4-1996

The Introduction of E-Mail and its Effect on the Expanded Use of Computers Among Teachers in the La Porte Schools

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THE INTRODUCTION OF E-MAIL AND ITS EFFECT ON THE EXPANDED USE OF COMPUTERS AMONG TEACHERS IN THE LA PORTE SCHOOLS

by

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A Project Report
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Specialist in Education
Department of Educational Leadership

Western Michigan University
Kalamazoo, Michigan
April 1996

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Western Michigan University, 1996

Despite a major investment in technology by the LaPorte, Indiana school district, some teachers were not using the computers installed in their buildings and classrooms. Consequently, they were not using instructional applications. This project is intended to demon strate that where building level e-mail had been intro duced, there was an increase in the number of teachers using computers and instructional applications.

Data were collected with a survey of teachers to determine the extent to which computers, computer applications, and other technology were being used in the district. Extent of use was analyzed for two groups: (1) teachers who had e-mail, and (2) teachers who did not have e-mail.

It was found that the introduction of e-mail resulted in a notable increase in the number of teachers using computers on a daily basis. Further it was found that the increase in computer use resulted in the expanded use of certain instructional applications.

ACKNOWLEDGMENTS

I wish to thank my advisor and committee chair, Dr. Mary Anne Bunda, and committee member Dr. Uldis Smidchens for their patience and constructive criticism; Dr. Rollin Douma for his persistence; fellow "Hoosier" Dr. Eugene Thompson for his consultation and Dr. Peggy Ondrovich for her understanding and support.

I wish to acknowledge my mother, Alice Randall, for her unwavering belief in my abilities and to the memory of my father, Dr. Donald Randall, a worthy role model who always pushed me to set higher goals. Dad would have been proud.

For her support and encouragement, I also wish to thank M. Laurie Randall. my wife and partner in education for 32 years.

David M. Randall

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CHAPTER I

INTRODUCTION

After a decade of seeing increasing numbers of computers in the classrooms of LaPorte Community Schools, the expectation that widespread, dramatic changes would occur in curriculum and the delivery of instruction across the district had not materialized. Some LaPorte teachers, realizing how computers and related technologies can contribute to a rich and vital curriculum, were applying technology successfully. The uses of word processing, data bases, simulations, CD-ROM, electronic communication, and multimedia to enhance teaching, learning, problem solving, and communications were increasing. Most teachers, however, had not moved beyond using computers for drill and practice and some were not using computers at all.

Through capital fund expenditures, the state of Indiana had allowed school districts to set aside a portion of their capital projects budget for technology. In addition, various local, state, and federal grants had been acquired to fund classroom technology in LaPorte. Over the course of the last five years under this plan, LaPorte has reported, in their annual audit, expenditures

of more than 3.5 million dollars on classroom technology. Most of that had gone toward computers in classrooms. Not counting computers more than eight years old, which are now considered to be obsolete, the district can account for 1478 computers in classrooms, instructional labs, and offices (LPCSC Equipment Inventory, 1995). That works out to be one computer for every 4.7 students and instructional staff members in the district (LPCSC Membership Report, 1995). With an investment of this magnitude, the district was rightfully concerned about the use being made of these computers and the impact on curriculum and instruction.

A survey conducted of staff by the school district in 1992 (Corporation-Wide Technology Committee, 1993), indicated that despite the increasing number of computers available, teachers were not applying the technology adequately. In fact, among teachers who had computers available, 30 percent indicated that they used the technology less than once per week. The survey indicated that teachers who were not using computers said they were uncomfortable with the technology, were not adequately trained, or did not have a computer available to them.

In the last three years, the LaPorte Schools have continued with their long range plan of computer and software acquisition (Corporation-Wide Technology Committee, 1990) and have stepped up training for staff. In

1993, the first building level or local area network (LAN) was installed at an elementary school. This network connected computers within the building together allowing for electronic communication (e-mail), the sharing of software and the transfer of data between connected computers. LANs were installed at two more elementaries and a middle school in 1994. By early 1995, principals of these buildings began to report notable increases in computer use among staff members. Of particular note to the principals was the sudden interest in computers observed among teachers who had not used computers frequently, or who had expressed discomfort with the technology. This was reported to the author during individual interviews held in April, 1995. The principals noted that all of their teachers had access to a computer for their own personal use for at least a year prior to the installation of the building network. In addition, all teachers in these building had received basic training in computer use and word processing. Some still were not using the computers. What made the difference for the non-users, the principals observed, was the installation of the LAN.

The building networks have great promise for assisting administrative functions such as attendance, grading, student data retrieval and reports. Software used incommon across the building can be accessed by personal

computers through the central terminal or server. But the single application getting the most use from the newly installed LANs was e-mail. Teachers were talking with each other via the computer. They were using e-mail to send messages when they couldn't get together to talk. They were e-mailing the principal when they had a question or concern and no time to make an appointment. They liked answering the e-mail on their own time. There were no disruptions of class and no paper notes to lose. E-mail is a non-threatening computer application and relatively simple to learn and use. For teachers, e-mail had become an efficient extention of their social and collegial network.

