THE FUTURE IMPACT OF COMPUTERS AND RELATED TECHNOLOGIES ON INTERPERSONAL COMMUNICATION:
A DELPHI STUDY
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The Future Impact of Computers and Related Technologies on Interpersonal Communication: A Delphi Study
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It has been suggested that the proliferation of communication technologies should be met by the identification of relevant communication competencies. This study was undertaken to identify the probable influences of increased use of computers and related technologies on interpersonal communication in the next twenty-five years and to recommend adaptive directions for both communication research and education.

The participants selected for this Delphi study were retired or practicing academics in the discipline of communication. These panel members responded to statements derived from published forecasts relating to the area under study. Fifty-six percent of the 284 potential respondents completed both rounds, with minor differences between subgroup responses.
Based on their responses, it is recommended that the concept of interpersonal communication should not exclude mediated communication, and mediated interpersonal communication should be included in the communication curriculum without superseding the current emphasis on face-to-face interactions. Because communication via computer appears to be somewhat better suited to the content than the relationship dimension of communication, instruction emphasizing the latter may become more important, especially for the frequent computer user. More research on mediated interpersonal communication should be undertaken, leading in time to changes in communication typologies.
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CHAPTER 1

INTRODUCTION

Exposure to computers and related technologies is increasing in the United States, with a 1983 study indicating that three to five percent of the population (some twelve to fifteen million households) own a personal computer. Further, according to the National Task Force on Education Technology, "[v]irtually all schools have at least some computers. . . ."

A variety of services are available to personal computer users, including not only games, word processing, and data base management, but also educational software, shopping, banking, travel and entertainment reservations, text of newspapers, library catalogs, indexing services, bulletin boards, and electronic mail, many of which require a modem and payment of "subscription" and/or telecommunication charges. Some, e.g., shopping, banking, and reservation services, could contribute to the reduction of
face-to-face contacts, although these services now are available by mail or through use of the telephone. Others, notably use of bulletin boards and electronic mail, could either extend or reduce traditional interpersonal contacts.

A number of studies of the social and psychological effects of electronic media and of their impact on communication have been reported in articles, books, and dissertations. Few have appeared in the communication literature despite findings that the medium employed does influence behaviors, attitudes, and communication itself. For example, in audio only, audio-visual, and computer-mediated environments, attitude and opinion change are more frequent, participation in discussion is more equal, and a leader is less likely to emerge than in face-to-face meetings. Getting to know someone is judged to be more difficult than in face-to-face interactions. Although people feel more confident about perceptions of another person gained from face-to-face meetings, these are no more accurate, and sometimes less so, than perceptions gained from mediated interactions.
A number of authors have speculated on the possible influence of the increased use of computers and related technology on interpersonal relationships and communication both in the home and the workplace. Both positive and negative outcomes have been forecast. For example, among the former, work at home is seen as the solution or partial solution to such diverse problems of modern society as transportation costs, pollution, the need for child care, and the perceived decline of the family unit. At the opposite pole, it is expected to limit opportunities for interaction with others in the organization and to result in difficulties in supervision and in making business contacts and in professional anonymity. Family interactions may decline rather than increase.

Thus, enthusiasm for the computer's perceived ability to provide such benefits as decreased transportation time and costs and increased number of potential relationships via electronic networks is balanced by concern for the possible isolation of people from each other.
and a potential loss or degradation of the skills important in interpersonal encounters.

Statement of the Problem and Significance of the Study

This study was undertaken to identify the probable influences of increased use of computers and related technology on interpersonal communication in the next twenty-five years, with a view toward identifying perceived trends in the practice of interpersonal communication, and, on the basis of these trends, suggesting adaptive directions for both research and education in this area. Emphasis was on interpersonal communication, including interpersonal communication in organizations, consequently mass communication and computer-assisted instruction were excluded from consideration.

In examining the probable relationship between interpersonal communication and increased use of computers and related technology, this study is responsive to concerns raised by Beethardt, Halloran, and Work. Beethardt, decrying "[t]he absence of a futuristics orientation and the presence of a time-bias [past
and present in education.

The importance of the ability to envision and select among alternative futures, Halloran has suggested that a research program be undertaken which would identify "... the basic information or communication needs of individuals and/or societies." To this end, he proposed a number of questions relating to technological developments and their potential effects on communication. Two of these questions are partially addressed here:

-Will new educational needs emerge and, if so, how will they be met?...
-Could the changes [resulting from technological developments] lead to reduced interpersonal relationships and more man-machine interaction?"

The first of these questions also was raised by Work, who asserted that the proliferation of communication technologies should be met by the identification of communication competencies responsive to them. To this end, the identification of probable changes in communication practice as a result of increased use of computers and related technologies should be undertaken in planning for the future of the discipline of communication.
And yet, relatively few communication scholars have included research on mediated (e.g., audio only, audio-visual, or computer mediated) communication in their research programs. Several futurists have published forecasts regarding the likely influence of increased use of computers and related technologies on interpersonal interactions, but few within the discipline of speech communication have contributed or responded to these forecasts in print. It is hoped that this study, by soliciting responses from communication scholars to a number of these forecasts, has served as a first step in identifying the probable future influences of computer technology on interpersonal communication and in suggesting directions for both research and education in that area.

Specific Research Questions

The specific research questions addressed were the following.

Research question 1. To what extent do respondents agree with forecasts about
interpersonal communication practice derived from
the literature?

Research question 2. What changes in
interpersonal communication practice do
respondents expect as a result of increased use
of computers and related technology?

Research question 3. What changes in the
communication curriculum do respondents think
should be made?

Research question 4. In the event of
statistically significant differences in
responses, are these attributable to area of
expertise, status of respondent (emeritus/
practicing), gender of respondent, and/or
frequency of personal computer use?

Research Method

The Delphi Method

Developed in the 1950s, the Delphi
technique is intended to structure group
communication "... so that the process is
effective in allowing a group of individuals, as
a whole, to deal with a complex problem."
Particularly useful when precise analytical
techniques are inappropriate, it utilizes expert opinion in the absence of "hard" data and frequently is used to forecast alternative futures for planning purposes. A questionnaire is distributed to participants, who are unknown to each other. Their responses are analyzed and returned to them; responses may be changed in subsequent rounds.

Educational applications of the Delphi method include use as a pedagogical tool forcing participants to think about the future in a more complex way than they ordinarily might and as an aid in planning. It is especially advantageous in educational planning when consultation is desired because it focuses attention on the topics of interest and

... provides a means of obtaining information from a large number of persons, without the restrictions often imposed by geography and scheduling.

Plan of the Dissertation

Chapter I. Introduction

Statement of the Problem and Significance of the Study

Specific Research Questions
Research Method
Plan of the Dissertation

Chapter II. Review of the Related Literature
Futures Research
The Effects of Communication Technologies on Communication
Communicating via Computer/Computer Conferencing
The Discipline of Communication in the Future
Summary of the Review of the Literature

Chapter III. Methodology
Purpose of the Study
Methods and Procedures

Chapter IV. Findings and Analysis of the Data
Data Collection and Preparation for Analysis
Findings and Analysis
Discussion

Chapter V. Conclusion
Summary
Limitations
Recommendations
NOTES--CHAPTER 1


18. Weatherman and Swenson, p. 111.
CHAPTER II

REVIEW OF THE LITERATURE

A number of conflicting forecasts regarding the likely influence of increased use of computers and related technologies on interpersonal interactions have appeared in the speculative literature about the future. Although relatively few speech communication scholars have included research on mediated communication in their research programs, a number of these forecasts have implications for speech communication research and education. This study is an attempt to determine if members of the speech communication discipline are aware of and prepared to deal with what the future might bring. To address this problem and to derive statements for a first round questionnaire, the literature review covers three major areas. These are: (1) futures research (the study of the future); (2) effects of communication technologies on communication; (3) the discipline of communication in the future.
The trends and concepts outlined are from the perspective of western society, and, for the most part, that of the United States of America.

Futures Research

Although interest in the future long has been recorded, Cornish noted that it was not until the end of the 1960s that two major changes became apparent: the emergence of a conviction that the future could be studied and a recognition that "[h]uman beings are not moving toward a predetermined future world, but instead are active participants in the creation of the future world." The following decade witnessed dramatic growth in the number of organizations and individuals world-wide with either a primary concern with futures research or an interest in long-term future perspectives, and the number continues to increase.

The study of the future is referred to variously, with futurology, futuristics, futurism, and futures research among the most frequent terms in use in the United States. Objectives include the identification and examination of alternative
futures and the degree of certainty associated with each. Towler identified futures research as concerned with long-range perspectives, with the future usually more than five years, and frequently twenty-five years or more, from the present. McHale distinguished long-range planning (five to ten years) from futures research ("... longer term, extending toward the next two or three decades and beyond ..."), but noted that in practice there is overlap between the two categories.

Futures research emphasizes forecasting, which, according to Joseph, differs from prediction in that

"Forecasting establishes visible trends, alternatives, and possible futures [whereas] predicting . . . includes the making of statements about occurrences that are supposed to occur in a specific future."

Futurists, according to Ferkiss, "... are less interested in attempting to predict the course of a particular set of events than in foreseeing the broad currents which will influence future history."

Current approaches to futures research were summarized by McHale as follows:

1. Descriptive: including conjectural, speculative, and imaginable modes as in many classical utopian futures.
2. Exploratory: forecasting based on
methodical and relatively linear extrapolation of past and present developments into the future, i.e., the "logical future," including most technological forecasting, some scenario-building. ...

3. Prescriptive: normatively oriented projections of the future in which explicit value insertions and choices are made about how a specific future may be viewed or attained. ...

The descriptive approach will be used in this study.

There is general agreement on the basic objectives of and approaches to futures research, if not always on terminology and definitions:

... today the major split is between those who see industrialism, science, and technology on the threshold of new triumphs, and those who see them leading to global doom. 10

Proponents of the optimistic viewpoint, Kahn and Brown averred that industrial growth and advanced technology would relegate overcrowding, famine, poverty, resource scarcity, and pollution to the status of temporary or regional phenomena, and make affluence possible for all mankind. They expressed concern...

... that beliefs and attitudes that create resistance to economic growth [e.g., extreme environmentalism, opposition to technology] will impede the resolution of our current problems and perhaps even lead to the kind of disasters we all want to prevent--they will become in effect, self-fulfilling prophecies. 12
On the other hand, Robins and Webster saw

... no reason to believe that information technology will not reinforce, and aggravate, existing inequalities at both the national and international levels.  

They are joined by Caihoun, Bidsbury, Ruben, and a host of others in forecasting a widening gap between the information-rich, who control access to technology and through it, information and power, and the information-poor.

Technologies are not autonomous, and as their creators, humans must accept final responsibility for their uses and abuses. As Ferkiss concluded:

... we have the technological and scientific knowledge to eliminate grinding poverty, prevent the pollution of our environment and make the world generally a better place in which to live, ... [yet] we do not do so.  

Without a change in our belief system, no amount of technology will overcome the spectre of overpopulation, depletion of resources, pollution, and famine and instead may contribute to them.

Futures research, then, is concerned with the identification and examination of alternative futures. To this end, it emphasizes forecasting (identifying trends and possible futures) rather
than prediction (making statements about occurrences expected to take place in a specific future). A major controversy in futures research today centers on whether technology will ameliorate or worsen such global conditions as overcrowding, famine, poverty, pollution, and inequality of access to information. While there is disagreement on the effect that technology might have, there is general agreement that it cannot be ignored in any study of the future.

**The Effects of Communication Technologies on Communication**

The post-industrial society, as envisioned by Bell, is based on services and information, with communication a central feature and technology a driving force. Others have come to accept his conceptualization, until, as Leed has stated,

> [M]ost visions of post-industrial culture stress the centrality of communication and suggest that the media of communication will play a much greater... role than they have in the past.

Others would disagree with the latter assertion, instead maintaining that communication media always have played a central role in shaping
civilization. Innis, for example, identified periods in western civilization in relation to their dominant media of communication, noting:

We can perhaps assume that the use of a medium of communication over a long period will to some extent determine the character of knowledge to be communicated and suggest that its pervasive influence will eventually create a civilization in which life and flexibility will become exceedingly difficult to maintain and that the advantages of a new medium will become such as to lead to the emergence of a new civilization.18

Whether or not technological media of communication will indeed play a greater role than have media in the past, that they will play a role is undisputed. Disagreement centers on what that role is likely to be.

Among the optimists, McLuhan stated unequivocally that

[that the medium, or process, of our time—electric technology—is reshaping and restructuring patterns of social interdependence and every aspect of our personal life,19]

As the phonetic alphabet and writing lead away from the directionless totality of earlier oral/aural societies to fragmentation, isolation, and individualism, so, in his view, electric technology will return us to the total involvement of each person with every other in the "global
village."

Org, too, characterized the shift from oral to written as one from the communal to the individual. He denoted the electronic age, with its foundation in writing and print, as one of secondary orality. Similar to its predecessor "... in its participatory mystique, its fostering of a communal sense, its concentration on the present moment, ..." it is different in that its community is the immeasurably larger "global village," its "group-mindedness" is self-conscious, and its spontaneity, planned.

Provenzo singled out computer and microcomputer technology as the basis for a communications revolution that would result in what he termed the post-typographic culture:

In the electronic and post-typographic culture that is superseding the typographic and mechanical age, the potential for new forms of human inter-dependence and expression to emerge. These will differ significantly from one social group to another and will bring about an important re-definition of our culture and our consciousness. At the same time, there is the potential threat to personal freedom posed by the new computer technology if it is misused or abused.

At the opposite pole from McLuhan, Eurich stated that technology results in the increasing
isolation of individuals, who have no direct, personal experience, but rather only have shared, vicariously, in the experiences of others. Electronic media may make McLuhan's global village possible, but it will be the antithesis of a true village, for a true village is one... characterized by close personal observation, building on personal experiences, direct contact.  

Similarly, Kahn, Brown, and Martel distinguished between "world city" and "global village."

... that is, impersonal and businesslike interactions as opposed to the close human ties implied by the words "community," "village," and "marketplace."... Unlike Eurich, they were optimistic about the emergence of "... a growing, if still fragile, sense of 'world public opinion' and of shared responsibility for all human beings."

