A Lack of Social Media and Its Effect on Technological Development, Reception, and Use

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Abstract

This research project demonstrates how an absence of social media during the early and mid-twentieth century affected the development, use, and reception of the computer and the Internet. Much has been written about the development of the computer and the Internet, as well as human-computer interaction and the differences between mass media and social media. However, little research has been done regarding the relationship between all three topics. The contribution made by this research project would serve to explain how closely the three topics are intertwined and provide a better understanding of current and historical relationships between people and the digital tools used to connect with other individuals. Specifically, it addresses how users accustomed to different types of media used computer technology over time. Research was conducted through investigations of the scholarly journal database as well as printed scholarly materials and primary sources. The results of this project will be discussed within the context of User Interaction Design and the history of technology and the media.

Keywords: Internet, Social Media, Mass Media

1. Introduction

Much has been written about the development of the computer and the Internet, as well as human-computer interaction and the differences between mass media and social media. This research seeks to explain how closely the three topics are intertwined and provide a better understanding of current and historical relationships between people and the digital tools used to connect with other individuals. The conclusions of this research indicate that a lack of social media created an environment in which individuals and developers worked with one another in close proximity to build the first computers and the beginnings of the Internet. Recognizing the importance of collaboration and social interaction, those individuals then adapted the use of networked machines to work together at the same time in different places. Those individuals also began to experiment with the way that humans and computers would interact. However, the general public took significantly more time to adapt computers for socializing, originally using the computers and Internet more frequently as an office tool or as a way of accessing the mass media. Different user interfaces used by the general public reflect and affected the way the general public used computer and Internet technology over time.

2. The 20th Century Before the Digital Computer

The 20th century was a time period rife with technological advances. Many of these technological advances made the completion of a variety of tasks faster and easier. Other advances widened the amount and types of entertainment

available, and some technologies eased the communication process and changed the way communication occurred. Prior to the late 19th century, much of the world's communication had been via social media. Today, our standard definition of social media involves "forms of electronic communication (as websites for social networking and microblogging) through which users create online communities to share information, ideas, personal messages, and other content."[1] However, Tom Standage and his research define social media as any participatory media that engages both sender and receiver in sharing, sending, changing, and building off of content.

By this definition (which is used throughout this paper), Standage explains that early letters and epistles, graffiti, and pamphlets were social media. Information was communicated via these channels among audiences who shared, responded, edited, replied, and created discussions via writing. The early Romans wrote messages for each other on the walls of their cities, and the early Christians shared the gospel, corrected and taught one another using epistles. Later, scholars and revolutionaries in Europe and America wrote, published, shared, discussed and responded to each other with pamphlets.[2] For people before the late 19th century, these technologies were used to create and engage in conversations. By the late 19th century and the early 20th century, however, the aforementioned technological advances brought the world into the mass media age.

The mass media, which include books, magazines, newspapers, radio, recorded music, film, and (at mid-century) television, was much less participatory. Because new media allowed communicators to quickly publish information that could be spread amongst a vast audience, much more information began to be published and circulated than ever before. Many audiences grew accustomed to having new publications available to them nearly every day – such as new editions of the newspaper, new books, and new issues of magazines.[3] These new media did not really allow for audiences to communicate back to publishers and reciprocate the conversation. For many early 20th century Americans, the media became a way of *receiving* information; if audiences did respond to the messages communicated, it was generally in person (without a medium), by telephone, or via a letter.[4] While letters to the editor, letters in response to radio broadcasts, and letters in response to films were written, they were largely ignored. Some organizations and groups did seek feedback from audiences through research. However, the results of that research were not widely applied or taken into consideration. One study showed that 34% of major media organizations "saw audience research figures, but most had general indifference to them."[5] This lack of conversation between communicator and audience reinforced the idea of a passive and anonymous audience in the mass media environment.[6] As a result, the paradigm in which the average American lived during the early and mid 20th century was one in which technology was used as a medium for receiving communication, but not conversing and interacting through it.

