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# INTERACTIVITY AND MEDIA IN THE 1990s

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## Introduction

Interactive media are receiving renewed interest in the trade press (1). The 1990s are forecast by many electronic futurists to become a wondrous decade in which the riches of the information age will bear fruit in a cornucopia of interactive services, e.g., two-way video between homes, videogames with broadcast-quality motion video images and pc-based shopping expeditions through electronic malls. This latest round of upbeat forecasts follows earlier periods of great optimism and subsequent pessimism about interactive cable services (in the 1970s), interactive videodiscs and consumer videotex services (in the 1980s).

Among academics, a modest interest in new interactive technologies during the 1960s and 1970s has grown into a steady stream of attention and scholarship in the 1980s (2). Many of these academics appear equally hopeful that the 1990s will bring forth valuable interactive services for education, business and everyday consumers (3).

Now that we have turned our calendars and entered the 1990s, it may be an appropriate time to step back and ask a few fundamental questions about interactive media. For example, what exactly do we mean by the term "interactive media?" And, why does interactivity hold such fascination for so many media

scholars as well as electronics manufacturers? This paper addresses these questions. In addition, it reviews some lessons that emerged from early market experiences with interactive media, outlines technology trends that may affect interactive media services in the 1990s, presents an agenda of research issues on interactivity and draws some implications for those who teach journalism and mass communications.

### Defining Interactive Media

The term "interactive media" is used loosely and often inappropriately. It has become a popular term in advertisements for new technology and, like other catchphrases (e.g., "user friendly"), its relevance to a given technology can strain credibility. At the same time, it may be premature to set down a rigid definition, since the characteristics of many technologies are evolving rapidly. For discussion purposes, it may be argued that interactive media include technologies that provide:

- person to person communication mediated by a telecommunications channel, e.g., a telephone call;
- person to machine interactions that simulate an interpersonal communication exchange, e.g., a student using a personal computer software package that simulates a student-teacher dialogue or a bank customer using an automated teller machine (ATM) that simulates a transaction with a teller; and,
- group communications mediated by a telecommunication channel, e.g., audio, video and computer conferences.

There are many technologies or services that fall in a murky middle ground or which are open to debate as interactive media. For example, simple selection from a menu of information files, as in a broadcast teletext service, would not likely be classified as interactive. However, a large cable teletext service with a tree and branching menu structure along with reveal/response frames might be classified as interactive. In the latter case, a one-way transmission medium can appear to be interactive in actual usage. Similarly, the use of a VCR remote control to zip past commercials on a videocassette would not likely be classified as interactive. However, the use of a remote control to move forward and back on an educational videocassette or videodisc that is designed to provide choices (e.g., remedial segments, question and answer segments, etc.) would probably be classified as interactive.

In addition, a traditional one-way medium such as broadcast radio or television can make use of an adjunct technology to provide an interactive component to programming. Radio call-in programs and automated voting by television viewers who call a special 900 telephone number are two examples. Some may also argue that traditional feedback mechanisms for one-way, mass media (e.g., a letter to the editor) should be included in a broad taxonomy of how we interact with media. Such a taxonomy might also include a number of qualitative categories for each interactive medium or service, e.g., what is the length of time between user action and system response; can all users interact

with the system; and, is the response/interaction direct and individualized ("you answered incorrectly") or collective ("56 percent of viewers who called our 900 number indicated that they support more money for the space program").

### Excitement and Interest

The excitement and renewed interest in interactive media appear to stem from a few sources. First, many of the advances in technology over the past decade (along with lower costs and widespread adoption of some technologies) have provided a base for the development of interactive services in the 1990s. Second, there is a reasonably good track record and a very strong economic carrot for interactive services in business, including interactive videodisc-based training, online information services, videoconferencing and e-mail, among other services. Third, there is considerable activity in the development of new interactive services for education (e.g., interactive television via satellite) and many needs (e.g., rural education services and higher education courses for working adults) that can be addressed through interactive media. Fourth, in spite of a shaky history for interactive consumer services such as videotex, the "potential" revenue from such services is viewed by so many as so strong that there will undoubtedly be continued activities in search of the holy online consumer service.