The literature suggests that media of communication have had and will continue to have an effect on the societies employing them. Whether new technological media of communication will have a greater impact than have other media in the past is open to question, as is the effect.
they will have. Forecasts span the continuum from increasing isolation to the interdependence of the "global village."

Communicating via Computer/Computer Conferencing

Computers and related communication technologies used in teleconferencing and electronic mail again emphasize print rather than sound, but with a more immediately interactive capability than previously was possible. Through substitutions for nonverbal cues (see below), frequent users appear to attempt to mitigate the difference between oral and written speech.

Chesebro identified several primary differences between face-to-face and computer mediated interpersonal communication, relating . . . to the channels used, the type of discursive modes used in each system, the unique feedback systems built into each system, and the use of time embedded in each system.29

Face-to-face exchanges include verbal (typically oral) and nonverbal channels, while computer-mediated exchanges are limited to the written. In the former, feedback is synchronous, in the latter, asynchronous. "A face-to-face exchange
necessarily includes a presentation or 'statement' of one's age, race, nationality, and gender, while in computer-mediated exchanges, each person exerts discretionary control over the sociological information conveyed.

Teleconferencing, and in particular, computer teleconferencing, has been the subject of a number of studies which indicate that the medium employed does influence behaviors, attitudes, and communication itself. A summary of research findings follows.

According to Johansen et al.,

Computer conferencing is an unfortunate label for this medium: the computer ideally should remain in the background, invisible to the user. . . . Essentially, computer conferencing is print-based communication which does not require all participants to be present simultaneously. And such written asynchronous communication changes many of the rules for small group meetings.32 (italics theirs)

System capabilities usually include provision for both public (to the entire group) and private (to one person or to a number of specified individuals) entries; ability of individual participants to retrieve or delete their own entries (the group usually may not alter or delete public entries, but a conference or group leader
may have that ability; word processing and
searching; asynchronous and synchronous modes; and
33
graphics.

Computer conferencing may be especially
well-suited to information exchange:

Written material . . . can be more effective
for the communication of factual information
than face-to-face, perhaps because of its
preciseness and the greater comprehension
gained from rereading text without the
pressure to overcome latency.34

Content may be better organized because
participants are able to reflect on a response or
comment and reorganize and rework it. Use of
indentations, numbering, and graphs may facilitate
presentation of information.

Controlled experiments on problem solving
provide empirical evidence that [computer
conferencing] groups can reach at least the
same quality of solution . . . as they can
with face to face discussions.35

However, as noted by Hiltz and Turoff, computer
conferencing groups take more time to reach
agreement, and consensus is less likely, perhaps
because of the absence of dominant leaders and
because participants in computer conferences tend
to express more overt disagreement with each other
than do those in face-to-face conferences.

Anonymity, which may be responsible at
least in part for the increased disagreement expressed in discussion and for the willingness of participants to share personal or potentially embarrassing information, may promote interaction (free exchange without threat of disclosure), objectivity (consideration given to each contribution on its own merits), and problem solving (attention to the group task without fear of ridicule at the advancement of unpopular ideas).

Computer conferences often are described as encouraging more equal participation than do face-to-face meetings, because, in the asynchronous mode, all participants are able to "talk" at once, without interruptions. Greater equality of participation may in part explain the finding that computer conferencing groups take longer to reach consensus; Rice suggested that...

"...inequality of participation may be functional for such tasks, which require coordination and direction of comment flow by a leader." 38

Related to participation is emergence of a leader, and, as noted above, a leader is less likely to emerge in teleconferencing than in face-to-face meetings. The personality and
physical attributes which may play a role in leadership emergence in face-to-face groups for the most part do not obtain in computer conferencing, and, in asynchronous computer conferencing, it is literally impossible for one person to hold the floor to the exclusion of all others. Instead of a single leader, multiple leaders, each with a special area of expertise, are likely to be deferred to as particular aspects of a problem are discussed.

In distinction to leadership emergence among conference participants, a strong conference leader, moderator, or organizer may be crucial to conference success. Because each participant is alone, computer conferencing is contingent upon her/his motivation to participate, and "[t]he provision of incentives for participation ... appears to be one of the demands upon leadership." Setting an agenda and establishing rules and procedures, including deadlines for responses and guidelines for frequency and amount of participation, may compensate in part for a lack of self-pacing on the part of participants. The computer itself may
to some extent substitute for the order-keeping function through group-ware, software designed to support particular group processes and procedures, such as feedback of results and voting.

Group development also may be affected by the medium of communication, and Rice has identified specific stages of group development in conference groups:

1. culture shock, learning the commands, loss of interpersonal cues, new social dynamics
2. ability to use basic commands
3. push toward sociability, introduction of new cues and group norms, \textit{learning}
4. serious use, perhaps dependence/addiction\footnote{1}

The absence of nonverbal cues renders communication via computer less like face-to-face interactions. Studies suggest that these cues often appear in new forms. Hiltz found that users ... quickly learn to substitute written cues for non-verbal (sic) ones. They add expressions like "ha-ha" and "um-er" to their written messages, and they begin to explicitly ask for or indicate agreement with the statements of others to substitute for reactions such as nods of the head\footnote{2}.

Not unexpectedly, Hiltz and Turoff found that computer conferencing is considered less satisfactory than face-to-face interactions for getting to know someone. Social and emotional needs of the participants are less likely to be
overtly met; nonetheless, Hiltz found that, very quickly,

... participants begin to reach out in a personal way, trying to get to know the people with whom they are communicating. This "push toward sociability" is so strong that it almost seems to be an over-compensation for what is seen as the coldness or impersonality of communicating by typing and reading.44

A study of computer conferencing by Hiltz indicated that "social connectivity"—as measured by the number of system members known or "met" online and the number of valued relationships developed—is the most important factor in determining satisfaction with communicating in a computer conference. Although Williams suggested that

[many business trips may be replaced with teleconferences where individual participants meet electronically rather than travel across country.]45

Hiltz found that, not only did individual attendance at professional meetings remain the same or increase for system users,

... even the lowest level users are likely to report an increase in communication with colleagues in their own organization as a result of using EIES [Electronic Information Exchange System].46

She postulated that system users serve as a link between others using the system and those who do
not. Overall, increased system use seemed to contribute to expanded use of other communication media, including the telephone, and to an increase in the total volume of communication as system users expand their networks of both personal and collegial relationships.

In summary, communication via computer appears to be most satisfactory for task, or content, dimensions of communication: exchanging information, discussing ideas, asking questions. It is less satisfactory for the relationship dimension, including getting to know someone, and, perhaps for this reason, an overt "push toward sociability" often is a feature of computer use for conferencing. Contrary to the expectation of Picot et al., that electronic text media would replace the mail and oral (face-to-face and telephone) communication, computer conferencing has replaced neither travel or use of the telephone, but rather has increased the quantity of communication overall.

Work at Home

Work at home (also referred to as telecommuting), like computer conferencing,
involves the use of computer and telecommunications technologies as substitutes for transportation.

Alvin Toffler introduced the concept of the "electronic cottage" as the solution or partial solution to such diverse problems of modern society as pollution, transportation costs, energy shortages, the need for child care, and the perceived decline of the family unit. He foresaw that the home and the neighborhood, rather than the office, would become loci of interpersonal interactions.

Others are not in complete agreement. Albertson anticipated difficulties in the reintegration of work and family roles.

Clarke, writing of work-at-home, stated: "Of course, few of today's families could survive this..." Hiltz observed that

[when the terminal is used at home, other household members frequently develop strong positive or negative attitudes toward the system. Perhaps employees will need a new kind of counseling if the family is to successfully adjust to life in an "electronic village."]

Picot, et al., stressed the importance of face-to-face communication for developing trusting relationships, for coordinating information,
solving complex problems, and motivating employees. Similarly, Albertson found that working at home using a computer severely limited opportunities for both the social and task related interactions which occur daily in the office. Problems included difficulties in making business contacts, the absence of cross-fertilization of ideas or feedback, professional anonymity, and lack of social contacts. Toffler, too, has affirmed that not all jobs can be performed effectively in the absence of face-to-face contact and cited potential problems including motivation and management.

Gordon and Olson noted that the identification of individuals and positions appropriate for telecommuting will be an important personnel management issue. Job characteristics they considered optimal for work at home include:

1. Minimal physical requirements (space and equipment)
2. Heavy use of computer terminals or telephone
3. Individual control over work pace
4. Well-defined and easily measured
contacts. Employees who "... participated in family or solitary activities beyond work ... had fewer problems with social isolation or concentration."  

Work at home should be voluntary; Gorden inveighed against self-selection and recommended that the employer 

... select employees carefully, using information from the manager about the person's work habits and planning skills, then screen the candidates with one or more appropriate personality inventories that help indicate a person's need for social interaction and the ability to direct his or her own activity.  

A study by Ramsower, which included full-time (four to five days per week) and part-time (two to three days per week) telecommuters, corroborated such that was noted above. Ramsower found that, for the first group, upward, downward, and horizontal communication decreased, with a decrease specifically in communication which was "... not work related, informational, and immediately important to the current task." Use of the telephone increased and apparently was effective for such functions as giving and receiving information and task instructions. Members of this group reported
outputs (both quality and quantity)

5. Well-defined milestones (intermediate deadlines)

6. Relatively low need for communication with others in the organization.

Although telecommuting often is considered appropriate for managers, professionals, and office workers, many positions in these categories require considerable and frequent interpersonal communication with a variety of others in the organization and outside of it. Even so, some fraction of these jobs might be performed successfully at home. Olson reported that managers who do work at home cite heavy reliance on the telephone and electronic mail in maintaining contact with employees (some of whom also may work at home) and with clients.

Olson has postulated attributes of individuals which promote successful work at home to include:

1. Self-motivation, self-discipline
2. Family requirements, including child care
3. Preference for limited social
decreased satisfaction with the amount of variety in their jobs. Neither the telephone nor the computer were completely adequate for supervision and performance evaluation, and at least one participant reluctantly gave up supervisory responsibilities as too difficult. In general, those reporting the greatest satisfaction with full-time telecommuting had strong personal reasons for working at home (usually, child care) and were less interested in the social and/or self-actualizing aspects of employment.

Part-time telecommuters did not experience a noticeable decrease in communication, perhaps because more office time was devoted to it, sometimes with adverse effects on co-workers. Citing uninterrupted time to work on mentally intensive tasks such as writing and planning and a concomitant increase in productivity, members of this group generally found part-time telecommuting beneficial, in spite of ...

... some loss of identification with their work group, a decline in their opportunities for advancement and their ability to supervise others.

Thus, while computer conferencing may increase the amount of communication and the use
of other communication media including the telephone and expand the network of contacts available to participants, remote work via computer appears to have the opposite effect, especially for those who work at home full time. Telecommuters may experience a decrease in upward, downward, and horizontal communication, and especially in communication not specifically task-related. Opportunities for interaction with others are limited, resulting in professional anonymity, difficulties in making business contacts, and lack of social contacts. Part-time telecommuting may prove satisfactory for those in managerial and supervisory positions, as it offers both uninterrupted time at home for writing and thinking and the opportunity for considerable and frequent interpersonal communication with a variety of others both inside the organization and outside it.

**Future of Work**

Because organizations are more likely than individuals to have a variety of communication media at their disposal, communication via computer may, at least in the immediate future, be
more common in organizational than in other settings. However, teleconferencing and telecommuting are not the only possible manifestations of computer technology in the work place, and several authors have addressed the broader issue of the future of work in a technological society.

Toffler advanced the positive view that machines would increasingly take over routine tasks, leaving to people the creative and intellectual ones. Pelton concurred: "The work of the future will be increasingly intellectual as machines perform more and more mechanical tasks." Simon admonished: . . . we must acquire the computer technology of the changes that it has been and will be a cause of widespread alienation from work. Empirically we find no signs of a downward trend in work satisfactions . . . On the contrary, the new technologies may even have a modest humanizing effect. . . .

Others are not convinced. Cowan expected a reduction in jobs and/or working hours. Shaiken projected a concentration of few creative and meaningful positions at the top of the hierarchy, with the remainder requiring fewer skills and subject to electronic monitoring and control. Winner cited
[A number of studies, including those of the U.S. Bureau of Labor Statistics, which suggest that the vast majority of jobs will be menial service positions paying relatively low wages.]

Williams predicted

... changes in the U.S. workforce, with jobs increasing in the information, knowledge, and service sector and declining in traditional manufacturing. ... He cited results of several studies suggesting a thirty percent to fifty percent reduction in the number of clerical workers as a result of increased use of new technologies. Among those who continue in clerical positions,

[Word processing has not been without serious criticism, especially from clerical personnel who feel their work depersonalized when working more in conjunction with machines than people.]

Downing characterized the shift from typewriters to word processors as transferring control from the operator to the machine with its built-in monitoring elements:

In becoming tied to, paced and controlled by machine, typists will not simply become de-skilled, but will become increasingly subject to ... control. ... Several authors recognized the necessity for job redesign, with Shaiken emphasizing that those whose positions are affected by technology
should be involved in the process to ensure better communication and coordination rather than increased control. He also noted that technological alternatives, with their differing effects on people and management, should be investigated.

The impact of computer technology on work in the future, then, may go beyond the possibilities for teleconferencing and telecommuting. Machines may take over routine tasks, leaving creative and intellectual work to people. However, few positions requiring creative and intellectual activity may be concentrated at the top of the organizational hierarchy, with the remainder requiring fewer skills and subject to electronic monitoring. Computer technology may or may not contribute to decreased opportunities in the workplace; to minimize potential negative effects, job redesign with the involvement of those whose positions are affected could become more important as technology results in changes to existing positions.

**Interpersonal Relations**

Although most analyses of communication via computer have centered on organizational
contexts, a few have addressed likely impacts of computers and related technologies on interpersonal interactions outside the organization. In an unpublished paper, Salem and Gratz report a self-described "... first step in a research program investigating the social and psychological impacts of technological involvement." Six hundred and seventy three undergraduate students enrolled in introductory communication courses completed three instruments:

(1) a communication opinions questionnaire, (2) a communication activities inventory, and (3) a response chosen from a set of possible responses to a communication situation.

The results indicated a marginal relationship between technological involvement and social dysfunction; citing the restricted sample and the doubtful reliability of two of the instruments selected as possible contributors to this marginal relationship, the authors plan future research in this area.

