Division.

Please return the completed form and any comments to Bob Gahagan Unit 30401, Box 2496, APO, AE 09131. A stamped, addressed envelope is provided for this purpose.
Any Questions regarding this study should be directed to Bob Gahagan - (049)711 6877-225 or FAX (049)711-6877-134 or by E-Mail to bob_gahagan@odedodea.edu or bob_gahagan@ compuserve.com.

Thank you for your assistance.

Sincerely,

Bob Gahagan

REFERENCES

Allen, T. J.. & Hauptman, O. (1987). Influence of communication technologies on organizational structure. Communication Research, 14(5), 575.

Alreck, P. L.& Settle, R. B. (1995). The survey research handbook, (2nd ed.). New York: Irwin, McGraw-Hill.

Barnes, S. & Greller, L. M. (1994). Computer-mediated communication in the organization. Communication Education, 43, 129-142.

Barzelay, M. (1992). Breaking through bureaucracy: a new vision for managing government. Berkeley Calif.: Univ. California Press.

Beard, F. (1995). Marketing clients and their advertising agencies: the antecedents and consequences of client role ambiguity in complex service production. Doctoral dissertation, University of Oklahoma, Norman.

Betts, F. (1994). On the birth of the communication age: A conversation with David Thornburg. Educational Leadership, 51(7), 20-23.

Binning, B. (1996). Universal E-mail. Original published in On the Horizon, May/June, 1996. Retrieved May 1997 from the World Wide Web: http://www.busn.ucok.edu/desci/binning/uni-e-m.htm.

Burgstahler, S., & Swift, C. (1996). Enhanced learning through electronic communities: a research review. February, Retrieved February,

1998 from the World Wide Web: http://inform.ospi.wednet.edu/ELTEC/research_report.html.

Copin, P. (1995). Connecting classrooms through telecommunications. Education Leadership, 53(2), 44-47.

Crook, C. W. & Booth, R. (1997). Building rapport in electronic mail using accommodation theory. SAM Advanced Management Journal, 62(1), 4 - 14.

Daft, R. L. & Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. Management Science, 32(5), 554-571.

Dillman, D.A. (1978). Mail and telephone surveys: the total design method. New York: John Wiley and Sons.

Drucker, P. F. (1988). The coming of the new organization. Harvard Business Review. Jan. /Feb.

Duin, A. H. & Archee, R. (1996). Collaboration via e-mail and internet relay chat: understanding time and technology. Technical Communication, 43(4), 402-413.

Dyrli, O. E., (1995). E-mail bridges to school collaboration. Technology and learning, 16(2), 26-27.

Garton, L. & Wellman, B. (1993). Social impacts of electronic mail in organizations: a review of research literature. Retrieved September 1998 from the World Wide Web: http://www.dgp.utoronto.ca/tp/papers/9313.

Greengard, S. (1995). E-mail: using your connections. Personnel Journal, 74(9), 161-167.

Guzzo, R., A. & Dickson, M., W. (1996). Teams in organizations: recent research on performance and effectiveness. Annual Review of Psychology, 47, 307-339.

Hequet, M. (1995). E-mail spins a new web at work. Training, 32(8), 53-58.

Kimbal, L. (1995). Ten ways to make online learning groups work. Educational Leadership, 53(2) 54–56.

Kiess, H.O. (1989). Statistical concepts for the behavioral sciences. Massachusetts: Allyn and Bacon. 294-296.

Kling, R. & Jewett, T. (1995). The social design of worklife with computers and networks: an open natural systems perspective. Retrieved October 1998 from the World Wide Web: http://www.slis.indina.edu/~kling/pbs/worknt.html.

Kydd, C. K. & Ferry, D. L. (n.d.). Electronic mail and new methods for measuring media richness. Retrieved November 1998 from the World Wide Web: http: kyddc@college.be.udel.edu. htm.

Leidner, D., E. & Jarvenpaa, S. L. (1995). The use of information technology to enhance management school education: a theoretical view. MIS Quarterly, 19(3) 265-292.

Lentini, M. (1995). Use of communication resources in a networked collaborative design environment. Interactive Media Group. Cornell Univ., 1-12.

Lieb, J. M. (1995). The impact of intra-district communications using electronic mail on the Fullerton school district. (Dissertation). Los Angeles, CA: University of Southern California.

Lindeborg, R. A. (1994). Excellent communication. Public Relations Quarterly, 39(1), 12.

Means, Barbara (2000). Technology in America's Schools: Before and After Y2K, Education in a New Era, ASCD Year Book. VA: ASCD. 185-206.

