

SP
6615

USES OF COMPUTER COMMUNICATION SYSTEMS
BY THE UNIVERSITY OF WISCONSIN
COOPERATIVE EXTENSION SERVICE

By
Linda A. Boelter

A Thesis Submitted in Partial Fulfillment
of the Requirement for the Degree of

MASTER OF ARTS

in

COMMUNICATION

at

University of Wisconsin-Stevens Point
Stevens Point, Wisconsin

August 1983

FORM D



Report on Oral Defense of Thesis

USES OF COMPUTER COMMUNICATION SYSTEMS BY THE UNIVERSITY
TITLE: OF WISCONSIN COOPERATIVE EXTENSION SERVICE

AUTHOR: LINDA A. BOELTER

Having heard an oral defense of the above thesis, the Advisory Committee:

- A) Finds the defense of the thesis to be satisfactory and accepts the thesis as submitted, subject to the following recommendation(s), if any:
- B) Finds the defense of the thesis to be unsatisfactory and recommends that the defense of the thesis be rescheduled contingent upon:

Date: 30 June 1983

Committee:

Eric Loman, Advisor
(11/11/83) 1983
C. Y. Allison

TABLE OF CONTENTS

	Page
LIST OF FIGURES.	v
ACKNOWLEDGEMENTS	vi
Chapter	
I. INTRODUCTION	1
Overview of Computer Communication	1
Handling the Information Deluge.	4
Other Communication Applications	6
Nature and Purpose of the Study.	10
Review of Literature	12
Organization of the Study.	15
II. THE CURRENT WISPLAN SYSTEM	17
Nature of the Extension Organization	17
Computer Use by CES.	18
Uses of WISPLAN.	22
Obstacles to Greater Use	26
Information Management	29
Research on Computer Message Systems	32
Computer Decision Aid Programs	34
Lack of Software	37
More Study Needed.	40
III. INCORPORATING MICROCOMPUTERS	41
Expanding the WISPLAN System	41
Agent Training Needed.	48
Microcomputer System in Indiana.	50
Differences Between FACTS and WISPLAN.	56
Microcomputer Networks in Other States	61
IV. APPLICATIONS AND TRIALS OF VIDEOTEX.	62
Technology of Videotex	62
Teletext Trials.	69
WETA Trial	70
Viewdata Projects.	75

Other Viewdata Systems.	82
Implications for Cooperative Extension.	84
Public Teletext	85
Use of Viewdata	87
 V. IMPLICATIONS FOR COMPUTER COMMUNICATIONS FOR CES.	 92
Increased Information Flow.	92
Computer Conferencing	95
Information Retrieval Using Viewdata.	98
Delivering Information Directly to Clientele.	100
Role of Local Agents.	102
Need for Research and Evaluation.	105
 GLOSSARY.	 108
 BIBLIOGRAPHY.	 112

LIST OF FIGURES

Figure		Page
2.1	Organizational Chart of Wisconsin Cooperative Extension Service.	19
2.2	Typical WISPLAN BROADCAST Messages	25
2.3	Typical WISPLAN BROADCAST Summaries.	31
3.1	Automatic Overnight Downloading System	44
3.2	FACTS Goals and Objectives	57
3.3	Communication/Membership Network	60
4.1	Broadcast Teletext	64
4.2	Viewdata	66

ACKNOWLEDGEMENTS

I wish to express my appreciation to those who served on my committee for their assistance in the preparation and review of this thesis. I am very grateful to Eric Somers, chairman, for allowing me access to his personal library as well as for his suggestions and criticisms of my drafts. Al Croft was especially helpful in assisting me to identify a meaningful topic for study with relevance both to the discipline of communication and to my work as an extension home economist. C. Y. Allen's insight helped me clarify my objectives and sharpen my focus.

I am particularly indebted to Shaun Abshere for his patient explanations and answers to all my questions about the WISPLAN network. Interviews with Paul Edison-Swift, Arlin Brannstrom, and Lois Berg at the North Central Computer Institute helped me understand the broader implications of my study and directed me to valuable resources. Steve Vedro provided information about the present and future uses of WHA's Infotext.

Finally, I am grateful to the University of Wisconsin Cooperative Extension Service for providing me a fellowship for my graduate study and to Marge Hamann, program leader, and Palmer McCoy, district director, for their encouragement and support.

CHAPTER ONE

INTRODUCTION

Overview of Computer Communication

In the coming century, the emergence of a new framework based on telecommunications may be decisive for the way in which economic and social exchanges are conducted, the way knowledge is created and retrieved, and the character of the occupations and work in which we engage.¹

The "information society," the "technological revolution," the "post-industrial society," the "Third Wave," and the "computer age" are all names that have been given to the profound changes shaping contemporary society. Futurists such as Bell, Masuda, Thompson, and Toffler agree that the computer and its resulting communication potential have been and will be the most significant development to influence society since the Industrial Revolution.