Teachers choosing not to use e-mail ran the risk of missing out on an emerging form of communication with colleagues. Not to be left out of the collegial communication loop, teachers who were not using their computer prior to the installation of the building LAN, were warming up to the equipment using e-mail. This project is intended to demonstrate that where LAN e-mail has been introduced, there has been an increase in the number of teachers using computers.

CHAPTER II

REVIEW OF RELATED LITERATURE

The review of literature associated with this project is organized into the following three categories: (1) the importance of computers to instruction in the classroom; (2) factors associated with teachers' use of computers; and (3) e-mail as a factor influencing the use of computers.

The Importance of Computers to Instruction in the Classroom

In the 1980s, the United States experienced dramatic growth in the use of computers for instructional purposes. According to a 1988 report from the U. S. Congress, Office of Technology Assessment (OTA) (as cited in Software Publishers Association, 1995), the percentage of schools with one or more computers had grown from 18 percent in 1981 to 95 percent in 1987. By 1995, the OTA estimates that more than 5.8 million computers were installed in the nation's 109,000 public and private K-12 schools for instruction (U.S. Government, Office of Technology Assessment, 1995).

Did all the money spent on computers in classrooms actually produce results? In the view of many research-

ers, the answer is yes. A study by Apple Computer (as cited in Templin, 1995), suggested a 10% to 15% increase in test scores when the computer was used by students as a drill and practice tutor. This study also suggested that students working on a computer typically took about a third less time to complete work than with traditional pencil and paper drill. An analysis of computer-based instruction reported by Kulik and Kulik (1991) noted that schools can dramatically improve the achievement level of high-aptitude learners by providing more challenging programs. Further, they stated:

> The next most potent innovations involve individual tutoring by computers or by other students...computer tutoring seems to be slightly more effective. Instructional technologies that rely on paper and pencil are at the bottom of the scale of effectiveness (p. 82).

In its latest study, the OTA questioned the most accomplished computer-using teachers and reported the following benefits of computers in the classroom (U.S. Government, Office of Technology Assessment, 1995):

1. 72% said they could expect more from their students in terms of pursuing and editing work.

2. 70% said they spent more time with individual students.

3. 65% stated that they were more comfortable with students working independently.

4. 63% said they could present more complex mate-

rial to students.

5. 61% said they were better able to tailor instruction to individual student needs.

6. 52% said they spent less time lecturing.

In separate studies, the Software Publishers Association (1995), and SRI International (as cited in Templin, 1995), agreed that computers appeared to be an effective tool for connecting with poor or minority children. They also reported that the use of computers in the classroom appeared to improve student satisfaction and participation. The SRI research studied the use of computers as writing tools. They reported that in nearly all cases, students writing on computers were more willing to work intensely and more willing to revise their writing than students writing without computers. A ten year study by Apple Computer, Apple Classrooms of Tomorrow (as cited in West, 1995), concludes that one of the most effective uses of classroom computers is as a collaborative project and research tool where students work together in teams of two or three. Their findings suggest that fewer computers in the classroom may actually produce more effective use of technology.

A recently concluded, five year study commissioned by the Software Publishers Association is one of the most comprehensive reports on the importance of computers in the classroom. The Report on the Effectiveness of Tech-

nology in Schools, 1995-1996, summarizes 176 research studies conducted between 1990 and 1995 (Software Publishers Association, 1995). The following are relevant major findings of this report:

1. Educational technology has demonstrated a positive effect on achievement in all major subject areas, at all levels, and for regular education as well as special needs students.

2. Interactive video appears to be especially effective for teaching skills and concepts that have a visual component.

3. Some reports indicate that academic skills improve with the use of on-line telecommunications for collaboration involving classes in different geographic locations.

4. Students felt more successful, were more motivated to learn and had higher self-confidence and self-esteem when working with computer instruction.

5. Introducing technology into a classroom can make learning more student-centered, encourage collaboration, and stimulate teacher-student interaction.

6. Student-to-student and student-to-teacher interaction increased where computer-based networks were installed. Students who seldom participated in discussions in their classrooms became more active in on-line situations.

7. Greater student cooperation, sharing and helping resulted when students used computer-based learning designed so that they competed against the computer rather than against each other.

In a published interview by John O'Neil (1995), Chris Dede, futurist and expert on educational technology, stated that the impact of technology on K-12 education will depend on the teaching and learning models we employ. He said that if we use technology only to enhance our traditional models, it will have little or no effect. Dede went on to say, "If it's used to enable new models of teaching and learning, models that can't be implemented without technology, then I think it'll have a major impact on schools" (p. 6).