That computers increasingly will be used in homes in the United States for education, entertainment, banking, shopping, and the like was forecast in a Delphi study on future trends in
telecommunications and space applications

published by Pelton in 1981. The

... best experts in the field in Europe,
Japan, Australia, Canada, the U.S. and in the
developing world. ... [representing] a good
cross-section of government officials,
scientists, corporate officials,
representatives of international
organizations, and of academia.82

responded to nineteen statements, although the
majority dealt specifically with
telecommunications, among them was the following:

Use in 25 percent of the homes in the U.S. of
computer/telecommunications/video center for
entertainment, education, shopping, payment of
bills, research, computer access, etc.83

Sixty-two of eighty-three responses (seventy-six
percent) expected this level of use by the year
2000.

As a result of such an expected increase
in opportunities for electronic banking, shopping,
and recreation, Phillips, Boden, and Gratz
predicted increased isolation from
other human beings. Similarly, Williams projected
reduced emphasis on personal interactions with
family and with others outside the home as a
result of an increase in leisure time which is
likely to be filled by increased television
viewing. Additional leisure time might be
filled in other ways: Pelton suggested "... more time for rest, relaxation, intellectual activity. (Not to mention infidelity and boredom.)"

Others expressing ambivalence toward Toffler's avowal that family interactions will increase include Badzik, who noted that "[V]ideotex systems may either draw a family together or further erode this basic unit of society." Dutton, et al. suggested that, as family members increasingly establish their own electronic networks, they either may

... spend less and less time together and develop more and more divergent interests... [or] the multiple-user interactive capabilities of personal computing may encourage group activities. ...

Salem and Gratz suggested that the presence of computers in the home may necessitate development of "... an improved family recreational program to provide opportunities for expanding relationships within the family unit."

Williams observed that "[t]oo often we think of 'community' in physical terms but for us humans it can just as well refer to community of interests" (italics his). Instead of the
increased individual involvement in the
residential community or neighborhood projected by
Toffler, Webber noted:

Groups held together by common beliefs, interests and fashions are becoming the
primary communities to which individuals belong, displacing the communities of
residence as locus of loyalty and fealty. 94

Thus, communication technologies, including the
telephone, have the potential both to inhibit
interpersonal relationships and to extend them
from the immediate, physically present family or
neighborhood to the world beyond.

Although it is anticipated that computer
technology in the forms of electronic banking,
shopping, and recreation will become increasingly
available, research in this area has been
minimal. Possible consequences forecast range
from increasing isolation and reduced interaction
with others to increased family interactions and
expanded social networks through the formation of
electronic communities based on common interests.
Interpersonal relationships thus may be either
inhibited or extended.
The Discipline of Communication in the Future

In contrast to the numerous forecasts made about the practice of communication, few authors have addressed specifically the future of the discipline of communication in a perceived technological age. Among those who have, Work emphasized that

... citizens of the future will need to understand and be able to use a rapidly growing array of new technologies--technologies that expand the individual's and society's communicative capacities. 95

Similarly, Deethardt's "functionally articulate communicator" of the future should be able to respond in any medium of communication required by the communication context.

Work anticipated that communication, as a means of resolving or reducing conflicts, increasingly will become important as an alternative to violence in a world in which we are ever more interdependent upon each other. Electronic participatory democracy, made possible by interactive cable television, will require of the citizenry

... levels of skill in information management, analysis of data, decision-making
and persuasion demanded only of the governing elites in our present form of representative government.97

To meet the needs of electronically mediated democracy, Deethardt urged political competence as individuals take part in policy making.98

In response to anticipated future demands, Work recommended the identification of social and technological developments which have implications for communication education in the future and of concomitant communication competencies. Educational requirements should include not only basic communication skills for effective reading, writing, speaking, and listening, but also interpersonal skills, competency in conflict management, problem solving, and creative thinking, and opportunities for increased interaction with such communication technologies as computers, teletext, and videotext and with interactive media, such as interactive cable television. Educational requirements identified by Deethardt included: intercultural, interpersonal, political, and futurized; the last perhaps most important, requiring "... a provisionning of alternatives and choosing preferable futures." He noted that
communication education "... must prepare people to function in ever larger, more impersonal amalgams" and recommended training not only in interpersonal skills but in public communication.

Salem and Gratz perceived an increased requirement for "... the ability to initiate, maintain, terminate, and/or renew social relationships." To meet this need for social competence, they prescribed the inclusion of the study of the relationship dimension of communication in the curriculum, and, concerned that increased person-machine communication will result in the inability or impaired ability to build and maintain effective interpersonal relationships, they stressed the importance of cultivation of opportunities for human encounters and "... planning for enhancing human communication skills particularly in the area of relationship building." They cautioned that

[s]chools that develop instructional applications of the computer should simultaneously consider programs that will provide children with enhanced opportunities to explore human roles and relationships. Schools that employ the computer intensively will also have to develop higher quality instructional programs in interpersonal communication.
Eurich also expected that education in communicative relationships would become especially important, so that "... people once again learn how to socialize." 106 Noting that "[a]ll media are not mass media," Cathcart and Gumpert were 107 . . . quite convinced that the traditional division of communication study into interpersonal, group, and public, and mass communication is inadequate because it ignores the pervasiveness of media. 108 They maintained that definitions of communication should incorporate media and that media should not be relegated to mass communication, but should be included in other categories as well. Communication research should account for media influences, and a "... new typology should incorporate traditional concepts of communication with the role of technological media." To this end, they proposed "mediated interpersonal communication" as "... a general category referring to any situation where a technological medium is introduced into face to face interaction." 109 To meet the perceived requirements of increased use of computer and related technologies
at home, school, and work, it has been suggested that communication curricula in the future should include basic communication skills, interpersonal skills, conflict management, problem solving, creative thinking, and the ability to communicate via a variety of media. Communication research should incorporate the study of media influences and media effects on interpersonal interactions.

Summary of the Review of the Literature

Communication via computer differs from face-to-face interaction in a number of ways. It appears to be most satisfactory for task, or content, dimensions of communication: exchanging information, discussing ideas, asking questions. It is less satisfactory for the relationship dimension, including getting to know someone, and, perhaps for this reason, an overt "push toward sociability" often is a feature of computer conferencing. Rather than replacing the mail, telephone, or face-to-face interactions, computer conferencing has increased the amount of communication and expanded the network of contacts available to participants. In this, it is
distinguished from full time telecommuting, which has resulted in decreased upward, downward, and horizontal communication and with reduction noted especially in communication which is not specifically task-related. Opportunities for interaction with others in the organization are limited, leading to professional anonymity and difficulties in making business and social contacts. Part-time telecommuting may be more satisfactory for those in managerial or supervisory positions requiring considerable and frequent interpersonal contact with others inside and outside the organization.

The impact of computer technology on work in the future may extend beyond the possibilities for teleconferencing and telecommuting. Machines may take over routine tasks, leaving creative and intellectual work to people. However, positions requiring creative and intellectual activity may be few and concentrated at the top of the organizational hierarchy with the remainder requiring limited skills and subject to electronic monitoring. Computer technology thus may or may not contribute to decreased opportunities in the
work place. To minimize potential negative effects, job redesign could become more important as technology contributes to changes in existing positions.

If little research has been done on the impact of computer technologies on organizational communication, less has been published on their impact on interpersonal relationships outside the organizational context. Forecasts span a continuum from increased isolation and reduced interaction with others to increased family interaction and expanded social networks through the formation of electronic communities based on common interests.

To meet the perceived requirements of increased use of computer technology at work and at home, it has been suggested that communication curricula should include an increased emphasis on basic communication skills, interpersonal skills, conflict management, problem solving, creative thinking, and the ability to communicate via a variety of media. Research in communication should incorporate the study of media influences and media effects on interpersonal interactions,
as well as in mass communication contexts.

In summary, the literature review of futures research, the effects of computer and related technologies on communication, and the discipline of communication in the future indicates (1) that the medium of communication does have an effect on the practice of communication; (2) that, although a number of studies and forecasts about the relationship between computer and related technologies and the practice of communication have been published, relatively few are the work of those in the discipline of communication; and (3) limited attention has been given to the directions that teaching and research in the discipline of communication should take to meet expected changes in communication practice. This study, by soliciting responses from communication scholars to forecasts derived from this review of the literature, is intended to serve as a first step in identifying probable future influences of computer technology on interpersonal communication and to provide a basis for planning for the future of education and research in the discipline.
NOTES--CHAPTER II


5 McHale, p. 10.

6 McHale, p. 10.


9 McHale, p. 10.

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20 McLuhan and Fiore.

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23 Ong, p. 136-37.


26 Eriech, p. 35.
27 Kahn, Brown, and Martel, p. 183.
28 Kahn, Brown, and Martel, p. 183.
30 Chesebro, p. 209-10.


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61 Olson, p. 185.
62 Gordon, p. 110.
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65 Ramsower, p. 73.
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67 Ramsower, p. 76.
68 Ramsower, p. 79-80.


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93. Williams, p. 164.


98. Deethardt, p. 278.


100. Deethardt, p. 274.

102 Deethardt, p. 278.


105 Salem and Gratz, "High Technology."

106 Eurich, p. 37.


108 Cathcart and Gumpert, p. 277.

109 Cathcart and Gumpert, p. 268.

110 Cathcart and Gumpert, p. 268-69.
CHAPTER III

METHODOLOGY

This chapter presents the methods used to gather the data on the probable influence of increased use of computers and related technology on interpersonal communication in the future. It includes the purpose of the study, a description of the Delphi method, panel selection, questionnaire development, data collection methods, and the plan for analysis of the data.

Purpose of the Study

It has been suggested that the proliferation of communication technologies should be met by the identification of relevant communication competencies. This study was undertaken to identify the probable influences of increased use of computers and related technology on interpersonal communication in the next twenty-five years and to recommend adaptive directions for both communication research and
education. To this end, four research questions were developed:

1. To what extent do respondents agree with forecasts about interpersonal communication practice derived from the literature?

2. What changes in interpersonal communication practice do respondents expect as a result of increased use of computers and related technology?

3. What changes in the communication curriculum do respondents think should be made?

4. In the event of statistically significant differences in responses (i.e., the dependent variables), are these attributable to the independent variables: area of expertise, status of respondent (emeritus/active), gender of respondent, and/or frequency of computer use?

Methods and Procedures

The Delphi Method

The Delphi method, or technique, elicits opinions on topics for which reliable objective evidence is unobtainable and frequently is used in forecasting. It originated with the Rand
Corporation's "Project Delphi," a study undertaken for the U.S. Air Force as an alternative to more costly data collection methods and computer modelling. It is

... a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem."

To this end, anonymity of group members, feedback of individual contributions to the group, assessment of group judgment, and an opportunity for group members to change their responses are provided.

The Delphi has a number of applications, including forecasting (e.g., prediction of alternative futures, identification of expected technological and societal innovations, estimation of probability and time of occurrence of events), strategy (selection of a given strategy from identified alternatives), and the determination of preferences and priorities of individuals and groups. It is especially valuable when

1. The problem does not lend itself to precise analytical techniques and can benefit from subjective judgments on a collective basis.
2. The individuals who need to interact cannot be brought together in a face-to-face exchange because of time or cost constraints. Further, a conventional conference tends to be dominated by particularly strong personalities or to give rise to an undesirable bandwagon effect.

Because its purposes include the utilization of expert opinion in the absence of "hard" data for forecasting, panel members are not selected as representatives of the population at large, but rather for the insight they are expected to have into the problem under study. A questionnaire, containing statements and/or open ended questions, is distributed to panel members, who are unknown to each other. Responses are analyzed and returned to the respondents, who may change their original replies. At least two rounds are conducted, and a narrowing of the initial spread of opinion and a shifting of the median generally occur in successive rounds. The result may be consensus on what the future might be, or, "[i]f no consensus emerges, at least a crystallizing of the disparate positions usually becomes apparent." Thus a Delphi study may identify plausible alternative futures which may form a basis for the planning of contingent
futures.

The Delphi method was used in this study for three reasons. First, the study was undertaken to estimate the probability and time of occurrence of events from five to twenty-five years in the future, i.e., to forecast probable future(s) for communication practice and education. Second, the problem did not lend itself to precise analytical techniques and could benefit from subjective judgements on a collective basis. Third, it was not feasible to bring respondents together for face-to-face interaction.

Panel Selection

The original panel consisted of 284 members representing two groups: 212 practicing academics in colleges and universities in the United States and seventy-two emeritus members of the Speech Communication Association. Consideration was given to the possibility that emeritus panelists might respond differently from practicing academics, and, within the latter group, that the area of expertise of the participant might influence responses.
Consequently, respondents were assigned to one of two groups, and within the first group, to one of three subgroups.

**Group 1.** The first group was a constructed panel of 212 college and university professors in communication. Because this study was undertaken to identify the probable influence of increased use of computers and related technology on interpersonal communication, and because organizations are likely to have at their disposal, and encourage the use of, computer technology, this panel included respondents with knowledge of these various dimensions of the problem, i.e., (a) those who have published on the relationship between technology and communication and/or the future of the discipline of speech communication; (b) those with expertise in the area of interpersonal communication; (c) those with expertise in the area of organizational communication.

**Subgroup (c).** To maximize the number of participants in this subgroup, respondents in subgroup (c) included all forty-three authors identified as having written about the
relationship between technology and communication and/or the future of the discipline of speech communication who hold a PhD in communication and the rank of Assistant, Associate, or full Professor.

Subgroups (i) and (o). The number of potential respondents in these two subgroups was much greater than that available for inclusion in subgroup (t). Thus, to emphasize the criterion of expertise, members of these subgroups were subject to more selective criteria for inclusion. Subgroup (i) was composed of the 132 members of the Interpersonal and Small Group Division of the Speech Communication Association who hold a PhD, the rank of Associate or full Professor, and are employed at an institution granting an advanced degree in communication (as determined from examination of the 1985 and 1986 Speech Communication Association directories and the division mailing list). Subgroup (o) was composed of the thirty-seven members of the Organizational Communication Division of the Speech Communication Association who hold a PhD, the rank of Associate or full Professor, and are
employed at an institution granting an advanced
degree in communication (again, as determined
from examination of the 1985 and 1986 Speech
Communication Association directories and the
division mailing list).

Group 2. The second group was composed
of seventy-two emeritus members of the Speech
Communication Association who were identified as
having an interest in or knowledge of the area
under study by Carroll Arnold in his capacity as
secretary of the emeritus group. They were
assumed to have maximum relevant experience in
the field of communication.