Beyond these incentives for new services to address specific needs and generate revenue, there appear to be some

important social motivations and communication values underlying our fascination with interactive media. Some interactive media offer an opportunity for more individuals to create communications: many individuals creating content for many other individuals. This may appeal to a democratic value of broad participation in public discussion about social and political events. In addition, interactive media often require users to participate actively in the selection and processing of information that is made available to them. Presumably, one cannot be a passive couch potato while using interactive media. Further, interactive media offer some opportunities to package and distribute information to highly specific groups of users. And, there are well-publicized examples of small software producers creating highly successful interactive services in basements or garages to the chagrin of large publishers and software producers. This may encourage us that the "little guy" can compete against large corporate entities in the interactive media arena.

Collectively, these values reflect a reaction against the processes and effects that we associate with mass communication: large complex organizations creating public content that is distributed one-way to mass audiences (4). In this sense, the fascination with interactive media may represent a hope that they will enable us to break the control of one-way mass media on information and entertainment for the public.

## Lessons From Earlier Interactive Media

The modern era of interactive media is often traced to 1964 when AT&T demonstrated a picture telephone at the New York World's Fair. Over the next decade, the picture telephone was tested in a number of market trials and limited services. It was not widely adopted for several reasons: the quality of the image was poor; cost of the service was high; users could communicate only with a limited network of individuals who also had a picture telephone; and there was little need or demand to see interactants in most of the situations where it was tested (5). Nonetheless, picture telephones did eventually find some practical applications. For example, it has been adopted in a number of criminal justice settings. Further, a group-to-group version of the picture telephone (videoconferencing) has been adopted in many business settings.

The 1970s was a decade rich in trials and tests for interactive media. The National Science Foundation sponsored three major trials utilizing interactive cable television for education, community services and worker training (6); the U.S. Department of Health, Education and Welfare (DHEW) supported a number of tests and services utilizing interactive media for health care (7); and a large commercial test of interactive cable (Warner Amex's Qube system in Columbus, Ohio) received considerable publicity. It is difficult to summarize the results of these tests and services succinctly. However, a few lessons can be drawn. First, there were many technical

problems. Equipment was often in a prototype stage of development and it was not consistently reliable. This had a negative impact on many tests. Second, equipment was generally expensive. Often, the user group could not afford the equipment without the aid of a federal or foundation sponsor. Third, there were many organizational problems associated with implementation of the service that had little to do with the interactive technology as such. Nonetheless, many needed and wanted services did emerge. They were adopted directly by organizations and communities or evolved into permanent services (8). In this sense, the results of these trials and tests were mixed, not a dismal failure as is sometimes attributed to them.

Qube deserves special mention since it is cited frequently as an example of failed interactive technology. Qube technology was very expensive, particularly in a 1970s context. The Qube terminal in homes cost approximately \$200, or, four times the cost of standard decoders at that time, and Qube equipment at the cable headend added approximately \$2-3 million in plant costs. In addition, it was expensive and difficult to maintain the upstream or return data path from homes. This introduced reliability problems for the interactive service.

Production costs and interactive program design presented further obstacles. Budgets for Qube programs were very low compared to broadcast network programming budgets. "Interactivity" with low production values could not compete with network programming. Moreover, those producing interactive



programs were starting from scratch: there was little previous experience in designing interactive programs.

Use of Qube programming was generally low but there were a few exceptions. Some game format programs achieved moderate viewership and strong interactive participation from those watching. Qube also demonstrated that pay-per-view programming was potentially viable - if the cost of processing pay-per-view orders could be reduced. And, Qube introduced a number of interactive formats that have since evolved and been adopted as interactive components in cable and broadcast programming.

Cost of the technology, low production values and problems in maintaining the upstream data path were sufficient to doom Qube in a late 1970s - early 1980s context. In addition, Qube had served as a franchising tool for Warner Amex: the promise of interactive programming helped them to win many franchises. After the franchising wars of the early 1980s were completed, the marketing value of Qube for Warner Amex was eliminated (9).