Factors Associated With Teachers' Use of Computers

It has been reported by Vakalis (1990), Hurst (1994), and others that the integration of computers into the curriculum is dependent on teachers' level of comfort with the technology and the use of the technology as a normal part of their work day. It was further noted by Vakalis (1990) that where teachers use computers, the technology provides a range of resources enabling them "to focus more on the quality of the teaching process than on the delivery of content alone" (p. 4). But a

two-year study released in April by the OTA (U.S. Congress, Office of Technology Assessment, 1995), found that while 68% of teachers said they had access to computers, only 42% of those surveyed said they used computers as part of their curriculum. More than 50% said they had access to instructional software, but only 32% said they used it in the classroom. Educational technology expert Chris Dede concurs with this finding (O'Neil, 1995). Dede concluded that a mistake we made in implementing technology in the classroom was to focus first on students rather than teachers. He stated, "...when the computers on students' desks are mysterious devices to teachers, it's unreasonable to expect effective integration (of the technology) into the curriculum" (p. 7). The OTA report (1995) cited four reasons why teachers are not utilizing new technologies:

1. Classrooms are insufficiently stocked, powered or wired for computer use. Many computers located in classrooms are older, outdated models which do not support new applications or software.

2. Teachers are inadequately trained in how to use the new technologies. Training, where it exists, usually focuses on the mechanics of operating the machines, instead of on how the machines can benefit instruction.

3. There is a lack of clear vision regarding the role of technology in schools.

4. There is insufficient time for teachers to learn and get comfortable with the new technologies.

The Panasonic Foundation believes that experience is a factor in why teachers are not using computers. In a collaborative paper with the American Association of School Administrators, the Panasonic Foundation (1995) concluded that teachers have been so overwhelmed with the routine day-to-day delivery of instruction, that they have had little personal experience with technology's advanced capabilities. Without the experience, they said, teachers will have trouble developing a vision of how technology could be used to achieve educational goals.

If teachers are to use technology effectively in the classroom, their needs for adequate and appropriate in-service training must be met. This is the conclusion of several writers and researchers including Shore (1995), Baskin (1985), Solomon (1995), Hurst (1994), West (1995), Sandholtz (1995), and others. David Hurst elaborated on the point by saying that the site and timing for teacher training were also factors. Hurst found that computers were often not readily available when teachers had the time to use them. He also found that teachers were reluctant to pursue learning and practice on the computer when students were around. They did not want to look foolish in front of students.

To apply technology effectively in the classroom,

teachers need a basic understanding of computers and some interest in their uses. In the early stages, teachers' attitudes were often resistant to new technology (Vakalis, 1990). Baskin (1985) cites a "computer mystique" which intimidates some teachers into not using computers. This is supported by Joseph (1995), who goes on to say that some teachers have an outright fear of technology, estimating that one in five adults fear computers too much to try them. She also reports that some teachers express their dislike for computers saying they resent the intrusion of the technology on their traditional methods of teaching and that computer use is not essential to success in the classroom. In her 1990 study, Vakalis states the following regarding computer anxiety:

> The computer has long since proven its fantastic speed, accuracy, versatility, and all-around usefulness, yet man has hesitated to deal with this machine, displaying an attitude which seems akin to fear, the result of a lack of understanding of the basic nature of the device, an ignorance which many cultivate and shelter carefully, and a fear or dislike of the complexity which has traditionally surrounded the access to the computer (p. 19).

Rutherford and Grana (1995) cite nine fears which inhibit teachers in learning new technologies: (1) fear of change, (2) fear of time commitment, (3) fear of appearing incompetent in front of colleagues and students, (4) fear of techno lingo, (5) fear of failure, (6) fear

of not knowing where to start, (7) fear of being married to bad choices, (8) fear of having to become a beginner again, and (9) fear of rejection or reprisals.

In his book, Silicon Snake Oil, Clifford Stoll (as cited in Hurst, 1995) sees real problems in relying too heavily on technology, especially the Internet. Stoll's concern is that we will lose touch with our communities, face-to-face interaction, and ultimately, reality. More important to this project, Mehan (1989) proclaims that computers add a new dimension of participation to the classroom. He believes that computers in a classroom are a "social practice" (p. 19) and not a technology. Mehan states that "the crucial ingredient is people's experience with the machine, not its 'inherent' features. It is what people do with the machine itself, that makes the difference" (p. 19).

E-mail as a Factor Influencing the Use of Computers

Electronic Mail, or e-mail, was invented by Ray Tomlinson in 1972. Developed as a vehicle to transmit typed messages between computers, e-mail was a minor feature of the first large-scale computer network known as ARPANET (Watts & Castle, 1992). First commissioned by the U.S. Department of Defense in 1969, ARPANET was installed at major universities involved in research in science and

technology to link computer data banks (McLain, 1995). While not seen as vital, e-mail quickly became one of the most popular features of ARPANET according to Watts and Castle (1992). Scientists exchanged ideas casually, graduate students discussed problems and shared skills, and project leaders coordinated activities and communicated with funding agencies. In 1973, England and Norway became the first international connection to the ARPANET (McLain, 1995). By the early 1980s, electronic switching capabilities were perfected allowing e-mail to be exchanged among computers that were not on ARPANET (Cerf, 1995). During the 1980s, the development of the desk-top computer, computer network infrastructures, and commercial links to the networks, opened the computer network door, including the Internet and e-mail, to everyone. This global, seamless interconnection of computer networks started in the 1970s, is the backbone of the Internet today (Cerf, 1995).