Questionnaire Development

The literature search undertaken to
derive ideas and speculations about the
relationship between communication and increased
use of computers and related technologies yielded
over two hundred statements. These were divided
into categories and consolidated into forty-six
statements comprising the first draft of the
first round questionnaire. These statements
included ideas and forecasts about the
relationship between increased use of computers
and related technologies and communication practice and education and about future directions for the discipline of communication. To better focus the instrument on interpersonal communication, regardless of context, and on future directions for the discipline, fourteen statements were eliminated. The remaining thirty-two statements remained as written or were re-worded for clarity, and three demographic questions were added. The latter, age (in ten year increments), sex, and frequency of computer use (frequently, sometimes, never), were included in response to research question four.

The questionnaire was tested in a class of fifteen students of information theory offered in the Department of Communication at the University of Colorado, Boulder. Following the pretest, minor changes were made to two questions for clarity, after which the questionnaire was approved for distribution.

Response to twenty-eight of the thirty-two statements was to be a rating on a five-point scale (with 1 the most probable and 5 the least probable) of the likelihood of each
statement being true within five, ten, and twenty-five years. Response to an additional three statements was to be "yes" or "no" to the desirability of each statement for each of the three time periods. The last statement (More emphasis should be placed on instruction in __________) was open-ended for participants to supply a category of their choosing and answer it yes or no for each time period. Participants were invited to add comments or contribute additional statements to the original thirty-two provided on the first round questionnaire (included in Appendix A).

**Round 1**

On 17 February 1982, the first round questionnaire, a cover letter, and postage-paid return envelope were mailed to the 286 potential respondents. Each questionnaire was numerically coded to indicate the group and subgroup (for members of group 1) to which the respondent had been assigned. One week later, participants were sent a follow-up postcard thanking those who had already responded and requesting a response from those who had not. Two weeks after the postcard...
was sent, a second copy of the questionnaire, with a cover letter and postage paid envelope, was sent to those whose questionnaires had not yet been received.

By the first week in April, 181 (sixty-four percent) of the questionnaires had been returned with usable responses. Of these, 138 were from group 1, with twenty-five from subgroup (t); eighty-seven from subgroup (i), and twenty-six from subgroup (e). Forty-three were received from group 2. Eighteen recipients (six percent) of the first round questionnaire declined to participate; three questionnaires (one percent) were returned due to incorrect addresses. Eighty-two questionnaires (twenty-nine percent) were not returned. The respondents provided additional statements and a number of comments about the perceived ambiguity of some of the statements. Seven of the suggested statements consistent with the focus of the questionnaire were added to the second round. Thirteen statements were worded slightly for clarity, and this was indicated in their numbering on the second round questionnaire. Two of the yes/no
statements were omitted because of the homogeneous responses they received, and the open-ended statement and the demographic questions also were omitted.

For each group and for the three subgroups of group 1, the ratings were tallied and mean and median rating and the interquartile range calculated for each statement and each time period. The second round questionnaire included twenty-nine of the original statements with the mean, median, and interquartile range for the group (but not for the subgroup of group one), and the respondent's first round response indicated for each statement and each time period.

Round II

On 14 April 1986, the thirty-six item, four-page second round questionnaire, with cover letter and postage paid envelope, was mailed to the 181 panelists who had responded to the first round questionnaire. Each participant was requested to review her/his first round responses and to indicate any changes. Statements added to the second round questionnaire were to be treated
as new statements.

One week after the second round questionnaire was mailed, a follow-up postcard was sent to all panelists, thanking those who had responded and requesting a response from those who had not.

On 10 July 1986, when compilation and analysis of the second round data was begun, 158 second round questionnaires had been received from participants whose first round responses had been included in the first round calculations: 119 from members of group 1 (subgroup (i): twenty-two; subgroup (ii): seventy-six; subgroup (o): twenty-one); and thirty-nine from group 2.

In many Delphi studies, the first round is designed to elicit statements from respondents. These statements then form the basis for the questionnaire in subsequent rounds. Because the literature search, by providing statements for the questionnaire, served this purpose, panelists participated in two rounds. The decision to restrict this study to two rounds of panel participation has support from several sources. Martino stated:
The panel may in effect skip the first round by receiving at the outset a list of events of interest to the panel director. In such cases, the entire sequence may be collapsed to two rounds.  

Linstone suggested that if a round produces less than fifteen percent change from the preceding round, the Delphi should be terminated. This is substantiated by Gordon, who noted that a number of two-round Delphi studies have been completed and that they "... produce the characteristic narrowing of opinions and median shifts found in more elaborate studies." In this study, eight percent of the responses were changed during the second round, thus, only two iterations were completed.

Statistical Analysis of the Data

Frequencies were run on all data, and those relevant to the research questions are reported. An analysis of variance was performed to determine the presence or absence of statistically significant differences between group/subgroup responses. In those cases where differences between groups/subgroups were
statistically significant, a Scheffe test was performed to identify the source of the variation. Further, within each group/subgroup, mean responses were computed and examined to determine whether frequency of personal computer use or gender of respondent contributed significantly to the variation.

Analyses of the data were done using the Statistical Package for the Social Sciences (SPSS). The results of the data analysis are reported in chapter IV.
NOTES--CHAPTER III


5. Linstone, p. 275


8. Linstone, p. 298.

CHAPTER IV

FINDINGS AND ANALYSIS OF THE DATA

This chapter presents and analyzes the findings of the second round questionnaires and the responses to the three first round statements omitted from the second round. The first and second round questionnaires are found in Appendix A.

Data Collection and Preparation for Analysis

To review the data gathering procedures, the first round questionnaire was distributed to 212 practicing academics in the discipline of communication (group 1) and to seventy-two emeritus members of the Speech Communication Association (group 2). The practicing academics included forty-three authors of articles on the relationship between communication technology and communication and/or the future of the discipline of communication (subgroup t). 132 members of the Speech Communication Association's Interpersonal
and Small Group Division (subgroup i), and thirty-seven members of its Organizational Communication Division (subgroup o). The questionnaire consisted of thirty-one statements derived from the literature and one open-ended statement to be completed by the respondents. Response to twenty-eight statements was a rating on a five-point scale (with 1 the most probable and 5 the least probable) of the probability of each statement being true in five, ten, and twenty-five years; three statements required responses of yes or no for the same three time periods; and one was open-ended to be completed by participants and rated yes or no. Participants were invited to add comments and/or contribute additional statements for possible inclusion in round two. The second round questionnaire included twenty-nine of the original statements (with thirteen reworded slightly for clarity) with the group mean, median, and interquartile range and the respondent's own first round response indicated. Seven additional statements suggested by participants were added. Respondents were asked
to review their first round responses and make changes if they wished to do so. The seven statements added to the second round questionnaire were to be treated as new statements.

Table 1 summarizes the distribution and return of the first and second round questionnaires.

<table>
<thead>
<tr>
<th>Group</th>
<th>Round 1</th>
<th>Round 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>sent/</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>completed</td>
<td>returned</td>
</tr>
<tr>
<td>1* subgp</td>
<td>209/138</td>
<td>66%</td>
</tr>
<tr>
<td>e</td>
<td>37/26</td>
<td>70%</td>
</tr>
<tr>
<td>i</td>
<td>131/87</td>
<td>66%</td>
</tr>
<tr>
<td>t</td>
<td>41/25</td>
<td>61%</td>
</tr>
<tr>
<td>2*</td>
<td>72/43</td>
<td>60%</td>
</tr>
<tr>
<td>Total</td>
<td>281/181</td>
<td>64%</td>
</tr>
</tbody>
</table>

*1= Practicing academics
  1= Members of the SCA Interpersonal and Small Group Division
  2= Members of the SCA Organizational Division
  3= Authors on the relationship between communication technology and communication
  2= Emeritus members of SCA
Sample Characteristics

Response by gender of participant. The majority (seventy-four percent) of the panelists responding to both rounds were male. Fifteen percent were female, eleven percent did not answer the demographic questions (Table 2).

Response by age of participant. Forty-eight percent of the panelists responding to both rounds of the questionnaire were between thirty and forty-nine years of age. Twenty percent were between fifty and sixty-nine years of age; twenty percent were seventy years old or older. Eleven percent did not answer the demographic questions (Table 2).

Response by computer use of participant. Forty-three percent of the panelists responding to both rounds were self-identified as frequent personal computer users. Twenty-one percent were occasional personal computer users, and twenty-five percent never used a personal computer (Table 2).
Table 2. Second Round Responses: Group, Sex, Age, Computer Use

<table>
<thead>
<tr>
<th>Group</th>
<th>Subcategory</th>
<th>Subpop 1 (practicing)</th>
<th>Subpop 2 (emeritus)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ns</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>76</td>
<td>21</td>
<td>22</td>
<td>39</td>
</tr>
<tr>
<td>Male</td>
<td>54</td>
<td>15</td>
<td>15</td>
<td>33</td>
</tr>
<tr>
<td>Female</td>
<td>13</td>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>No response</td>
<td>9</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-39</td>
<td>26</td>
<td>9</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>22</td>
<td>8</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>50-59</td>
<td>17</td>
<td>1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>60-69</td>
<td>1</td>
<td></td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>70+</td>
<td></td>
<td></td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>No response</td>
<td>9</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Personal computer use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequent</td>
<td>38</td>
<td>13</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>Occasional</td>
<td>18</td>
<td>4</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Never</td>
<td>11</td>
<td>1</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td>No response</td>
<td>9</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

* Members of the SCA Interpersonal and Small Group Division

** Members of the SCA Organizational Communication Division

† Authors on the relationship between communication technology and communication
Findings and Analysis

Responses to the Second Round Questionnaire

Table 3 includes the second round questionnaire with the grand mean and median response indicated for each statement. An analysis of variance, performed to determine the presence or absence of statistically significant differences between group/subgroup responses, indicated that such differences existed in responses to four of the thirty-six statements on the second round questionnaire (Table 4). Consequently, with the exception of those four statements, responses for members of group 1 (all practicing academics) and group 2 (emeritus panelists) were combined in the analysis that follows. For those four statements, responses of members of group 2 and each subgroup of group 1 were considered separately. To identify the source of the variation, a Scheffe test was performed and, within each group/subgroup, mean responses were computed by gender of respondent and frequency of personal computer use to determine whether either factor contributed to the variation.
Table 3. Second Round Responses (Groups 1 and 2 Combined)