It may be argued that the principal lesson of the Qube experiment is not the failure of interactive media in competition with traditional one-way mass media. Rather, interactive media must be developed in a viable economic and technical context. Even with these elements in place, producers must learn to create with the new medium and audiences should not be expected to change their media habits overnight.

During the 1980s, a broad scope of media has been introduced into businesses, homes, libraries and schools. It may be noted first that the marketplace acceptance of these technologies has been complex and dramatic - extraordinary successes, extraordinary failures and a few technologies that seem to ride waves of success and failure (e.g., videogames). If there is a lesson in this marketplace history, it may be that the interactive media industries are as volatile as the entertainment or toy businesses.

Second, a broad infrastructure of interactive technologies has entered many education environments, households and workplaces. The most important of these is undoubtedly the microcomputer which can serve as a terminal for many present and future interactive services. Third, a very large (but less than universal) share of the public has gained experience in using interactive media and machines that require interactive responses: personal computers, ATMs, VCR remote control keypads, microwave ovens, information kiosks at airports and other devices in the home and workplace are teaching people important basic skills in using interactive technology.

The most flamboyant interactive service of the 1980s, consumer videotex, deserves special attention. Field Enterprises, Knight-Ridder, The New York Times, Times Mirror, and Time Inc. among others have tried videotex services in one form or another and have come up empty. Why did so many of

these groups fail? And, why is there seemingly no end to the line of new groups who are willing to try videotex?

Research from and about consumer videotex services in the 1980s has been reasonably consistent. Though other researchers may differ, I would argue that the principal lessons or problems associated with consumer videotex are the following:

- The Home Terminal. Consumers appear to be reluctant to pay for a special terminal that can access videotex and do nothing else. The solution appears to be the use of a personal computer as the terminal.
- Pricing. Relatively few consumers are willing to pay more for videotex than household telephone service, cable TV service or electricity. An acceptable price for videotex is probably similar to basic cable service or a newspaper subscription, i.e., a flat fee of \$10 to \$20 per month.
- Information. Videotex consumers have consistently demonstrated little or no interest in voluminous amounts of information on a broad array of topics. Rather, they want small amounts of information, written specifically for a videotex service, on a relatively few topics such as weather, sports scores, news headlines and stock information.
- Communication. In trial after trial, communication services such as sending messages or posting/reading comments on electronic bulletin boards have been more popular than access to information services created by the videotex publisher.
- Women. For reasons that are not clear, users of most videotex services have been males, overwhelmingly. In some cases, more than 90 percent of users have been male.
- Graphics. Users like graphics in a videotex service but they are not willing to pay more money for a service with graphics and they do not like the slow display time that has been associated with most videotex services with graphics.

- Advertising. Users appear to have little concern about advertising in a videotex service. Unfortunately, most advertisers have been conservative in their attitude about videotex - they want a large base of users before they place ads.

Presumably, a group that solves these and a few additional problems associated with videotex can make a go of it. However, it has been tough sledding thus far.

A related question concerns why so many groups have been willing to pickup the videotex banner and march with it? In the past, it appears that many newspaper groups did so for defensive reasons. They feared that videotex might displace newspapers and, if so, they wished to control the "future newspaper." However, as this rationale faded (and many newspapers departed from the videotex scene), a new motivation has emerged: the network argument. This argument holds that sooner or later (5,10 or 20 years from now) basic consumer services such as mail, catalogue shopping and banking will move onto interactive telecommunication networks. Whoever controls the network at that time, it is argued, will control access to the network by all service providers. This may be a motivation for the current videotex activities of the Regional Bell Operating Companies (RBOCs), Prodigy (a joint venture of IBM and Sears Roebuck) and, presumably in the near future, AT&T. It should be noted that some scholars are skeptical about these arguments and claim that videotex research findings show that consumers do not want the service (10).