E-mail is described as a form of rapid, asynchronous communication via computers which are linked or networked together (Romiszowski, 1993). E-mail allows users to communicate with other members on the network. Messages are entered using the computer keyboard, addressed to an electronic mailbox, and then sent or transmitted by the computer via wire or phone line to be posted in another person's computer mailbox. A mailbox is a designated

space within a computer's memory, which has its own electronic address. When the person receiving the message checks his or her computer mailbox, all mail received is listed. The person selects the mail to be read, and then deletes or stores it for later use (Raimondi, 1984).

E-mail is a function of computers which are linked or networked together. In simple terms for schools, networks within buildings or departments are called local area networks (LAN), while the link between buildings is referred to as a wide area network (WAN). In addition to e-mail, Watts and Castle (1992) and Klemm and Snell (1994) list other functions school networks generally serve:

1. A resource file to enter, store, and retrieve data and information stored in other computers.

2. A server, supplying software and applications which cannot be stored on individual computers.

3. A connection to peripheral equipment such as printers.

4. An electronic bulletin board allowing users to post messages for others to see.

5. Access to wide area networks and the Internet.

6. A conferencing function, less common in schools, allowing users to carry on a discussion with all other members of the network.

E-mail as a factor influencing the use of technology

in the classroom is supported by Dyrli and Kinnaman (1995) who stated: "The keyword for the future of educational computing is interconnections; person-to-person, point-to-point communication" (p. 82). They concluded that the power of telecommunications was vital to the classroom for local communications as well as connections to the world via the Internet. Hunter (1990) learned that teachers using computer-based communications were collaborating with other teachers and that this was recognized as necessary for achieving increased professionalism and school restructuring goals.

Apple Computer's study of technology in schools (as cited in Sandholtz, 1995), examined the relationship between collegial interaction and technological innovation. In the entry stages, the project teachers, inexperienced with computers, indicated little desire for significant instructional change as they continued relying on traditional instructional strategies. As teachers began to use the new technology, they interacted more. The more they interacted, the more they supported each other in using the computers. Among their conclusions, Apple stated that making changes in the school environment requires collaboration between teachers. They also said that the introduction of technology to schools can act as a catalyst for change, thereby enhancing restructuring efforts.

Solomon (1990), Lee (1995), Charp (1995), Schrum (1991), and others cite the origin and evolution of electronic mail on college campuses. A common college-level use of e-mail, which could have value at the K-12 level, involves joint authorship of papers by writers in different locations. Solomon says, "Authors can exchange documents, modify and manipulate the text using word processors, and then transmit the altered transcripts back. Without e-mail, joint authorship...entails long delays between exchanges. With it, authors can trade updated drafts daily" (p. 64). Charp (1995) discusses the value of e-mail in teacher-student interaction. She says that students feel that instructors are more accessible and they appreciate not having to wait for an appointment. Instructors also note that students are using a higher level of critical analysis when responding via e-mail. Looking to the future, Solomon (1990) concludes by stating the following:

> E-mail is likely to become preferred over the U.S. postal mail and even the telephone because of its speed and convenience. E-mail messages travel across the country in minutes and can be sent from or received at your desk. Just as we have seen Fax usage mushroom, we will see a similar phenomenon with e-mail (p. 65).

Other uses of e-mail found in the literature which could have implications for expanding computer use among teachers in schools include the following:

1. In an effort to change the pattern of lecture-

intensive teacher training at four Texas Universities, student teachers were provided with e-mail connections to their professors and pre-service trainers (Smith, Houston, & Robin, 1994-95).

2. A project designed to motivate and assist teachers to use technology, paired and connected teachers via e-mail to a mentor outside the state. The mentors offered assistance and encouragement in use of the technology (Parker, 1994).

3. Probationary teachers, in their first years in the classroom, were provided with e-mail connections to a mentor teacher and to their former professors (Schrum, 1991).

4. A cooperative learning project in a California classroom utilized e-mail to develop joint projects with classrooms in Germany (Hofmann, 1994).

5. An elementary school in an inner-city neighborhood utilized a total information and communication network, including e-mail, to develop and build a magnet school to attract a multi-racial membership (Malfitano & Cincotta, 1993).

Eisenberg (1993) points out that interaction through e-mail helps to break down communication barriers and inhibitions that often stifle the open exchange of ideas in traditional classrooms. Collin, Wing and Teichert (1991) concur, and add that electronic mail permits greater ef-

ficiency in planning time, encourages teacher collaboration, and increases teacher communication with administrators.

Finally, what of the human dimension? In his 1980 book, The Third Wave, Alvin Toffler warned that mechanization needs to be balanced with personalization. Can the highly mechanical aspect of computers be made more personal through e-mail? Can receiving personal messages and writing personal notes to friends and colleagues engage reluctant users in the technology? Joseph (1995) believed this to be the case stating the following:

> Once your colleagues understand how easy it is to contact other teachers for sharing project ideas and information through e-mail, they won't want to function without it. Immediate success using e-mail will give your teachers the confidence to move on to learning other programs (p. 38).