<table>
<thead>
<tr>
<th></th>
<th>5 years mean</th>
<th>10 years mean</th>
<th>25 years mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In general, computer-mediated interpersonal communication will be more frequent than it is today.</td>
<td>1 3 4 5</td>
<td>1 3 4 5</td>
<td>1 3 4 5</td>
</tr>
<tr>
<td>2. There will be at least one computer in 75 percent of homes in the United States.</td>
<td>1 3 4 5</td>
<td>1 3 4 5</td>
<td>1 3 4 5</td>
</tr>
<tr>
<td>3. Use of computers will be taught in 95 percent of public elementary schools in the United States.</td>
<td>1 2 4 5</td>
<td>1 2 4 5</td>
<td>1 2 4 5</td>
</tr>
<tr>
<td>4. Use of computers will be taught in 95 percent of all public high schools in the United States.</td>
<td>1 2 4 5</td>
<td>1 2 4 5</td>
<td>1 2 4 5</td>
</tr>
<tr>
<td>5. Computer-mediated interpersonal communication will be more common than will face-to-face communication.</td>
<td>1 3 4 5</td>
<td>1 3 4 5</td>
<td>1 3 4 5</td>
</tr>
<tr>
<td>6. Electronic networks will increase the opportunities for interpersonal communication.</td>
<td>1 2 4 5</td>
<td>1 2 4 5</td>
<td>1 2 4 5</td>
</tr>
<tr>
<td>7. Increased use of computers will change opportunities to develop interpersonal relationships.</td>
<td>1 2 4 5</td>
<td>1 2 4 5</td>
<td>1 2 4 5</td>
</tr>
<tr>
<td>8. Increased use of computers will contribute to a decline in interpersonal skills.</td>
<td>1 2 4 5</td>
<td>1 2 4 5</td>
<td>1 2 4 5</td>
</tr>
<tr>
<td>9. Increased use of home computers will contribute to decreased interaction among nuclear family members.</td>
<td>1 2 4 5</td>
<td>1 2 4 5</td>
<td>1 2 4 5</td>
</tr>
<tr>
<td>10. People will have more interpersonal relationships through electronic networks than face-to-face with others in their residential community.</td>
<td>1 2 4 5</td>
<td>1 2 4 5</td>
<td>1 2 4 5</td>
</tr>
<tr>
<td>11. Computer conferencing, electronic mail, and similar technologies will contribute to a 75 percent or greater reduction in business travel, including travel to conferences and professional meetings.</td>
<td>1 2 4 5</td>
<td>1 2 4 5</td>
<td>1 2 4 5</td>
</tr>
<tr>
<td></td>
<td>5 years mean</td>
<td>10 years mean</td>
<td>25 years mean</td>
</tr>
<tr>
<td>---</td>
<td>-------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>124. Computer conferencing, electronic mail, and similar technologies will contribute to a 25 percent or greater reduction in the use of first class mail.</td>
<td>1 2 3 4 5 3.95</td>
<td>1 2 3 4 5 2.37</td>
<td>1 2 3 4 5 1.08</td>
</tr>
<tr>
<td>125. Computer conferencing, electronic mail, and similar technologies will contribute to a 25 percent or greater reduction in the use of the telephone (other than for data transmis.</td>
<td>1 2 3 4 5 3.65</td>
<td>1 2 3 4 5 3.14</td>
<td>1 2 3 4 5 2.17</td>
</tr>
<tr>
<td>126. Computer conferencing, electronic mail, and similar technologies will contribute to a 25 percent or greater reduction in face-to-face communication.</td>
<td>1 2 3 4 5 3.84</td>
<td>1 2 3 4 5 3.66</td>
<td>1 2 3 4 5 3.11</td>
</tr>
<tr>
<td>127. The majority of the working population of the United States will work at home full time.</td>
<td>1 2 3 4 5 4.67</td>
<td>1 2 3 4 5 4.32</td>
<td>1 2 3 4 5 3.09</td>
</tr>
<tr>
<td>128. For people who work at home full time, the majority of primary interpersonal relationships will be with others in their residential community.</td>
<td>1 2 3 4 5 2.80</td>
<td>1 2 3 4 5 2.71</td>
<td>1 2 3 4 5 2.10</td>
</tr>
<tr>
<td>129. The majority of the working population of the United States will divide work between home and the workplace.</td>
<td>1 2 3 4 5 3.61</td>
<td>1 2 3 4 5 3.14</td>
<td>1 2 3 4 5 2.74</td>
</tr>
<tr>
<td>130. For people who divide work between home and the workplace, the majority of primary interpersonal relationships will be with others in their residential community.</td>
<td>1 2 3 4 5 3.14</td>
<td>1 2 3 4 5 3.03</td>
<td>1 2 3 4 5 2.89</td>
</tr>
<tr>
<td>131. Increased use of computers for work will contribute to the prevalence of flexible work schedules.</td>
<td>1 2 3 4 5 2.60</td>
<td>1 2 3 4 5 2.16</td>
<td>1 2 3 4 5 1.82</td>
</tr>
<tr>
<td>132. Work at home via computer will contribute to increased interaction among nuclear family members.</td>
<td>1 2 3 4 5 3.11</td>
<td>1 2 3 4 5 2.94</td>
<td>1 2 3 4 5 2.81</td>
</tr>
<tr>
<td>Event</td>
<td>5 years</td>
<td>mean</td>
<td>10 years</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------</td>
<td>---------</td>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td>219. Electronic monitoring via the computer terminal of those work at</td>
<td>1 2 3 4</td>
<td>3.55</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>home will be prevalent.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>228. The majority of new jobs will be menial.</td>
<td>1 2 3 4</td>
<td>3.63</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>23. Machines will perform the majority of routine tasks in the</td>
<td>1 2 3 4</td>
<td>3.15</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>workplace.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. Fifty percent or more of those employed in the United States will</td>
<td>1 2 3 4</td>
<td>3.67</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>be employed in positions requiring creative and intellectual work.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Most people will have more available leisure time as a result of</td>
<td>1 2 3 4</td>
<td>3.18</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>applications of computer technology.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. Communication curricula will be much the same as those today.</td>
<td>1 2 3 4</td>
<td>3.09</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>27. The pedagogical categories of communication (e.g., interpersonal,</td>
<td>1 2 3 4</td>
<td>2.77</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>small group, organizational) will include provision for mediated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>communication (in addition to mass communication).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28. Research in communication will include more research in mediated</td>
<td>1 2 3 4</td>
<td>2.33</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>interpersonal communication.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31. In college/university curricula, more emphasis should be given</td>
<td>yes</td>
<td>74.34</td>
<td>yes</td>
</tr>
<tr>
<td>to mediated interpersonal communication.</td>
<td>31%</td>
<td>21.49%</td>
<td>13.01</td>
</tr>
<tr>
<td>32. For the majority of public elementary school students in the</td>
<td>1 2 3 4</td>
<td>3.96</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>United States, formal education will include one or more required</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>courses taken at home via computer.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 years</td>
<td>mean</td>
<td>10 years</td>
</tr>
<tr>
<td>---</td>
<td>---------</td>
<td>------</td>
<td>----------</td>
</tr>
<tr>
<td>a. For the majority of public high school students in the United States, formal education will include one or more required courses taken at home via computer.</td>
<td>1 2 3 4 5</td>
<td>3.76</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>b. In the United States, government monitoring of individuals by electronic surveillance will increase.</td>
<td>1 2 3 4 5</td>
<td>3.82</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>c. Increased use of computers and related technologies will increase direct voter participation in public policy decision-making at all levels of government in the United States.</td>
<td>1 2 3 4 5</td>
<td>3.92</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>d. Increased use of computers and related technologies will contribute to greater voter understanding of public policy issues.</td>
<td>1 2 3 4 5</td>
<td>3.95</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>f. At all levels (elementary through college/university), more emphasis should be given to teaching about communication.</td>
<td>yes</td>
<td>97.16%</td>
<td>no</td>
</tr>
<tr>
<td>g. In college/university curricula, more emphasis should be given to basic communication skills.</td>
<td>yes</td>
<td>93.03%</td>
<td>no</td>
</tr>
</tbody>
</table>
Table 4. Second Round Statements with Statistically Significant Differences (p<.05) Between the Mean Responses of Two Groups/ Subgroups.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Time</th>
<th>Group</th>
<th>Mean</th>
<th>F</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Use of computers taught in high schools</td>
<td>1 yrs</td>
<td>1</td>
<td>2.8158</td>
<td>4.086</td>
<td>152</td>
<td>.0080</td>
</tr>
<tr>
<td></td>
<td>2 yrs</td>
<td>c</td>
<td><strong>3.0999</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 yrs</td>
<td>1</td>
<td>2.3600</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Use of computers will limit opportunities to develop interpersonal relationships</td>
<td>0 yrs</td>
<td>1</td>
<td><strong>3.0447</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 yrs</td>
<td><strong>3.1022</strong></td>
<td>3.620</td>
<td>152</td>
<td>.0146</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 yrs</td>
<td>1</td>
<td><strong>3.6717</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Increased use of home computers will decrease family interactions</td>
<td>0 yrs</td>
<td>1</td>
<td><strong>3.0879</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 yrs</td>
<td><strong>3.0896</strong></td>
<td>5.094</td>
<td>153</td>
<td>.0010</td>
<td></td>
</tr>
<tr>
<td>7. More leisure time available</td>
<td>0 yrs</td>
<td>1</td>
<td><strong>2.4045</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 yrs</td>
<td><strong>2.0811</strong></td>
<td>4.955</td>
<td>152</td>
<td>.0026</td>
<td></td>
</tr>
</tbody>
</table>

* = Members of SCA Organizational Communication Division
** = Members of SCA Interpersonal and Small Group Division
* Significant variations in mean response per Scheffe
Statement 4. Use of computers will be taught in 95 percent of all public high schools in the United States.
For the five year period, F for this statement was 4.086 and was significant at the .05 level (p = .008; df = 3, 112). A Scheffe test indicated that mean responses of subgroup o (members of the Speech Communication Association's Organizational Communication Division) and subgroup t (authors on the relationship between communication and communication technology) varied significantly from one another, with the former expecting the statement to be probable (mean response 2.0476) and the latter uncertain of its probability (mean response 3.0909). Within each group/subgroup, mean responses by gender of respondent and frequency of personal computer use were computed. Observation of the means yielded no pattern which would suggest a consistent relationship between responses and either factor. In the ten and twenty-five year time periods, there were no significant variations between group or subgroup responses.
Statement 7. Increased use of computers will limit opportunities to develop interpersonal relationships.

In all three time periods, F was significant for this statement at the .05 level. In the five year time period, $F = 3.722 \ (p = .0128; \ df = 3, 152)$. A Scheffe test indicated significant variations between the mean response of the emeritus panelists (3.2105) and that of members of the Interpersonal and Small Group Division of SCA (3.9737). In the ten year period, $F = 3.620 \ (p = .0146; \ df = 3, 151)$. A Scheffe test again indicated significant variations between mean responses of the emeritus panelists (3.1621) and of members of the Interpersonal and Small Group Division (3.8816). In the twenty-five year period, $F = 3.558 \ (p = .0158; \ df = 3, 151)$, and a Scheffe test indicated significant variations between mean responses of the emeritus panelists (2.9189) and members of the Interpersonal and Small Group Division (3.6579). Within each group/subgroup, mean responses by gender of respondent and frequency of personal computer use were computed. Observation of the means yielded
no pattern suggesting a consistent relationship between emeritus group responses and either factor. Among members of the Interpersonal and Small Group Division, frequent computer users rated this statement somewhat more improbable than did either occasional personal computer users or non-users. Both groups expected little change during ten or twenty-five years, with the responses moving only slightly in the direction of probability (emeritus group twenty-five year mean response 2.9189, Interpersonal and Small Group Division panelists twenty-five year mean response 3.6579).

Statement 98. Increased use of home computers will contribute to decreased interaction among nuclear family members. For the five year time period, the F for this statement was 5.691 and was significant at the .05 level (p = .001; df = 3, 153). A Scheffe test indicated significant variations between mean responses of the emeritus group (mean response 3.0789) and members of the Interpersonal and Small Group Division (mean response 3.9211). Within each group/subgroup, mean responses by
gender of respondent and frequency of personal computer use were computed. Observation of the means yielded no pattern which would suggest a consistent relationship between responses and either factor. In the ten and twenty-five year time periods, there were no significant variations among/between groups.

Statement 23. Most people will have more available leisure time as a result of applications of computer technology. F was significant at the .05 level for both the ten and twenty-five year periods. For the ten year period, $F = 3.615 \ (p = .0147; \ df = 3, 152)$. A Scheffe test indicated significant variations between the mean response of emeritus panelists (2.4054) and authors on the relationship between communication and communication technology (3.3636). For the twenty-five year period, $F = 4.955 \ (p = .0026; \ df = 3, 152)$. A Scheffe test again indicated significant variations between the mean response of emeritus panelists (2.0811) and authors on the relationship between communication and communication technology (2.1818). Within groups/subgroups, mean
responses by gender of respondent and frequency of personal computer use were computed. Observation of the means yielded no consistent pattern which would suggest a consistent relationship between responses and either factor.

In summary, with the exception of four of the second round statements (4, 7, 9R, 25), no statistically significant variations among/ between groups or subgroups were identified. In the absence of a pattern suggesting a consistent relationship between responses and either gender of respondent or frequency of personal computer use, differences between groups/subgroups on statements 4, 9R, and 25 are not clearly attributable to either factor. For statement 7, the difference between responses of the emeritus group and those of members of the Interpersonal and Small Group Division might be considered attributable to more personal computer use (either occasional or frequent) and more frequent personal computer use by the latter. However, members of the Organizational Communication Division of SCA and authors on the relationship between communication and communication
technology both were more frequent computer users than were members of the Interpersonal and Small Group Division, yet the Scheffe test did not identify their responses as significantly different from those of the emeritus group. Thus, it appears unlikely that variations in participant responses are attributable to frequency of personal computer use.

Members of the Interpersonal and Small Group Division were more likely than members of any other group to comment on the phrase computer mediated interpersonal communication as an oxymoron, suggesting a value orientation which identifies "interpersonal" with "face-to-face." Nonetheless, although value orientation may have played a role in responses to statements 7 and 9R, with the implication that increased computer use would not negatively affect interpersonal communication, such a potential relationship seems weak at best since responses to other statements did not follow a similar pattern.

Members of the emeritus group, whether computer users or not, may be more pessimistic about the effects of computer use on interpersonal
relationships, and, indeed, their mean response on statements 7, 8, and 9R was lower than that of any other group.

**Statements Relating to Communication Practice**

**Probable statements.** Seven statements relating to the use of computers and related technology and communication practice had a mean response in the probable to highly probable range (1.00 to 2.00) during at least one of the time periods. Table 5 lists these statements and the mean response for each.

None of these statements relate directly to the possible effects of computer use on interpersonal relationships or interaction, although statement 11 does so indirectly, implying that some face-to-face contacts would be replaced by mediated contacts or perhaps lost.

**Statement 1R.** Computer-mediated interpersonal communication will be more frequent than it is today.

The response of "probable" to this statement is doubtless a safe one barring unforeseen
Table 3. Second Round Statements Relating to Communication Practice: Probable (2.00) to Highly Probable (1.00).

<table>
<thead>
<tr>
<th>Statement</th>
<th>5 yrs</th>
<th>10 yrs</th>
<th>25 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Computer mediated interpersonal communication will be more frequent</td>
<td>(2.0385)</td>
<td>1.7161</td>
<td>1.4615</td>
</tr>
<tr>
<td>2. At least one computer in 75% or more of all homes</td>
<td>(3.5962)</td>
<td>(2.6447)</td>
<td>1.9299</td>
</tr>
<tr>
<td>3. Use of computers taught in 95% of public elementary schools</td>
<td>(3.0127)</td>
<td>(2.1948)</td>
<td>1.5562</td>
</tr>
<tr>
<td>4. Use of computers taught in 95% of public high schools</td>
<td>(2.5231)</td>
<td>1.8182</td>
<td>1.3548</td>
</tr>
<tr>
<td>11. Reduction in business travel</td>
<td>(3.2451)</td>
<td>(2.4869)</td>
<td>2.0033</td>
</tr>
<tr>
<td>12. Reduction in use of 1st class mail</td>
<td>(3.0850)</td>
<td>(2.3693)</td>
<td>1.8562</td>
</tr>
<tr>
<td>19. Prevalence of flexible schedules</td>
<td>(2.6013)</td>
<td>(2.1569)</td>
<td>1.8235</td>
</tr>
</tbody>
</table>

**Note:** Mean responses outside the probable to highly probable range appear in parenthesis.

economic factors or social collapse; if anything, the response may be too conservative in omitting
the five year time period. Increased use of electronic mail and computer bulletin boards already has been documented, with the latter increasing some six-hundred-fold since their inception in 1978. In 1983, approximately one million home computer users were estimated to participate.

Statement 2. There will be at least one computer in 75 percent or more of all homes in the United States. The expectation of probability in twenty-five years may be the result of familiarity with surveys of home computer users; in 1983, three to five percent of the population owned a home computer.

Statement 3. Use of computers will be taught in 95 percent of all public elementary schools in the United States. Statement 4. Use of computers will be taught in 95 percent of all public high schools in the United States. These two statements are among the three judged most probable in twenty-five years. This relative certainty may be a result of personal
experience, familiarity with the literature on computer literacy and computer-assisted instruction, and/or with such studies as the National Task Force on Education Technology, which indicates that "[v]irtually all schools have at least some computers, but only a relative few have then in sufficient numbers to provide adequate student access to a work station."

Statement 11. Computer conferencing, electronic mail, and similar technologies will contribute to a 25 percent or greater reduction in business travel, including travel to conferences and professional meetings. Recent studies suggest that, to the contrary, attendance at professional meetings remains the same or even increases for computer conference participants today. This may or may not be the case in twenty-five years, when respondents expect it is probable that business travel will decrease, particularly if transportation costs continue to increase and communication costs are reduced.

Statement 12B. Computer conferencing,
electronic mail, and similar technologies will contribute to a 25 percent or greater reduction in the use of first class mail. Some participants may use electronic mail, participate in computer conferences, or be familiar with the literature on this subject, hence their responses may to some degree be based on personal or vicarious experience extrapolated into the future.