Moeller, B. (1995). Collaborating online: LANs as a group learning tool. Electronic Learning, 14(5), 16-17.

Mohr, J. J. (1995). Communication flow in distribution channels: impact on assessment of communication quality and satisfaction. Journal of Retailing, 71(4), 393-417.

Nielsen survey report (2000). Retrieved June 2001 from the World Wide Web: http: //www.Nielsen-netratings.com.

Noble, D. D. (1996). Mad rushes into the future: the overselling of educational technology. Educational Leadership, 54(3), 18-24.

Orlikowski, W. J., Yates, J., Okamura, K. & Fujimoto, M. (1994). The metastructuring of technology in use. MIT Sloan School working paper. Wanda@mit.edu, jyates@mit.edu.

Parson, P. (1997). Electronic mail: creating a community of learners. Journal of Adolescent and Adult Literacy 40(7), 560-565.

Partee, M. H. (1996). Using e-mail, web sites and newsgroups to enhance traditional classroom instruction. THE Journal (Technological Horizons in Education), 23(11), 79-83.

Peha, J. M. (1995). How K-12 teachers are using computer networks (how technology is transforming teaching). Educational Leadership, 53(2), 18-26.

Peterson, R.A. (1994). A meta-analysis of Cronbach's coefficient alpha. Journal of consumer research, 21(2), 381-392.

Rheingold, H. (1997). The virtual community, Reviewed in Science, 277, 295.

Role of technology in the systemic reform of education and training. The part 1. (nd). Distance Learning Resource Network (DLRN) Far West Laboratory, San Francisco, CA. Retrieved November 1998 from the World Wide Web: http://www.fwl.org/edtech/reformtechpart1.html.

Schmitz, J. & Fulk, J. (1991). Organizational colleagues, media richness and electronic mail. Communication Research, 18(4), 487-523.

Shaffer, J. (1997). Reinventing communication. Communication World, 14(3), 20-24.

Snider, J. H. (1996). Education wars: the battle over information-age technology. The Futurist, 30(3), 24-30.

Spring, J. H. (1994). The American school, 1642-1993 (3rd ed.). New York: McGraw-Hill, 256.

Sproull, L. & Kiesler, S. (1991). Connections: new ways of working in networked organizations. Cambridge, MA: MIT, 59-64, 88-89.

SPSS Base 10.0 Application Guide. (1999). Chicago: SPSS.

Stamps, D. (1997). A conversation with doctor paradox (Richard Farson). Training, 34(5), 42-49.

Stillman, N. J. (1996). E-mail: essential ingredient in streamlining operations. The Public Manager: the new Bureaucrat, 25(1), 53-61.

Swanson, D. J. (1993). Towards a policy for managing the use of computer mediated communication in the workplace. Retrieved November 1998 from World Wide Web: http://www.swanson.93txt@ infosoc.uni-koeln.de.

Taylor, J. & MacDonald, J. (n.d.). Electronic mail, communication and social identity: a social psychological analysis of computer-mediated interactions. Retrieved May 1998 from World Wide Web: http://xanadu.bournemouth.ac.uk/CDTAYOR/TAYLOR.HTM.

Trevino, L. K., Lengel, R. H. & Daft, R. L. (1987). Media symbolism, media richness, and media choice in organizations. Communication Research, 14(5), 553-574.

Valacich, J. F., Parankka, D., George, J. F. & Nunmaker, J.F. Jr. (1993). Communication concurrency and the new media a new dimension for media richness. Communication Research, 20(2), 249-276.

Wageman, R. (1995). Interdependence and group effectiveness. Administrative Science Quarterly, 40(1), 45-181.

Wagner, T. (2001). Leadership for learning – An action theory of school change. Kappan, 82(5), 379.

Walther, J., Anderson, J. F. & Park, D. W. (1994). Interpersonal effects in computer-mediated interaction. Communication Research, 21(4), 460-487.

Webster, J. & Trevino, L. K. (1995). Rational and social theories as complementary explanations of communication media choices: two policy-capturing studies. Academy of Management Journal, 38(6), 1544-1573.

Wellman, B., Salaff, J., Dimitrova, D., Garton, L., Gulia, M., & Haythornthwaite, C., (1996). Computer networks as social networks: collaborative work, telework, and virtual community. Annual Review of Sociology, 22, 213-239.

Wiersma, W. (1995). Research methods in education. Needham, MA: Simon & Schuster. 294-297.

Williams, F. (1992). Reasoning with statistics-how to read quantitative research. Orlando FL: Harcourt Brace. 189 – 191.