Watts and Castle (1992) concluded that electronic communication fosters individual affirmation and a sense of closeness among faculty. Kersten and Phillips (1992) infer that e-mail has a potential impact on a worker's job satisfaction and how a user is viewed by others. In describing their project, Malfitano and Cincotta (1993) stated the following regarding electronic communication:

> Most teachers have by now achieved at least a basic level of comfort, and we know that some will follow their interests and delve deeper to unearth more capabilities...we are confident that our teachers will soon come up with more innovative, creative uses for the computer tools (p. 73).

Chris Dede (O'Neil, 1995) suggested that, like businesses, schools could encourage the integration of technology by relying on e-mail instead of paper memos, forcing people to use their e-mail. He concludes that "once employees are in the e-mail world, even if they're not there for the right reasons, then there's a much greater possibility of luring them into more productive parts of the technology" (p. 7). When teachers become comfortable with e-mail, technology becomes less frightening, more useful, and more integrated into their daily routines (Hurst, 1994).

CHAPTER III

HOW DATA WERE COLLECTED

Data for this project were collected with a survey of all employees of the LaPorte (Indiana) Community Schools. The questionnaire was administered by the Corporation-Wide Technology Committee in January, 1996. The purpose of the questionnaire was to determine the extent to which computers, computer applications, and other technology were being used in the district. The questionnaire also requested information regarding staff development and technical training needs. The results of the questionnaire were to be used to refurbish the district's five year technology plan and to support the need to continue appropriate funding for technology. The questionnaire was conducted anonymously on scantron forms and took approximately fifteen minutes to complete. The scantron response form was constructed to permit separation of various groups to determine trends. These groups included: (a) building groups, (b) specific buildings, (c) assignment, (d) years of experience, (e) availability of computer, (f) availability of e-mail, (g) comfort with e-mail, and (h) level of technology training. A copy of the questionnaire is included in Appendix A.

The questionnaire was distributed to 749 employees of the LaPorte Community Schools. Of that total, 371 certified classroom teachers made up the research sample. The questionnaire was designed in such a manner that subjects could not be identified directly or through identifiers linked to the subjects. Permission to use questionnaire data and supportive materials was granted by the Superintendent of the LaPorte Community School Corporation (See Appendix B).

This project is limited to the study of classroom teachers responding to the questionnaire. Specifically, two groups will be analyzed: (1) teachers who have e-mail, and (2) teachers who do not have e-mail. The level of use of computers and other technology and applications will be reported for each group. Also reported will be the extent to which e-mail influenced the use of computers.

CHAPTER IV

REPORT OF FINDINGS

The 371 certified classroom teachers making up the research sample were located in eleven district school buildings (8 elementary, 2 middle schools, and 1 high school). As reported in Table 1, 267 of those teachers completed questionnaires which is a 72.0 % rate of return. This rate was slightly higher than the percentage of questionnaires returned across the district (67.2%). The findings in this project were based on the 267 responses from the classroom teachers.

There will be references throughout this chapter to the schools to which the teachers were assigned. This sub-grouping of teachers was necessary for the following reasons:

1. The purchase and installation of computer equipment and much of the software and applications have been made on a building by building basis.

2. Most of the training and staff development for technology occurred at the building level rather than being directed to individual teachers or district groups.

3. The installation of LAN networks and e-mail have been made on a building by building basis.

Table 1

Teachers Responding to the Questionnaire

School	Classroom teachers	Survey response	Percent returned
Elementary			
C	25	18	72.0
Hl	23	16	70.0
Hnd	23	17	73.9
IT	23	17	73.9
K	23	20	87.0
KH	19	12	63.2
L	19	16	84.2
R	20	14	70.0
Sub Total	175	130	74.3
Middle School			
BMS	46	40	87.0
KMS	46	29	63.0
Sub-Total	92	69	75.0
High School			
LHS	104	68	65.4
Total All Schools	371	267	72.0

4. The survey was designed to provide a breakdown of the data into building sub-groups to expedite reports.

Use of Computers Among Teachers

The questionnaire asked respondents to indicate the extent to which they personally used a computer at work or at home (see Technology Survey, Appendix A). The principals at each building have indicated, through interviews conducted by the researcher, that all teachers have access to a computer at their work site, although a few teachers at the high school do not have a computer directly at their desk. In those cases, teachers have access to computers in the library, computer labs or teacher work rooms. Only one teacher surveyed said he or she did not have access to a computer.

Overall, 80.1% of teachers surveyed indicated that they used a computer every day (Table 2). The middle schools had the highest daily use rate at 91.3%, followed by the elementaries at 87.7%, and the high school at 54.4%. More than 93% of district teachers indicated that they used a computer weekly or more often. All of the teachers in four of the elementaries said they used their computers every day.