Statement 19. Increased use of computers (for work) will contribute to the prevalence of flexible work schedules. The most efficient and cost effective use of some computer systems is made in evening, night, or early morning hours when costs and use are lower. This may or may not be the case in twenty-five years.

Improbable statements. Three statements relating to communication practice had a mean response in the improbable to highly improbable (4.00 to 5.00) range. These appear in Table 6. Statements 5 and 10 relate not only to interpersonal interactions in the broadest sense,
Table 6. Second Round Statements Relating to Communication Practice: Improbable (4.00) to Highly Improbable (5.00).

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Computer-mediated communication will be more common than face-to-face</td>
<td>4.6463 4.4065 4.0897</td>
</tr>
<tr>
<td>10. More interpersonal relationships through electronic networks than face-to-face</td>
<td>4.1667 (3.7580) (3.4519)</td>
</tr>
<tr>
<td>15. Majority will work at home full time</td>
<td>4.6645 4.3170 (3.8889)</td>
</tr>
</tbody>
</table>

Note: Mean responses outside the improbable to highly improbable range appear in parenthesis.

but specifically to face-to-face interactions.

Statement 5. Computer-mediated interpersonal communication will be more common than will face-to-face communication. Statement 10. People will have more interpersonal relationships through electronic networks than face-to-face with others in their residential community.

Responses to these statements may reflect as much the hope as the opinion that face-to-face
communication will not be superseded by mediated communication. The relatively greater probability anticipated for statement 10 may reflect the knowledge that, for many people, the residential community is not the locus of the majority of interpersonal relationships today.

Statement 15. The majority of the working population will work at home full time. Research on telecommuting supports these responses, with full time telecommuters reporting dissatisfaction with limited opportunities for interaction with others, professional anonymity, and difficulties in supervision and making business contacts.

Statements with uncertain probability. It should be noted that most of the forecasts and trends discussed in Chapter 11 had both proponents and detractors, hence, it should not be surprising that responses to many of the statements were more ambivalent than those detailed above. Mean responses for these statements appear in Table 3.
Statements Relating to Communication Research and Curricula

Probable statements. The two statements relating to communication research and communication typologies were expected to be in the probable to highly probable (1.00 to 2.00) range during one or more of the three time periods. These appear in Table 7.

Statement 27. The pedagogical categories of communication (e.g., interpersonal, small group, organizational) will include provision for mediated communication. Cathcart and Gumpert have suggested the inclusion of "mediated interpersonal communication" in communication typologies. Whether, or how soon, it might be included, or whether a completely different set of typologies will be advanced, is uncertain.

Statement 28. Research in communication will include more research in mediated interpersonal communication. Since the inception of this study, research in this area has increased, with a number of
Table 7. Second Round Statements Relating to Communication Research and Typologies: Probable (2.00) to Highly Probable (1.00).

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean Response</th>
<th>5 yrs</th>
<th>10 yrs</th>
<th>25 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>27. Pedagogical categories of communication include provision for mediated communication</td>
<td>(2.7742)</td>
<td>(2.1871)</td>
<td>1.8065</td>
<td></td>
</tr>
<tr>
<td>28. Communication research will include research in mediated interpersonal communication</td>
<td>(2.3280)</td>
<td>1.9290</td>
<td>1.6968</td>
<td></td>
</tr>
</tbody>
</table>

Note: Mean responses outside the probable to highly probable range appear in parenthesis.

articles appearing in the Communication Yearbook
and in the new journal Information and Behavior.

improbable statements. One statement relating to communication curricula had a mean response in the improbable to highly improbable range (4.00 to 5.00) during one of the time periods (Table 8).

Statement 26. Communication curricula
Table 8. Second Round Statement Relating to Communication Curricula: Improbable (4.00) to Highly Improbable (5.00).

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean Response</th>
<th>3 yrs</th>
<th>10 yrs</th>
<th>25 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>26. Communication curricula</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>much the same as today</td>
<td>(3.0260)</td>
<td>(3.6104)</td>
<td>4.0617</td>
<td></td>
</tr>
</tbody>
</table>

Note: Mean responses outside the improbable to highly improbable range appear in parenthesis.

will be much the same as those today. Given that research in mediated interpersonal communication is increasing and expected to be "probable" in ten years, this response suggests that curricula are expected to lag somewhat behind research.

Statements relating to desirable communication curricula. All three of the second round statements relating to communication curricula were considered to be desirable in all three time periods. These appear in Table 9.
<table>
<thead>
<tr>
<th>Statement</th>
<th>5 yrs</th>
<th>10 yrs</th>
<th>25 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>31. More emphasis on mediated interpersonal communication</td>
<td>yes 74.51%</td>
<td>86.39%</td>
<td>87.84%</td>
</tr>
<tr>
<td></td>
<td>no 25.49%</td>
<td>13.61%</td>
<td>12.16%</td>
</tr>
<tr>
<td>f. More emphasis on teaching about communication</td>
<td>yes 97.14%</td>
<td>97.81%</td>
<td>97.81%</td>
</tr>
<tr>
<td></td>
<td>no 2.86%</td>
<td>2.19%</td>
<td>2.19%</td>
</tr>
<tr>
<td>g. More emphasis on basic communication skills</td>
<td>yes 93.53%</td>
<td>52.65%</td>
<td>92.65%</td>
</tr>
<tr>
<td></td>
<td>no 6.47%</td>
<td>47.35%</td>
<td>7.35%</td>
</tr>
</tbody>
</table>

In addition, the two first round statements relating to communication curricula which were omitted from the second round were considered desirable. These appear in Table 10. Statement g was added as a reflection of the most frequent category of response to statement 32 on the first round questionnaire (More emphasis should be placed on instruction in ___________________). Other responses mentioned seven or more times are organizational communication (fifteen), small group (eight), family communication (seven), and technology
Table 10. First Round Statements Relating to Desirable Communication Curricula.

<table>
<thead>
<tr>
<th>Statement</th>
<th>5 yrs</th>
<th>10 yrs</th>
<th>25 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>29. More emphasis on inter-cultural</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>communication yes</td>
<td>84.57%</td>
<td>86.55%</td>
<td>87.13%</td>
</tr>
<tr>
<td>communication no</td>
<td>15.43%</td>
<td>13.45%</td>
<td>12.86%</td>
</tr>
<tr>
<td>30. More emphasis on inter-personal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>communication yes</td>
<td>80.46%</td>
<td>82.74%</td>
<td>82.94%</td>
</tr>
<tr>
<td>communication no</td>
<td>19.54%</td>
<td>17.26%</td>
<td>17.06%</td>
</tr>
</tbody>
</table>

(seven). A complete listing of responses to this statement appears in Appendix B.

Discussion

An analysis of variance indicated statistically significant differences between two of the groups/subgroups of respondents on only four (statements 4, 7, 9R, 25) of the thirty-six statements, consequently, with the exception of these four statements, responses were not analyzed by group or subgroup. The differences in statements 4, 9R, and 25 seem not to be attributable to either the sex of the respondents
or to frequency of personal computer use. For statement 7, the difference between the response of the emeritus group and that of members of the Interpersonal and Small Group Division of SCA might be attributable to more personal computer use and more frequent personal computer use by the latter, and/or to a value orientation which identifies "interpersonal" with "face-to-face," although this is not borne out by responses to other statements. The former assumption is called into question by the fact that members of the Organizational Communication Division and writers on the relationship between communication and communication technology both were more frequent personal computer users than were members of the Interpersonal and Small Group Division, yet their responses did not vary significantly from those of the emeritus group. In the absence of an observable pattern which would suggest a consistent relationship between responses and either gender of respondent or frequency of personal computer use, differences between group/subgroup responses are not clearly attributable to either factor. Similarly, within
groups, no consistent relationship between either factor and group response was observed. Members of the emeritus group may be slightly more pessimistic about the effects of computer use on interpersonal relationships, as their mean responses to some of the statements are lower than those of other groups.

None of the nine statements expected to be probable in one or more of the three time periods directly related to interpersonal relationships or interaction; two of the four expected to be improbable in one or more time period specifically referred to face-to-face interactions. If the forecasts of participants are borne out, availability of computers in at least seventy-five percent of homes in the United States and in ninety-five percent of public elementary schools is likely in twenty-five years, with availability in ninety-five percent of public high schools likely in ten years. Electronic mail, computer conferencing, and similar uses of technology will result in reductions in business travel and use of the first class mail in twenty-five years. The
majority of those employed are unlikely to work at home full time during the next twenty-five years, but in twenty-five years, flexible schedules will be prevalent. Although computer mediated interpersonal communication will be more frequent in ten years than it is today, it will not exceed face-to-face communication in five, ten, or twenty-five years. Further, people will have more interpersonal relationships face-to-face with others in their residential community than via electronic networks.

Communication curricula should include more emphasis on intercultural, interpersonal, mediated interpersonal, organizational, and small group communication and on communication skills, including public speaking. While an increase in research in mediated interpersonal communication is likely in ten years, changes in communication curricula to include provision for mediated interpersonal communication may lag somewhat behind. This may reflect the reality that changes in typologies do tend to follow, not precede, research in new areas.
NOTES—CHAPTER IV


2 Chesebro, p. 205.

3 Chesebro, p. 203.


CHAPTER V

CONCLUSION

Summary

If, as Innis stated, the medium of communication does to some extent determine the character of the civilization employing it, then widespread use of computer-based technologies such as electronic mail, computer conferencing, bulletin boards, and others should contribute to the redefinition of our culture. Whether the product will resemble the interdependent electronic village envisioned by McLuhan, the world city of Kahn, Brown, and Martel, or the increasing isolation of individuals anticipated by Eurich is impossible to tell. Nonetheless, use of computers and related technologies is increasing, and studies indicate that computer-mediated communication does differ from face-to-face communication not only in channel and synchronicity but also in effect. Consequently, communication scholars should
consider the relationship between increased computer use and the practice and teaching of interpersonal communication.

A number of conflicting forecasts concerning the likely influence of increased computer use on interpersonal interactions have appeared in the literature (albeit not primarily in the communication literature), and some among them have implications for communication research and education. Full or part time work at home may result in increased (or decreased) family interactions, difficulties in reintegrating work and family roles, and reduced opportunities for both the social and task related interactions of the workplace. As machines perform more routine tasks, the remaining work may be creative and stimulating or menial and low paying, with job redesign a necessity. Interpersonal relationships may be extended by electronic networks or inhibited by increasing isolation of people from each other. Effective use of electronic mail, teleconferencing, and similar technologies would require awareness of the effects of media on communication.
This study was undertaken to identify the probable influences of increased use of computers and related technology on interpersonal communication in the next twenty-five years, with a view toward identifying perceived trends in the practice of interpersonal communication, and, on the basis of these trends, suggesting adaptive directions for both research and education in this area. To that end, it solicited responses to the above and to similar forecasts from retired and practicing academics in the discipline of speech communication. The former were emeritus members of the Speech Communication Association; the latter included members of its Interpersonal and Small Group Division and Organizational Communication Division and authors who had published in the area of the future of communication and/or the relationship between communication and the use of computers and related technologies.

There were few differences in responses between or within groups/subgroups, suggesting that a smaller sample might suffice should a similar study be undertaken. Likewise, there were few differences between first and second
round responses, indicating that two rounds were adequate for the achievement of consensus among participants. Neither gender of respondent nor frequency of personal computer use had a demonstrable effect on responses. Emeritus panelists may be slightly more pessimistic about the effects of computer use on interpersonal relationships than are their practicing academic counterparts.

Perceived trends. Responses to the questionnaire indicate that computer mediated communication will be more frequent as more of the population of the United States is exposed to computers both at home and in elementary and high schools. However, mediated communication will not supersede face-to-face communication, but rather will extend and complement it as face-to-face interactions continue to exceed those occurring via electronic networks. In twenty-five years, flexible schedules will be prevalent, and electronic mail, computer conferencing, and similar technologies will result in reductions of twenty-five percent or greater in business travel and the use of first
class mail. The majority of the working population will continue to spend most, if not all, of their working hours in the office/workplace, suggesting continuing face-to-face interaction among co-workers.

**Education and research.** Responses indicate that more emphasis should be placed on intercultural, interpersonal, organizational, small group, and mediated interpersonal communication, and on communication skills, including public speaking. More research in mediated interpersonal communication is expected to be undertaken in the next ten years, with communication curricula and pedagogical typologies changing somewhat in twenty-five.

Although perhaps not startling, these results represent the consensus of experts in the field of speech communication on what the future might be. As such, they provide a basis for planning responsive curricula for the discipline.

**Limitations**

The effectiveness of a Delphi survey may be limited by design considerations such as
participant selection and questionnaire design. This study focused on the future in the United States; responses may not be generalizable to other, especially Third World, countries. By virtue of their credentials, respondents are assumed to be middle or upper middle class. The majority were male. The participants were selected for their presumed expertise in the field of communication, therefore those without a Ph.D in communication were excluded entirely. The selection criteria may have resulted in an academic bias which would not generalize to the population at large. However, this is in keeping with Delphi methodology, i.e., panel members are selected for their expertise rather than through random sampling. Thus, there was no expectation or intention of generalizing responses to another population.

It was the intent of this study to elicit panelists' responses to the literature relating to interpersonal communication and the increased use of computers and related technologies. Therefore, because the first round consisted of statements derived from the literature rather
than those synthesized from participant suggestions or responses to open-ended questions, some plausible but less obvious possibilities for the future may have been overlooked.

Nonetheless, the Delphi methodology is well suited for an exploratory attempt to identify trends. As Gordon noted: "Delphi studies do not produce 'truth' about the future;" rather, their product is a consensus of opinion about what the future might be. And, in the absence of verifiable facts about the future, the consensual conclusions of knowledgeable participants form a basis for planning.

The unwillingness of panelists to participate is sometimes cited as a disadvantage of the Delphi method. In this study, this was not pronounced, as fifty-six percent of the selected population responded to both rounds.

Recommendations

The concept of interpersonal communication should not exclude mediated communication. Sixteen of the 181 respondents to
the first round questionnaire commented on the phrase "mediated interpersonal communication." Typical statements included "These terms are contradictory to me" and "Computer mediated communication is, by definition, not interpersonal..." Consequently, in the cover letter accompanying the second round questionnaire, a partial definition was provided: "Mediated interpersonal communication," as distinguished from mass communication, is an attempt to characterize situations in which two or more people, who are not face-to-face, communicate with each other via a technological medium.