## Selected Trends For The 1990s

It appears that the technology environment of the 1990s will support the introduction of many new interactive services. Three trends support this conclusion. First, the telecommunication networks in the U.S. are being upgraded at a rapid pace. This includes fiber optic trunk lines, electronic digital switches in central offices and high-speed data transmission capability for homes and schools as well as businesses. Second, the technology infrastructure (i.e., equipment necessary to utilize interactive services) in homes and schools has grown significantly during the 1980s - a trend that will likely continue into the 1990s (11). Third, there is sufficient commercial interest in interactive services to drive much hardware and software development. Of particular note are interactive customer support systems (e.g., audiotex systems that handle customer inquiries) and interactive games/entertainment (e.g., several new systems that permit television viewers to participate in game shows).

At the same time, we may be disappointed or chagrined by some of the interactive services that are likely to emerge in the 1990s: pornographic audiotex services; information machines in government offices that completely replace information personnel; fully-automated off-track betting parlors; and, interactive television game shows that charge children who wish to participate. Further, the interactive media marketplace

will likely be as volatile in the 1990s as it has been in the 1980s.

I am not trying to paint a pessimistic scenario for the 1990s. Quite the contrary. If this scenario unfolds, many more citizens will acquire (at lower costs) the technology necessary to utilize interactive education or information services and many more citizens will acquire the skills necessary to use them.

### Interactivity and Communication Research in the 1990s

Research issues associated with the development, adoption and use of interactive media are broad and deep. In this sense, the 1990s promise to be a very exciting decade for communication researchers. I will not attempt to outline a comprehensive agenda of research issues associated with interactive media. Rather, I will emphasize those issues that intersect with my own work or interests.

Policy Issues. There are a number of important policy issues associated with interactive media that will be decided sometime in the 1990s. For example, the debate about high definition television (HDTV) involves a comprehensive review of television standards, not simply the resolution of the screen. Should the new standard include interactivity and, if so, in what form? In the telecommunications area, the debate about fiber optics to the home will directly affect interactive media since fiber optics can support many forms of interactivity including two-way video to the home. However, the installation

of fiber to the home will be quite expensive. Should government policy provide economic incentives for telephone companies to install fiber to the home (12)? Additional policy debates center on who will be allowed to provide interactive data services to the home; the privacy of data that is generated by interactive services; and, legal compliance when interactive media substitute for face-to-face interactions, e.g, does contact with a judge via two-way video constitute an appearance before that judge?

Mass Media Processes and Effects. Many of the research questions that have concerned mass media researchers for five decades can be applied productively in the new media environment. In some instances, they can be reapplied to one-way mass media as they face competition from or make use of interactive media. For example, it appears that channel adjacency to a popular network station on a large cable system can reap similar benefits as temporal adjacency by a weak program to a popular program on the same channel. That is, a cable operator can boost the viewership of a weak basic cable channel by placing it immediately above or below a commercial network affiliate. The effect, it is hypothesized, relates to increased use of remote control devices to change channels and a tendency to "graze" up and down in channel changing rather than search for specific channels.

Focusing specifically on interactive media, a number of familiar questions arise: what are the gatekeeping mechanisms

on large videotex bulletin boards; do interactive media increase person-to-person communication by users or do some of these media provide a form of parasocial interaction that encourages certain types of users to avoid interpersonal contacts; will interactive media lead to an increased number of information-producing organizations and greater diversity in public information sources or will traditional economic and institutional forces knock off/absorb the new competition?

In addition, there is a need to examine a fundamental premise associated with interactive media: that users of interactive media are "active" in the communication process and therefore can learn more from or exercise greater control over the information that is presented. The corollary to this premise - that users of one-way mass media are "passive" - has been a subject of heated debate (13). In examining this issue for interactive media, we may throw new light on our understanding of traditional one-way media behavior.