The Effect of E-mail on Computer Use

The questionnaire asked teachers if their building had e-mail allowing them to communicate with their colleagues via computer, specifying a building network only,

Table 2

Percent of Teachers Using Computers

School	Daily	Weekly	Yearly	Don't use
Elementary				
C	100.0	0	0	0
Hl	68.8	31.3	0	0
Hnd	82.4	11.8	5.9	0
IT	94.1	5.9	0	0
K	100.0	0	0	0
KH	100.0	0	0	0
L	56.3	31.3	0	12.5
R	100.0	0	0	0
All Elem	87.7	10.0	.8	1.5
Middle School				
BMS	95.0	0	2.5	0
KMS	86.2	13.8	0	0
All Middle	91.3	5.8	1.4	0
High School				
LHS	54.4	27.9	14.7	0
All teachers	80.1	13.5	4.5	.7

not the Internet. The findings were broken down into two groups: (1) Buildings where e-mail had been installed and the staff had been trained to use it, and (2) build-

ings where e-mail had not been installed or where staff had not been trained. One elementary had their e-mail system installed two weeks prior to the survey, but had not been trained in its use. For purposes of this study, they were included in the second group. Sub-groupings were studied among buildings where e-mail had been installed: (a) Buildings where teachers had been using e-mail for one year or more, and (b) buildings where teachers had been using e-mail for less than a year. The group with e-mail is made up of five elementaries and the two middle schools for a total of 150 teacher respondents. The high school and three elementaries comprised the no e-mail group for a total of 117 respondents.

E-mail was found to have an effect on computer use among LaPorte teachers. Ninety-eight percent of teachers with e-mail said they used a computer regularly, meaning weekly or more often, while 88.0% of teachers without e-mail indicated regular use. The more significant numbers, however, were found when daily use was considered. As indicated in Table 3, 94.0% of teachers with e-mail use their computers daily, while only 62.4% of teachers without e-mail indicated daily use. When the sub-groups were considered, the daily use of computers rose to 97.8% among teachers who had e-mail for one year or more. It would appear from these data that the introduction of e-mail had the immediate effect of significantly increasing

Table 3

Percent of Regular Computer Use Among Teachers Who Have E-mail and Teachers Who Don't

	Percent of Computer Use	
E-mail Status	Daily	Weekly
Have e-mail		
1 yr or more	97.8	0
Less than 1 yr	88.3	10.0
Total	94.0	4.0
Do not have e-mail	62.4	25.6

daily computer use among LaPorte teachers. In addition, computer usage increased further during the first year following the installation of e-mail.

The Effect of E-mail on the Use of Computer Applications

The questionnaire asked teachers to indicate the extent to which they personally used each item on a list of computer equipment, work tools, software, and applications. Of the list of 30 items, five software applications were selected for study in this project (See Table 4). These applications were selected for the following reasons:

1. They are common computer software applications

Table 4

Percent of Regular Use of Computer Applications Among Teachers Who Have E-mail and Teachers Who Don't

	Have e-mail			No e-mail
Computer Application	1 yr or more	Less than 1 yr	Total	
Word processor	66.7	71.7	68.7	60.7
Curriculum games, tutorials, simulations, & drills	68.9	63.3	66.7	44.4
Grade book & student progress programs	26.7	58.3	39.3	24.8
Tests, Worksheets, puzzles, signs, & banners	33.3	35.0	34.0	39.3
Data base, spread sheet, & graphing	38.9	21.7	32.0	19.7

Note. For word processor, Curriculum games, and grade book, regular use means daily or weekly use. For tests and data base, regular use means weekly or monthly use.

which are inexpensive and readily available to teachers.

2. The applications are useful to teachers in the instructional program.

3. The applications are designed for use on a personal computer. No other equipment, except a printer, is needed to use these applications.

4. These applications would serve as fair indicators of expanded personal use of computers among teachers

in this project.

Access to these products varied among buildings and seemed to be influenced by the needs, interests, and skills of staff members at each building. For instance, nearly all of the staff at one middle school used a grade book program while the other middle school did not. For purposes of this project, the author considered only the expanded use of applications and not the differences among buildings. It is presumed, although not specifically supported by the data, that expanded use is related of the increased use of computers among the teachers.

More teachers with e-mail were regular users of some software applications than teachers without e-mail (see Table 4). In particular, teachers with e-mail were more frequent users of tutorials, simulations, curriculum games, and drills. To a lesser extent, these teachers were more frequent users of word processing, grade book programs, and data base and spread sheet programs. It is interesting to note that the use of tutorials, simulations, games, drills, data base and spread sheet programs increased for those teachers who had e-mail for one year or more. Presumably, that is a result of the increase in use and comfort with the computer. A slight decline in the use of tests, worksheets, puzzles, signs, and banners was noted among teachers introduced to e-mail. This downward trend, although very slight, continued for

teachers who had e-mail for one year or more.

The questionnaire also asked teachers with e-mail to indicate the degree of influence e-mail had on their use of computers for other applications. A little over half, 53.3%, indicated that they believed that their use of e-mail influenced them to apply computers to other applications.

Summary

The data indicated that the introduction of LAN e-mail in LaPorte schools has resulted in a significant increase in the number of teachers using computers on a daily basis. In schools where e-mail had been employed for one year or more, computer users outnumbered users in non e-mail schools by 35%. More than half of the schools with e-mail reported that 100% of the teachers used computers daily.

The increase in the number of teachers using computers has resulted in the expanded use of computers for some software applications. Most notably, in schools where e-mail had been installed and an increased number of teachers were using computers, more teachers were using curriculum games, tutorials, simulations, and drills.