The phrase "mediated interpersonal communication" has appeared in the communication literature. Chesbro did not provide a definition, but stated:

While computer-mediated communication systems may foster task-orientations in institutional settings, there is nothing inherent within these systems which prevents them from functioning in the interpersonal realm to increase social presence and to establish and sustain more personal and social human linkages.6

Based on his finding that "... some 30 percent of the messages exchanged on [electronic bulletin
boards] are interpersonal in nature," he noted: "Mediated interpersonal communication now appears to be a demonstrated entity."

Citing Fearing's generalizations about situations in which human communication takes place, Cathcart and Gumpert suggested the addition of the following to incorporate the role of media:

1. There are interpersonal situations which require media for the purpose of communication.
2. The media are part of a complex of variables that influence behaviors and attitudes.
3. The content of media is both a reflection and projection of interpersonal behaviors.
4. An individual's self image and its development is media dependent.

Given the multiplicity of definitions of communication which have been proposed, it is suggested only that, at the very least,

... interpersonal communication need not be defined by an association with any particular medium. While face-to-face, telephone, and personalized letters may continue to provide channels for interpersonal communication, alternative technologies also appear to be emerging as vehicles for interpersonal relationships.

Based on participant responses, this study has demonstrated that mediated interpersonal communication should be included in
the communication curriculum, without supplanting
the current emphasis on face-to-face
interactions. Since organizations are more
likely than individuals to have a variety of
communication media at their disposal, at least
in the near future, organizational communication,
in particular, should incorporate an examination
of media effects and related communication
competencies. Because communication via computer
appears to be somewhat better suited to the
content than the relationship dimension of
communication, instruction emphasizing the latter
may become more important, especially for the
frequent computer user.

The study also indicates that more
research on mediated interpersonal communication
should be undertaken. This might include
extension of the methodologies of previous
studies of the effects of audio and video
environments to computer mediated settings, as
well as comparisons with face-to-face
interactions. As results become available,
communication typologies are likely to change,
perhaps moving away from the present emphasis on
number of interactivities to another, based on the content of the interaction and the relationship of the interactivities and incorporating the effects of media where appropriate.

The results of this study suggest the need for increased awareness of changes resulting from the use of computers and related technologies and for more active planning for the future in the speech communication discipline. To this end, in addition to research on mediated communication, and in response to Deethardt's emphasis on the importance of futures research, additional investigations into probable futures for the discipline of speech communication could be undertaken as a basis for planning. These might include attempts to go beyond the literature to identify and explore other plausible futures. Given the rapid achievement of consensus and the high degree of consensus achieved in this study, a smaller panel could be employed and given the opportunity to provide forecasts for the first round.

Only with more research on computer mediated communication will it be possible to
determine whether changes in communication competencies will be required as the use of computers and related technologies increases, and, if so, to identify them. Such research, combined with a future orientation, should be incorporated into planning for the future of the discipline. It is hoped that this study has provided the groundwork for future efforts in these directions.
NOTES--CHAPTER V

1 Harold A. Innis, The Bias of Communication (Toronto: University of Toronto Press, 1951, 1964), p. 34.


7 Chesebro, p. 220.

8 Chesebro, p. 220.


10 Cathcart and Gumpert, p. 268.

11 Chesebro, p. 220.


APPENDIX A

First round cover letters
First round questionnaire
Second round cover letter
Second round questionnaires
A number of predictions have been made about the relationship between increased use of computers and related technologies and the practice of interpersonal and organizational communication. Because many of these predictions have been made by futuroists outside the discipline of communication, I am undertaking a study to identify trends from the perspective of scholars within the discipline. This Delphi study, done in cooperation with the Department of Communication at the University of Colorado, will focus on changes occurring today and on forecasts about what may occur within the next twenty-five years.

One panel of respondents will be comprised of those with expertise in the areas of interpersonal communication, organizational communication, and/or who have published on the future of the discipline of communication or the relationship between technology and communication. Your participation in this study is solicited, as your expertise would contribute to its success in identifying possible future directions for the practice and teaching of communication.

I have the liberty of enclosing the first round questionnaire in the hope that you will participate in the minimum of two and anticipated maximum of three rounds of this Delphi. The questionnaire has an identification number so that your name may be checked off of the mailing list when your questionnaire is returned. The second round questionnaire will include mean and median scores and interquartile ranges for the panel as a whole; individual responses will be kept confidential.

If you have questions, please call me collect at (303) 492-7293 Monday-Friday evenings or on weekends or week days at (303) 492-6780. I regret that I am unable to accept collect calls at this number.

If I have an incorrect mailing address for you, please make a note of the correction on the questionnaire.

I appreciate your assistance.

Sincerely,

Carolyn J. Mueller
Principal Investigator

Donald K. Dimmick
Department Chair
A number of predictions have been made about the relationship between increased use of computers and related technologies and the practice of interpersonal and organizational communication. Because many of these predictions have been made by futurists outside the discipline of communication, I am undertaking a study to identify trends from the perspective of scholars within the discipline. This Delphi study, done in cooperation with the Department of Communication at the University of Colorado, will focus on changes occurring today and on forecasts about what may occur within the next twenty-five years.

One panel of respondents will be composed of emeritus members of the Speech Communication Association identified as having an interest in the future of the discipline. Your participation in this study is solicited, as your expertise in the field of communication would contribute to the success in identifying possible future directions for the practice and teaching of communication.

I have taken the liberty of enclosing the first round questionnaire in the hope that you will participate in the minimum of two and anticipated maximum of three rounds of this Delphi. The questionnaire has an identification number so that your name may be checked off of the mailing list when your questionnaire is returned. The second round questionnaire will include mean and median scores and interquartile ranges for the panel as a whole; individual responses will be kept confidential.

If you have questions, please call me collect at (303) 492-7973 Monday-Friday evenings or on weekends or weekdays at (303) 492-6766 (I regret that I am unable to accept collect calls at this number).

If I have an incorrect mailing address for you, please make a note of the correction on the questionnaire.

I appreciate your assistance.

Sincerely,

[Signature]

Carolyn J. Mueller
Principal Investigator

[Signature]

Donald K. Parrott
Department Chair
## First Round Questionnaire

For each statement below, please respond to the probability of occurrence in five years, ten years, and twenty-five years.

<table>
<thead>
<tr>
<th>Probability</th>
<th>5 years</th>
<th>10 years</th>
<th>25 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: highly probable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2: probable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3: may or may not be probable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4: improbable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5: highly improbable</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Computer-mediated interpersonal communication will be more frequent than it is today.  
   1 2 3 4 5  

2. There will be at least one computer in 75 percent or more of all homes in the United States.  
   1 2 3 4 5  

3. Use of computers will be taught in 50 percent of all public elementary schools in the United States.  
   1 2 3 4 5  

4. Use of computers will be taught in 75 percent of all public high schools in the United States.  
   1 2 3 4 5  

5. Computer-mediated interpersonal communication will be more common than will face-to-face communication.  
   1 2 3 4 5  

6. Electronic networks will increase the opportunities for interpersonal communication.  
   1 2 3 4 5  

7. Increased use of computers will limit opportunities to develop interpersonal relationships.  
   1 2 3 4 5  

8. Limited opportunities to develop interpersonal relationships will contribute to a decline in interpersonal skills.  
   1 2 3 4 5  

9. Use of home computers will contribute to a decrease in family interactions.  
   1 2 3 4 5  

10. People will have more interpersonal relationships through electronic networks than face-to-face with others in their residential community.  
    1 2 3 4 5
<table>
<thead>
<tr>
<th></th>
<th>5 years</th>
<th>10 years</th>
<th>25 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Computer conferencing, electronic mail, and similar technologies will contribute to a 25 percent or greater reduction in business travel, including travel to conferences and professional meetings.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>12. Computer conferencing, electronic mail, and similar technologies will contribute to a 25 percent or greater reduction in the use of the mail.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
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<tr>
<td>13. Computer conferencing, electronic mail, and similar technologies will contribute to a 25 percent or greater reduction in the use of the telephone.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>14. Computer conferencing, electronic mail, and similar technologies will contribute to a 25 percent or greater reduction in face-to-face communication.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>15. The majority of the working population of the United States will work at home full time.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>16. For people who work at home full time, the majority of interpersonal relationships will be with others in their residential community.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>17. The majority of the working population of the United States will divide work between home and the office.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>18. For people who divide work between home and the office, the majority of interpersonal relationships will be with others in their residential community.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>19. Increased use of computers (for work) will contribute to the prevalence of flexible work schedules.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>20. Work at home via computer will contribute to an increase in family interactions.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>21. Electronic monitoring of those who work at home will be prevalent.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
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<tr>
<td>------------------------------------------------------------------------</td>
<td>---------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>22. The majority of new jobs will be mental and pay relatively low wages.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>23. Machines will perform the majority of routine tasks in the workplace.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>24. Fifty percent or more of those employed in the United States will be employed in positions requiring creative and intellectual work.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>25. Most people will have more available leisure time as a result of applications of computer technology.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>26. Communication curricula will be much the same as those today.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>27. The pedagogical categories of communication (e.g., interpersonal, small group, organizational) will include provision for mediated communication.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>28. Research in communication will include more research in mediated interpersonal communication.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>29. More emphasis should be placed on instruction in intercultural communication.</td>
<td>yes no</td>
<td>yes no</td>
<td>yes no</td>
</tr>
<tr>
<td>30. More emphasis should be placed on instruction in interpersonal communication.</td>
<td>yes no</td>
<td>yes no</td>
<td>yes no</td>
</tr>
<tr>
<td>31. More emphasis should be placed on instruction in mediated interpersonal communication.</td>
<td>yes no</td>
<td>yes no</td>
<td>yes no</td>
</tr>
<tr>
<td>32. More emphasis should be placed on instruction in (please specify)</td>
<td>yes no</td>
<td>yes no</td>
<td>yes no</td>
</tr>
</tbody>
</table>
Please circle your response to each of the questions below.

1. Your age group
   - 20-29
   - 30-39
   - 40-49
   - 50-59
   - 60-69
   - 70+

2. Your sex
   - Female
   - Male

3. Do you use a personal computer?
   - Frequently
   - Sometimes
   - Never

If you would like to add comments about the future of the discipline and/or teaching of communication or comments about this questionnaire, please do so below.

Thank you very much for your participation.
Thank you for completing the first round of this study. Your participation is appreciated greatly.

With hopes for your continued participation, I have enclosed the second round questionnaire. Several respondents suggested changes and/or additional statements, a few of which have been incorporated. I regret that questionnaire length and focus precluded the inclusion of them all.

Comments on the first round questionnaire suggest that an explanation of the phrase "mediated interpersonal communication" should be provided. This is my attempt to characterize a situation in which two or more people, who are not face to face, communicate via a technological medium, in this case, a computer, and to distinguish it from mass communication.

Also on the basis of first round comments, several statements have been reworded on the second round questionnaire. These are indicated by an 'A' following the statement number.

On this second round questionnaire, the group mean for each time-frame appears to the right of the time-frame. The group median is indicated by an asterisk above the number. A box outlines the interquartile range, and your previous response is circled in green. If you choose to change any responses for this round, please circle the number you select in a color other than green. Whether or not you decide to change any responses, I would appreciate your returning the questionnaire to me at your earliest convenience.

If you have questions, please call me collect at (303) 492-7788. Monday through Friday evenings or on weekends or at (303) 492-7788 week days (I regret that I am unable to accept collect calls at this, my office, number).

Thank you again for your assistance.

Sincerely,

Carrie J. Mueller
Principal Investigator
Second Round Questionnaire: Group 1 (Practicing Academics)

Please refer to the cover letter for instructions. You may change your responses if you wish.

Probability
1. highly probable
2. probable
3. may or may not be probable
4. improbable
5. highly improbable