The information collecting, manipulating, generating, and communicating capabilities of computers will have tremendous impact on our lives. The fundamental function of computer technology is to substitute and amplify the mental labor of man.² As Martin explains, computers act as a storage battery for human intellect, and data networks provide the

¹Daniel Bell, "The Social Framework of the Information Society," in The Computer Age: A Twenty-Year View, eds. Michael A. Dertouzos and Joel Moses (Cambridge, MA: Massachusetts Institute of Technology Press, 1979), p. 164.

²Yoneji Masuda, The Information Society as Post-Industrial Society (Tokyo: Institute for the Information Society, 1980), p. 31.

means of distributing the resources.³

Computer communication, which is also referred to as telecommunications, data communication, or computer-mediated communication, combines the technologies of the telephone, computer, and television to form an integrated information and communication system that transmits data and permits instantaneous interaction among persons and computers.

Many computer communication systems use centralized or partially centralized processing which involves a central computer facility connected to a network of smaller terminals or desktop computers by telephone modems. Messages are entered into the system using the keyboard of the terminal and instantaneously sent to the central computer over telephone lines. The central computer processes the messages as directed--electronically transmitting them to one or more other terminals on the network, calling up information stored in the computer's memory, depositing information in the central computer's memory, or whatever else is directed by the sender. Messages are instantaneously received by the receiver's terminal from the central computer and are printed out on paper (hard copy) or on a television-like screen (cathode ray tube).

Non-centralized distributed computer communication systems consist of a network of linked micro, mini, or mainframe computers each having information storage, generation, and transfer capacities and thus not requiring a central host computer. In this case, messages are transferred directly from the sender's computer over telephone lines to one or more receiver computers on the network.

³James Martin, The Wired Society (Englewood Cliffs, NJ: Prentice-Hall, 1978), p. 85.

Computer communication is becoming an increasingly important function. As of 1980, it was estimated that 90 percent of all United States computers spend part of all of their time connected to a communication line.⁴

In the past, computers have been more or less the exclusive property of large corporations or institutions. Used primarily for accounting or scientific functions, they required a staff of data processing specialists and computer scientists to direct their operation. Today, computers are much more "user friendly" so even people with very little computer expertise can operate them. The programs that control the computer are so sophisticated that some "languages" used to command and interact with the computer are more like common conversation than traditional computer programming languages. Therefore, only a minimal amount of training is needed to perform many operations on today's computers.

Computer communication is just beginning to find its place in the world because up until recently the cost of computer usage and storage necessary to facilitate communication by computer was too expensive to permit the extended use of processor time. A primary factor in reducing computer costs was the development of interactive timesharing computer systems which allow simultaneous use of the same central computer by many users at different locations. The drastic decline of computer costs during the past decade, more "user friendly" systems, and the development of very powerful yet relatively inexpensive microcomputers have all given impetus to the computer communication revolution.

⁴Morris Edwards, "Understanding Data Communication's Basics," in The Computer Age, p. 7.

Just as when radio, television, and even the telephone were new media, it takes a period of experimentation before enough is understood about the potential and unique attributes of the new medium to discover its most effective applications and to gain popular acceptance. There is an interesting parallel between the growth of other media and growth of the computer. The telephone, like radio and television, grew as a communication medium because of the network. It was universal, shared, national and international, accessible, cheap, standardized, and efficient. These same qualities will be the key to the future of computer communication.⁵

The full impact of the computer communication revolution may not be felt, however, until the home computer becomes as universal as the telephone or television. In spite of a growing interest in home computers, they are not likely to become popular until the public perceives them to be easy to use and until a number of business, educational, and community services can be made available on an economic basis to terminal users.⁶

Handling the Information Deluge

We live in an age in which information is not only a renewable resource, but a self-generating one. As Naisbitt notes, there are between 6,000 and 7,000 scientific articles written each day. The amount of scientific and technical information now increases 13 percent a year, which

⁵A. M. MacMahon, "Computer Communication--Concepts and Technology," in Electronic Communications Systems, ed. William C. House (New York: Petrocelli Books, 1980), p. 14.

⁶William C. House, ed., Electronic Communications Systems, p. 69.

means it doubles every 5.5 years.⁷

This level of information is clearly impossible to handle without the aid of computerized information storage and retrieval systems. Computers can bring order to the chaos of the information deluge and thereby allow users to access needed data at their convenience. This is the principle driving force behind the new electronic publishers who provide on-line data bases and information utilities which provide the communication channels for sorting through and selecting the desired information.