CHAPTER V

IMPLICATIONS FOR LA PORTE

The results of this study reinforce the beliefs of district principals who have witnessed a surge in the use of computers among their teachers following the installation of building e-mail. It seems certain that the demonstrated effect that e-mail has on computer use will hasten the installation of LANs in the buildings which have not been networked. The installation of LANs and building e-mail, or even the increased use of computers is not the answer for improving instructional practices among teachers. It does, nevertheless, open the door to improving instruction using new technologies as a tool. In the words of software manufacturer, Bill Gates, "The most important use for information technology is to improve education" (West, 1995). To assure that the installation of e-mail has a lasting and appropriate effect on improving instruction, the following considerations and recommendations are set forth:

1. Recognize that e-mail is a useful tool for getting teachers to use their computers daily.

2. Recognize that daily use of computers can have the effect of expanding the use of educational software.

3. Recognize that e-mail is an important communication tool which has the potential for increasing and improving teacher collaboration on instructional issues.

4. Recognize that e-mail has the potential for becoming a teaching and learning system for students.

5. Recognize the importance of comprehensive and on-going training and staff development in the new technologies and applications.

6. Recognize that technology and applications are tools of learning which must be articulated into the curriculum and instructional program.

In 1995, U.S. Deputy Secretary of Education, Madeleine Kunin said, "our nation needs to do a better job with technology training, including developing teachers' professional skills with these new tools" (West, 1995). There is no questioning the importance of training in developing the effective use of these tools in the classroom. Getting started, however, often means getting comfortable with change. When it comes to the new technologies, Bill Gates says that "change is not really an option" (Winik, 1996). Gates says to use e-mail to talk to people to get comfortable with computers. "Those who don't will be left behind" (Winik, 1996).

Appendix A

LaPorte Community School Corporation
Technology Survey--1996

LA PORTE COMMUNITY SCHOOL CORPORATION

Corporation-Wide Technology Committee

January 3, 1996

TO ALL STAFF:

The "Nintendo" generation is at the school door! These students are not only used to eye-catching visuals, but also interactive toys, games, and instructional materials. Increasing numbers of students have routine access to personal computers, some far more sophisticated than they will see at school. By now, even the most die-hard traditionalists among us must concede the impact of information technology on education and our work. The world from which our students come and the world for which we prepare them have been thoroughly infused with technology. We have no choice but to improve our skills and upgrade our tools for instruction and work in the schools.

The attached survey will help us to determine what technology tools and applications are being used in our corporation, and where we need to upgrade and offer training. We will also look at the impact that building level e-mail has had on the implementation of other computer applications. Surveys done in 1990 and 1992 helped us to set direction for the acquisition of computers and software. Today we need to focus more on how the application of these technological tools will enhance instruction and our work in the schools. The results of this survey will be used to refurbish the Corporation's Technology Plan, and to support our need to continue adequate funding for technology.

Please complete the attached survey and return it to your principal or supervisor by 3:00 PM Monday, January 8. Thank you for your cooperation.

Sincerely,
Corporation-Wide Technology Committee

DIRECTIONS FOR COMPLETING THE SURVEY

1. WHO

All school employees are eligible to complete the survey.

All employees who use, or are expected to use, or who would like to use computers in their work are **ENCOURAGED** to complete the survey.

2. WHAT

You should have:

+ This letter with the Survey attached.
+ The answer sheet - a 3 1/2" x 8 1/2" scantron form titled "General Purpose Data Sheet III".
+ a #2 pencil which must be used to fill out the answer sheet. The pencil is our gift to you for completing the survey.

3. WHEN

The survey takes 10 minutes to complete.

Please return completed surveys to your principal or supervisor by **3:00 PM, Monday, January 8, 1996.**

4. HOW

Carefully fill in the circles on the answer sheet indicating your responses.

Use the #2 pencil provided.

Sometimes surveys don't ask the right questions. Please use the space on the answer sheet (if you can stay within those little boxes) or a separate sheet to make additional comments on technology in our school corporation.

THANK YOU FOR HELPING TO SHAPE THE FUTURE OF OUR SCHOOLS!

LA PORTE COMMUNITY SCHOOL CORPORATION
Corporation-Wide Technology Committee

Survey of Staff - January 1996

On the computer answer sheet provided, please indicate the response which best fits your situation today. Use the #2 pencil provided and fill in the circles for your answers. Please return the completed answer sheet to your principal or supervisor by **MONDAY, JANUARY 8, 1996**. Thanks for helping to shape the future of our schools.

SPECIAL CODES Section (on the left side of the answer sheet)

Please indicate the building in which you work or consider your home base:

A
0 High School
1 Middle School
2 Elementary
3 Park
4 ESC
5 Support Services
6 Transportation
7 Other

Elementary and Middle School - please specify your building:

B
0 Boston Middle
1 Kesling Middle
2 Crichfield
3 Hailmann
4 Handley
5 Indian Trail
6 Kingsbury
7 Kingsford Heights
8 Lincoln
9 Riley

Please indicate your current assignment:

C
0 Classroom Teacher
1 Administrator/Supervisor
2 Other Certified
3 Clerical
4 Instructional Assistant
5 Custodian/Maintenance/Transportation/Food Service
6 Business Office
7 Other Non-Certified

Please indicate your years of experience in education:

D
0 1 to 5 years
1 6 to 10 years
2 11 to 20 years
3 More than 20 years

Please indicate the availability of a computer for you to use:

E
0 Have a computer at my work station (classroom, office).
1 Have a computer available to me at another location in my building.
2 Have no computer available to me at work.
3 Have a computer at home.