<table>
<thead>
<tr>
<th>5 years</th>
<th>Group mean</th>
<th>10 years</th>
<th>Group mean</th>
<th>25 years</th>
<th>Group mean</th>
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<tr>
<td>10. In general, computer-mediated interpersonal communication will be more frequent than it is today.</td>
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<td>4.5</td>
<td>2.18</td>
<td>1</td>
<td>3</td>
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<td>2. There will be at least one computer in 75 percent or more of all homes in the United States.</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>3.66</td>
<td>1</td>
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<td>3. Use of computers will be taught in 95 percent of all public elementary schools in the United States.</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>3.07</td>
<td>1</td>
</tr>
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<td>4. Use of computers will be taught in 95 percent of all public high schools in the United States.</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>2.65</td>
<td>1</td>
</tr>
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<td>5. Computer-mediated interpersonal communication will be more common than will face-to-face communication.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>4.53</td>
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<tr>
<td>6. Electronic networks will increase the opportunities for interpersonal communication.</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>2.83</td>
<td>1</td>
</tr>
<tr>
<td>7. Increased use of computers will limit opportunities to develop interpersonal relationships.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>3.73</td>
</tr>
<tr>
<td>8. Increased use of computers will contribute to a decline in interpersonal skills.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>3.57</td>
</tr>
<tr>
<td>9. Increased use of home computers will contribute to decreased interaction among nuclear family members.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>3.64</td>
</tr>
<tr>
<td>10. People will have more interpersonal relationships through electronic networks than face-to-face with others in their residential community.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4.06</td>
<td>1</td>
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<td>2 probable</td>
<td>3 may or may not be probable</td>
<td>4 improbable</td>
<td>5 highly improbable</td>
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<td>--------------</td>
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<td>Group mean</td>
<td>10 years</td>
<td>Group mean</td>
<td>15 years</td>
</tr>
<tr>
<td>1.</td>
<td>Computer conferencing, electronic mail, and similar technologies will contribute to a 25 percent or greater reduction in business travel, including travel to conferences and professional meetings.</td>
<td>1 2 3 4 5</td>
<td>3.2</td>
<td>1 2 3 4 5</td>
<td>2.99</td>
</tr>
<tr>
<td>12.</td>
<td>Computer conferencing, electronic mail, and similar technologies will contribute to a 50 percent or greater reduction in the use of first-class mail.</td>
<td>1 2 3 4 5</td>
<td>3.0</td>
<td>1 2 3 4 5</td>
<td>2.39</td>
</tr>
<tr>
<td>13.</td>
<td>Computer conferencing, electronic mail, and similar technologies will contribute to a 75 percent or greater reduction in the use of the telephone (other than for data transfer).</td>
<td>1 2 3 4 5</td>
<td>3.54</td>
<td>1 2 3 4 5</td>
<td>3.13</td>
</tr>
<tr>
<td>14.</td>
<td>Computer conferencing, electronic mail, and similar technologies will contribute to a 25 percent or greater reduction in face-to-face communication.</td>
<td>1 2 3 4 5</td>
<td>3.83</td>
<td>1 2 3 4 5</td>
<td>3.38</td>
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<tr>
<td>15.</td>
<td>The majority of the working population of the United States will work at home full time.</td>
<td>1 2 3 4 5</td>
<td>4.49</td>
<td>1 2 3 4 5</td>
<td>4.21</td>
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<td>16.</td>
<td>For people who work at home full time, the majority of primary interpersonal relationships will be with others in their residential community.</td>
<td>1 2 3 4 5</td>
<td>3.01</td>
<td>1 2 3 4 5</td>
<td>2.89</td>
</tr>
<tr>
<td>17.</td>
<td>The majority of the working population of the United States will divide work between home and the workplace.</td>
<td>1 2 3 4 5</td>
<td>3.66</td>
<td>1 2 3 4 5</td>
<td>3.19</td>
</tr>
<tr>
<td>18.</td>
<td>For people who divide work between home and the workplace, the majority of primary interpersonal relationships will be with others in their residential community.</td>
<td>1 2 3 4 5</td>
<td>3.11</td>
<td>1 2 3 4 5</td>
<td>2.82</td>
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<td>19.</td>
<td>Increased use of computers (for work) will contribute to the prevalence of flexible work schedules.</td>
<td>1 2 3 4 5</td>
<td>2.72</td>
<td>1 2 3 4 5</td>
<td>2.32</td>
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<tr>
<td>20.</td>
<td>Work at home via computer will contribute to increased interaction among nuclear family members.</td>
<td>1 2 3 4 5</td>
<td>3.75</td>
<td>1 2 3 4 5</td>
<td>3.01</td>
</tr>
<tr>
<td>1</td>
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<td>---</td>
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</tr>
<tr>
<td><strong>218.</strong> Electronic monitoring via the computer terminal of those who work at home will be prevalent.</td>
<td>3.58</td>
<td>3.55</td>
<td>3.1</td>
<td>2.74</td>
<td>3.58</td>
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<tr>
<td><strong>228.</strong> The majority of new jobs will be mental.</td>
<td>3.61</td>
<td>3.55</td>
<td>2.58</td>
<td>2.17</td>
<td></td>
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<tr>
<td><strong>23.</strong> Machines will perform the majority of routine tasks in the workplace.</td>
<td>3.14</td>
<td>3.14</td>
<td>2.67</td>
<td>2.07</td>
<td>3.14</td>
</tr>
<tr>
<td><strong>24.</strong> Fifty per-cent or more of those employed in the United States will be employed in positions requiring creative and intellectual work.</td>
<td>3.08</td>
<td>3.08</td>
<td>2.57</td>
<td>2.02</td>
<td>3.08</td>
</tr>
<tr>
<td><strong>25.</strong> Most people will have more available leisure time as a result of applications of computer technology.</td>
<td>3.18</td>
<td>3.18</td>
<td>2.67</td>
<td>2.07</td>
<td>3.18</td>
</tr>
<tr>
<td><strong>26.</strong> Communication curricula will be much the same as those today.</td>
<td>3.02</td>
<td>3.02</td>
<td>2.57</td>
<td>2.02</td>
<td>3.02</td>
</tr>
<tr>
<td><strong>27.</strong> The pedagogical categories of communication (e.g., interpersonal, small group, organizational) will include provision for mediated communication (add in addition or noncommunication).</td>
<td>2.77</td>
<td>2.77</td>
<td>2.29</td>
<td>1.84</td>
<td>2.77</td>
</tr>
<tr>
<td><strong>28.</strong> Research in communication will include more research in mediated interpersonal communication.</td>
<td>2.4</td>
<td>2.4</td>
<td>2.02</td>
<td>1.56</td>
<td>2.4</td>
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<tr>
<td><strong>318.</strong> In college/university curricula, more emphasis should be given to mediated interpersonal communication.</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Questions added to this round**

a. For the majority of public elementary school students in the United States, formal education will include one or more required courses taken at home via computer. | 3.5 | 3.5 | 2.5 | 2.0 | 3.5 | 3.5 | 2.0 |

b. For the majority of public high school students in the United States, formal education will include one or more required courses taken at home via computer. | 3.5 | 3.5 | 2.5 | 2.0 | 3.5 | 3.5 | 2.0 |
<table>
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<tr>
<th>1 highly probable</th>
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<tbody>
<tr>
<td>3 years</td>
<td>10 years</td>
<td>25 years</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

c. In the United States, government monitoring of
   Individually by electronic surveillance will increase.
   
   1 2 3 4 5

d. Increased use of computers and related technologies
   will increase direct voter participation in public policy
   decision-making at all levels of government in the United
   States.
   
   1 2 3 4 5

e. Increased use of computers and related technologies
   will contribute to greater voter understanding of
   public policy issues.
   
   1 2 3 4 5

f. At all levels (elementary through college/university),
   more emphasis should be given to teaching about
   communication.
   
   yes no

g. In college/university curricula, more emphasis
   should be given to basic communication skills.
   
   yes no

Thank you for your participation.
Second Round Questionnaire: Group 2 (Emeritus Panelists)

Please refer to the cover letter for instructions. You may change your response if you wish.

**Probability**
1. highly probable
2. probable
3. may or may not be probable
4. improbable
5. highly improbable

<table>
<thead>
<tr>
<th>Event</th>
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<th>10 years</th>
<th>Group mean</th>
<th>15 years</th>
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<tr>
<td>10. In general, computer-mediated interpersonal communication will be more frequent than it is today.</td>
<td>4</td>
<td>2.19</td>
<td>3</td>
<td>1.97</td>
<td>4</td>
<td>1.7</td>
</tr>
<tr>
<td>2. There will be at least one computer in 75% or more of all homes in the United States.</td>
<td>2</td>
<td>3.25</td>
<td>2</td>
<td>2.0</td>
<td>4</td>
<td>2.12</td>
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<tr>
<td>3. Use of computers will be taught in 95% of all public elementary schools in the United States.</td>
<td>2</td>
<td>3.52</td>
<td>2</td>
<td>2.8</td>
<td>4</td>
<td>2.13</td>
</tr>
<tr>
<td>4. Use of computers will be taught in 95% of all public high schools in the United States.</td>
<td>1</td>
<td>4.25</td>
<td>1</td>
<td>3.87</td>
<td>4</td>
<td>3.58</td>
</tr>
<tr>
<td>5. Computer-mediated interpersonal communication will be more common than will face-to-face communication.</td>
<td>2</td>
<td>4.46</td>
<td>2</td>
<td>3.97</td>
<td>1</td>
<td>3.33</td>
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<tr>
<td>6. Electronic networks will increase the opportunities for interpersonal communication.</td>
<td>2</td>
<td>4.52</td>
<td>2</td>
<td>3.46</td>
<td>4</td>
<td>2.11</td>
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<tr>
<td>7. Increased use of computers will limit opportunities to develop interpersonal relationships.</td>
<td>1</td>
<td>4.75</td>
<td>1</td>
<td>4.25</td>
<td>4</td>
<td>2.85</td>
</tr>
<tr>
<td>8. Increased use of computers will contribute to a decline in interpersonal skills.</td>
<td>1</td>
<td>4.75</td>
<td>1</td>
<td>4.12</td>
<td>4</td>
<td>2.87</td>
</tr>
<tr>
<td>9. Increased use of home computers will contribute to increased interaction among nuclear family members.</td>
<td>1</td>
<td>4.75</td>
<td>1</td>
<td>4.12</td>
<td>4</td>
<td>2.97</td>
</tr>
<tr>
<td>10. People will have more interpersonal relationships through electronic networks than face-to-face with others in their residential community.</td>
<td>1</td>
<td>4.75</td>
<td>1</td>
<td>4.12</td>
<td>4</td>
<td>2.97</td>
</tr>
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<tr>
<td></td>
<td>5 Years</td>
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<td>25 Years</td>
<td>Group mean</td>
<td></td>
<td></td>
</tr>
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</table>

11. Computer conferencing, electronic mail, and similar technologies will contribute to a 25 percent or greater reduction in business travel, including travel to conferences and professional meetings.  
   ![Score](2.17)  
   ![Score](2.33)  
   ![Score](2.12)  

12A. Computer conferencing, electronic mail, and similar technologies will contribute to a 25 percent or greater reduction in the use of first class mail.  
   ![Score](3.05)  
   ![Score](2.33)  
   ![Score](1.94)  

13B. Computer conferencing, electronic mail, and similar technologies will contribute to a 25 percent or greater reduction in the use of the telephone (other than for data transfer).  
   ![Score](3.47)  
   ![Score](2.95)  
   ![Score](2.6)  

14. Computer conferencing, electronic mail, and similar technologies will contribute to a 25 percent or greater reduction in face-to-face communication.  
   ![Score](3.42)  
   ![Score](3.0)  
   ![Score](2.6)  

15. The majority of the working population of the United States will work at home full time.  
   ![Score](4.67)  
   ![Score](4.07)  
   ![Score](3.62)  

16A. For people who work at home full time, the majority of primary interpersonal relationships will be with others in their residential community.  
   ![Score](2.66)  
   ![Score](2.63)  
   ![Score](2.5)  

17A. The majority of the working population of the United States will divide work between home and the workplace.  
   ![Score](3.55)  
   ![Score](3.17)  
   ![Score](2.85)  

18B. For people who divide work between home and the workplace, the majority of primary interpersonal relationships will be with others in their residential community.  
   ![Score](2.92)  
   ![Score](2.89)  
   ![Score](2.75)  

19. Increased use of computers (for work) will contribute to the prevalence of flexible work schedules.  
   ![Score](2.67)  
   ![Score](2.17)  
   ![Score](1.9)  

20B. Work at home via computer will contribute to increased interaction among nuclear family members.  
   ![Score](2.97)  
   ![Score](2.79)  
   ![Score](2.67)  


<table>
<thead>
<tr>
<th></th>
<th>1 highly probable</th>
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<th>4 improbable</th>
<th>5 highly improbable</th>
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<td></td>
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<td>10 years Group Mean</td>
<td>25 years Group Mean</td>
<td>5 years Group Mean</td>
<td>10 years Group Mean</td>
</tr>
<tr>
<td>21. Electronic monitoring via the computer terminal of those who work at home will be prevalent.</td>
<td>3.51</td>
<td>2.94</td>
<td>2.12</td>
<td>3.51</td>
<td>2.94</td>
</tr>
<tr>
<td>22. The majority of new jobs will be manual.</td>
<td>3.17</td>
<td>3.13</td>
<td>3.02</td>
<td>3.17</td>
<td>3.13</td>
</tr>
<tr>
<td>23. Machines will perform the majority of routine tasks in the workplace.</td>
<td>3.27</td>
<td>2.67</td>
<td>2.02</td>
<td>3.27</td>
<td>2.67</td>
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<tr>
<td>24. Fifty percent or more of those employed in the United States will be employed in positions requiring creative and intellectual work.</td>
<td>3.45</td>
<td>3.02</td>
<td>2.45</td>
<td>3.45</td>
<td>3.02</td>
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<td>25. Most people will have more available leisure time as a result of simplifications of computer technology.</td>
<td>2.87</td>
<td>2.45</td>
<td>2.12</td>
<td>2.87</td>
<td>2.45</td>
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<td>26. Communication curricula will be much the same as those today.</td>
<td>3.13</td>
<td>3.5</td>
<td>3.0</td>
<td>3.13</td>
<td>3.5</td>
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<tr>
<td>27. The pedagogical categories of communication (e.g., face-to-face, small group, organizational) will include provision for mediated communication (in addition to mass communication).</td>
<td>2.76</td>
<td>2.25</td>
<td>1.66</td>
<td>2.76</td>
<td>2.25</td>
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<tr>
<td>28. Research in communication will include more research in mediated interpersonal communication.</td>
<td>2.47</td>
<td>2.05</td>
<td>1.9</td>
<td>2.47</td>
<td>2.05</td>
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<tr>
<td>29. College/university curricula, more emphasis should be given to mediated interpersonal communication.</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
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</table>

Questions added to this round

a. For the majority of public elementary school students in the United States, informal education will include one or more required courses taken at home via computer. | 3.45 | 2.95 | 2.12 | 3.45 | 2.95 | 2.12 |

b. For the majority of public high school students in the United States, formal education will include one or more required courses taken at home via computer. | 3.45 | 2.95 | 2.12 | 3.45 | 2.95 | 2.12 |
1. highly probable  2. probable  3. may or may not be probable  4. improbable  5. highly improbable

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<th>10 years</th>
<th>25 years</th>
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<td>d.</td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
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<td>f.</td>
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Thank you for your participation.
APPENDIX B

Responses to statement 32 (More emphasis should be placed on instruction in ______________ [please specify]) on the first round questionnaire. Note: Some respondents supplied more than one response.

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<td>Problem solving</td>
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<td>Logic</td>
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<td>Linguistic skills</td>
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<td>Command of literate use of language</td>
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<td>Written communication</td>
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unique responses 24
  systems theory 1
  contextual applications of human communication principles 1
  nonverbal communication 1
  leadership 1
  understanding others 1
  gullibility-reduction 1
  human/animal interpersonal communication 1
  information processing and retrieval 1
  creating information from raw data-
  either numerical or textual 1
  communication problems 1
  peace communication 1
  intrapersonal communication 1
  noninterpersonal communication 1
  economics of communication 1
  policy and planning 1
  freedom of communication or expression 1
  expressing feelings, helping others 1
  express feelings, and adapting to others 1
  old-time concept of invention 1
  traditional rhetoric 1
  communication behaviors effecting change 1
  communication of change 1
  cultural or common communication 1
  culture and communication 1

no response 52
  group 1
    subgroup (c) 6
    subgroup (1) 28
    subgroup (e) 13
  group 2 10