Computerized videotex information services such as Prestel, Ceefax, and Antiope now provide news, weather, and sports plus a vast array of other information to subscribers in Europe. The Source and CompuServe allow subscribers in this country to access various data bases and receive requested information. In addition, broadcasting companies, financial institutions, publishing houses, and major retailers are currently involved in testing various types of videotex networks to determine possible applications of this emerging communications technology.

As these computer networks develop, they create a unique form of centralization by bringing large bodies of information to central computer memories for storage and retrieval. They also allow for decentralization through remote access to the central memory. This decentralization allows decision points to take independent actions, confident that automatic updating by the central memory will take care of all interactions among decisions.⁸ Computers can play a very significant role in

⁷ John Naisbitt, Megatrends: Ten New Directions Transforming Our Lives (New York: Warner Communications, 1982), p. 24.

⁸ Herbert A. Simon, "Consequences of Computers for Centralization and Decentralization," in The Computer Age, p. 216.

the decision making process by opening up the process for greater participation and by providing access to more information. In addition, computer communication systems bring the computing power of the computer to bear on the decision process, using its ability to process, analyze, and synthesize vast quantities of data.

Computer communication systems can serve important management functions, but as Simon points out, all too often they have been used incorrectly. Instead of using the computer as a producer of information, we should be learning to use it as a compactor of information to reduce the amount of information that managers must absorb, and to assist in the analysis of the decision alternatives.⁹

Other Communication Applications

Other emerging potentials of computer communication systems which add to and build upon the information storage and retrieval and decision analysis capacities are electronic mail functions and computer conferencing.

Today the telephone is a primary lateral communication channel which links people in advanced societies. Telephone messages are transmitted in real-time. Both parties are simultaneously linked via the telephone lines. While this allows for the immediate sending and receiving of messages, it is not always the most efficient and cost-effective medium. It is estimated that only 28 percent of phone calls are completed on the first attempt.¹⁰

⁹ Ibid., p. 206.

¹⁰ Ronald Uhlig, D. J. Farber, and J. H. Bair, The Office of the Future (Amsterdam: North-Holland Publishing, 1979), p. 37.

The problem of uncompleted phone calls is eliminated by electronic mail. Like conventional mail, it transmits messages in non-real time. The sender and the receiver do not have to be on-line at the same time. Messages simply wait in the receiver's "electronic mailbox" until they are accessed. Unlike conventional mail, electronic messages travel instantaneously. Communicating word processors allow the same message to be sent to multiple locations with the same ease and speed as one. Another important difference is that electronic mail also can take place in real time which allows sender and receiver to "talk" back and forth.

Another communication application which is gaining popularity is computer conferencing. Computerized conferencing can be viewed as a written version of the conference phone call, except for the important advantages that each participant can select the time he or she wishes to send or receive.¹¹ Computer conferencing is similar to electronic messaging, however instead of sending individual messages, the computer conference establishes a shared space on the network where participants can hold a common discussion and maintain all the proceedings in a file for later reference. Conferencing may be simultaneous with persons engaging in exchange at the same time, or delayed when participants enter and retrieve at their convenience. It can range from informal jottings to formal presentations. The conference can be programmed to set specific roles and responsibilities with a group leader performing the organizational role of leading the group discussion.

¹¹Murray Turoff and Starr Roxanne Hiltz, "Meeting Through Your Computer," in Electronic Communications Systems, p. 200.

The research shows computer conferencing to be a supplement to rather than a replacement for other communication media.¹² Just like mail, telephone, face-to-face meetings, or print media, this new medium has its own special characteristics. Computer conferencing has been used by geographically dispersed individuals for brainstorming to stimulate creative ideas, for group planning and consensus polling, for co-authorship of reports or papers, and for refereeing articles for publication. Computer conferencing can effectively make use of techniques such as Delphi and nominal group for setting priorities and developing planning strategies by collecting the informed judgments from a group of "experts." The series of structured questionnaires used in the Delphi technique can be more easily administered and processed when using a computerized network.

From their research on knowledge synthesis using computer conferencing at The Institute for the Future, Vian and Johansen have discovered some differences in the way people communicate, handle information, and solve problems when using computer conferencing as compared to other communication media. First, they note that the computer conference is often characterized by informal exchanges that result in initiating creative ideas.¹³ The computer conference allows for greater networking between persons with different areas of expertise and for building ideas as a group synthesis process. They discovered computer conferencing is

¹² Ibid., p. 206.

¹³ Kathleen Vian and Robert Johansen, "Knowledge Synthesis and Computer-Based Communications Systems: Changing Behaviors and Concepts" (Institute for the Future, February 1981), p. 6 (ERIC ED 206 265).