Does your building have e-mail allowing you to communicate with your colleagues via computer (building network only, not internet)?

F
0 Yes, building e-mail has been available for more than a year.
1 Yes, building e-mail has been available for less than a year.
2 No e-mail available in this building.

How comfortable are you using your building e-mail system?

G
0 I'm comfortable using e-mail.
1 I'm not comfortable using e-mail.
2 No e-mail available.

Have you received training in technology applications (software) or tools (hardware) which are available in your work?

H 0 Yes, have had training and I'm comfortable using most of the tools and applications available.
1 Yes, have had training and I'm comfortable using some of the tools and applications available.
2 Yes, have had training, but I'm still not comfortable with the technology.
3 No, haven't had training, but I'm comfortable with some of the tools and applications.
4 No, haven't had training and I don't use the technology in my work.

CENTER Section

From the list of equipment, work tools, software and applications, please indicate the extent to which you personally use each item (at work and home). For questions 1 - 18 please use the following code:

A Use on a daily basis
B Use on a weekly basis
C Use a few times a year
D Do not use
E Not available/Not applicable to my work

1 Computer
2 Computer Lab
3 CD-ROM
4 Graphing Calculator
5 Copier, Fax
6 TV, VCR
7 Overhead Projector
8 Cassette player/recorder, 16 MM projector, filmstrip, slide projector
9 Windows 95
10 E-mail
11 Channel One
12 Internet
13 Gradebook and student progress programs
14 Microsoft Works word processor
15 Other word processor
16 CAD
17 Curriculum related games, simulations, tutorials, drill and practice
18 AS400 Data entry and retrieval

For items 19 - 30, please use the following code:

A Use on a weekly basis
B Use on a monthly basis
C Use a few times a year
D Do not use
E Not available/not applicable to my work

19 Scanner
20 Video camera
21 Quick-Take or Xap-Shot camera
22 Video projection
23 LCD Viewer for overhead projection
24 Video disc/Laser disc

25 Data base, spread sheets and graphing
26 Materials generator program: tests, puzzles, worksheets, signs, posters, banners.
27 Data collection probes and sensors
28 Multimedia presentation software
29 Video production
30 Hypermedia (Hypercard, Linkway, Hyperstudio)

Which type of computer are you most comfortable?

31
A Mac
B IBM compatible
C Apple IIe/IIgs/etc
D None

Please indicate in which areas you would like to improve your skills or receive training. Mark as many as apply:

32
A Computer - Basic skills
B Computer - Intermediate, advanced skills
C Computer Lab
D Scanner
E Quick-take or Xap-shot camera

33
A Windows 95
B Microsoft Works
C E-mail
D Internet
E Graphing Calculator

34
A Data base, spread sheets
B Student grading and progress program
C Materials generator programs: Tests, worksheets, signs, banners
D AS400 Data entry and retrieval
E Curriculum related games, simulations, tutorials, drill and practice

Did your use of e-mail in your school influence you to use computers for other applications?

35
A To a great extent
B Somewhat
C Not at all
D Don't use/Don't have

Appendix B

District Authorization to Use Data

LaPorte
COMMUNITY SCHOOL CORPORATION

Superintendent of Schools
Peggy Ondrovich, Ed. D.

Board of School Trustees
James Heinold, President
Kathryn Johnson, Vice President
Jeffrey Bernel, Secretary
Wesley England
Fran Milo
Ruth Minich
Elmer Szilagyi

December 5, 1995

To whom it may concern:

David M. Randall has permission to use data collected by this school corporation for a degree granting project to be conducted between December 1995 and June 1996. The data collection process and instruments meet all of the guidelines and requirements specified in policies of the LaPorte School Board of Trustees and the State of Indiana. Specifically, no students will be involved, and information will be recorded in such a manner that subjects cannot be identified directly or through identifiers linked to the subjects.

If you have further questions, you may contact me at 219 362-7056.

Sincerely,

Peggy Ondrovich

Dr. Peggy Ondrovich
Superintendent

Appendix C

Protocol Clearance From the Human Subjects Institutional Review Board

Human Subjects Institutional Review Board

Kalamazoo, Michigan 49008-3899
616 387-8293

WESTERN MICHIGAN UNIVERSITY

Date: January 10, 1996

To: David Randall

From: Richard Wright, Chair

Re: HSIRB Project Number 96-01-08

This letter will serve as confirmation that your research project entitled "The introduction of e-mail and its effect on the expanded personal use of computers among teachers in the La Porte Community Schools" has been **approved** under the **exempt** category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you must seek specific approval for any changes in this design. You must also seek reapproval if the project extends beyond the termination date. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: January 10, 1997

xc: Mary Anne Bunda, EDLD

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