#### Interpersonal Communication.

A major component of interactive media involves person-to-person communication mediated by technology, e.g., a telephone call, computer conferencing and two-way video interactions. There is a large body of research on the characteristics of interpersonal communication under these conditions (14). However, much of the literature involves studies of interactive media usage in business, government or education settings, since these were the dominant environments



for many of these technologies in the 1970s and 1980s. In the 1990s, more and more ordinary people will have access to interactive media in their homes. Among the research questions that merit attention are: will the patterns of interpersonal communication behavior found in business or education settings be duplicated in households; where will media be located in households and how will this affect patterns of use; and, how will the channel characteristics of specific media affect communication styles?

#### Production and Design.

A good deal of practical knowledge about production and design for interactive media has been developed, e.g., writing for screen-based information systems, designing interactive videodiscs that have limited memory capacity and the use of icons to help users maneuver through a system. However, interactive media are evolving rapidly and some of the lessons acquired from earlier systems may no longer apply. Moreover, we are faced with a number of new production issues: the use of sound in pc-based interactive systems; writing and production for limited-response mass audience programming; and design of interactive HDTV systems. The 1990s should provide a rich laboratory for exploring production and design issues. In addition, some of the new systems will provide a capability for limited applications of artificial intelligence. For example, from a production perspective, how might we design an electronic information service in which we could present different users

with different information based upon a profile of usage patterns for each person, a profile that sharpens over time as the system learns more about the user?

Communication Theory. When people use new communication systems, it can sometimes open a door for us to observe fundamental components of mediated communication, e.g., the respective roles of social context, channel characteristics and user groups in the formation of shared codes and conventions that allow meaning to be exchanged. For example, how do people take turns at talking in audio teleconferences? Where does this "rule" come from, how do people learn it, and does it change over time?

The adoption and use of new interactive technologies may provide us with an opportunity to study many important components of mediated communication. I have tried to examine codes and conventions in studies of a few interactive media (15). Some of the issues that intrigue me include: the growing sophistication of graphics in interactive systems and the reliance on them to convey meaning that was conveyed previously in text; the development of user behaviors in situations where there is/is not training or instructions on how to use a system; borrowing of conventions from older media in new interactive systems; and, efficiency mechanisms (i.e., ways in which conventionalized messages can, over time, be communicated more quickly or simply).

## Conclusion

In many ways, the prospects for interactive media in the 1990s are strong: a growth in penetration of technologies (in homes, schools and businesses) that will enable many to use interactive services; an improved telecommunications infrastructure to support the delivery of interactive services; and more experience in the design and marketing of interactive services. However, optimism must be tempered by the mixed track record of previous interactive technologies and uncertainty about current appetites for interactive services. In addition, many of the hopes and promises that are pinned to the interactive media star may not be realized. For example, the hope that interactive media will lead to more information sources and greater diversity in content may fall short as traditional economic and institutional forces work upon the new media.

From a research and teaching perspective, four concluding points may be noted. First, there is both an opportunity and a strong need to train students about interactive media: what are the characteristics of these media; how does one write or design content for them; and, what social effects are associated with them; among other issues? Associated with this, the professional goals that departments set for students and students set for themselves may change. While it is likely that many journalism and mass communications students will eventually create interactive media services for great

metropolitan newspapers, it is just as likely that many students will create such services for Regional Bell Operating Companies and major banks.

Second, interactive media raise a question of interdisciplinary communication. In the 1970s and earlier, interactive media were equated largely with telephony and were the domain of engineers, computer scientists and a scattered group of social scientists. Often, these groups did not communicate with each other and many problems followed. During the past decade, many academics from mass media and journalism departments have adopted interactive media as an appropriate area for teaching and research. They have brought a fresh and valuable perspective to interactive media studies, along with useful methodological tools that were not present earlier. However, the need to communicate across disciplines and share teaching resources is greater than ever.

Third, there is a strong need to strengthen the academic voice in public policy debates about new technologies. These debates should not revolve exclusively around the arguments of large commercial groups.

Finally, I suspect that the 1990s will echo the 1970s as a period of many demonstration projects, field trials and market tests for new interactive services. For example, there will be many tests of interactive services to schools and homes delivered via fiber optic cable. These field tests, in turn,

should provide a rich environment for research about interactive media.

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