3. The Early Computers

It was during this period of mass media that the first digital computers began to be developed. For years, mathematicians and researchers had explored the possibility of computing machines and other tools to simplify the solving of mathematical equations. The abacus had been around for millennia, logarithmic tables and the slide rule had been around for centuries, and during the 19th century, Charles Babbage built a mechanical computer that allowed him to calculate certain quantities. As he built his machine, however, he realized that a machine that could be programmed to calculate any quantity would be more valuable and useful. His idea, titled the "Analytical Engine," would also be able to store and output information. Upon hearing of Babbage's machine, Lady Ada Lovelace, a mathematician, began to write the steps and information needed to actually program the machine and make calculations. Despite the extensive plans Babbage developed for his machine and the "code" that Lady Lovelace produced, the Analytical Engine was never built. Babbage's ideas, however would influence the individuals working on the first modern computers.[7]

The first modern computers were produced principally to meet the demands of World War II. In the high stakes environment of conflict and complex, deadly weapons, countries needed to be able to calculate distances, speeds, and locations to accurately fire torpedoes and missiles, as well as make calculations that would aid in the production of newer, deadlier weapons. There was also a need to be able to encode and decode enemy communications. The calculation of and delivery of this information became the main goal.[8] Under these demands, the first electromechanical computers began to be built in the United States and England.

In the beginning of the war, some scientists and researchers worked in isolation – some making progress, others not. However, the increasing demands of war began to bring together some of the best minds from different schools, corporations, and branches of the government. Working closely together, these researchers and developers were able to make progress more quickly. Due to government constraints and the secrecy needed to protect innovation, various groups did not communicate much with one another. During this time period, the Colossus computer was built in

Great Britain and the ENIAC was built in Pennsylvania.[9] Smaller, less complex computers were built and loaded onto submarines to produce the information needed to torpedo ships accurately. The users of these early machines generally interacted with them through a series of switches, buttons, dials, and/or tapes and cards with holes punched in them.[10]

Once the war ended in 1945 and some of the barriers to sharing research between groups were gone, different researchers somewhat began to share what they had discovered by telephone, meeting face to face, and by writing letters. By mixing and discussing the ideas, these individuals and groups were able to continue to progress and innovate.[11]

As ideas were exchanged, some scientists began to expand their thoughts to what future computers may be capable of. Vannevar Bush, one of the key computer developers in the United States imagined computers with which people interacted via electrical impulses and waves that traveled between the brain and the machine[12] – a far cry from the switch and tape interactions of the time. JCR Licklider, another principal developer wrote in 1960 that "Relative to men, computing machines are very fast and very accurate, but they are constrained to perform only one or a few elementary operations at a time. Men are flexible, capable of 'programming themselves continuously' on the basis of newly received information. Computing machines are single-minded, constrained by their 'preprogramming.' Men naturally speak redundant languages organized around unitary objects and coherent actions and employing twenty to sixty elementary symbols. Computers 'naturally' speak nonredundant languages, usually with only two elementary symbols and no inherent appreciation either of unitary objects or of coherent actions… Computing machines can do readily, well, and rapidly many things that are impossible for man, and men can do readily and well, though not rapidly, many things that are difficult or impossible for computers. That suggests a symbiotic cooperation, if successful in integrating the positive characteristics of men and computers, would be of great value. *The differences in speed and in language, of course, pose difficulties that must be overcome.*" (emphasis added).[13] Alan Turing felt that people would need to be able to input information that was not limited to "yes" or "no" – which was more or less the capacity at the time.[14] Turing, Bush and Licklider – among others of the era – recognized that for the full potential of the computer to be realized, the ease with which man and machine communicated would need to greatly increase.

4. The Rise of the Network and the Command Line Interface

One of the most significant technologies that would contribute to the simplification of the use of the computer was the invention of the technologies used to build the television. Before discussing the implications of the technologies' effects on the computer and its use, however, it is important to understand the way that it affected the mass media environment. The television produced with those technologies was introduced with mixed reviews and opinions, but grew to be a staple appliance in the American home. The television helped to emphasize and reinforce the mass media way of thinking. It was also the television's place in the home that established the public's expectation of what a screen would be used for. By 1956, families were gathering and spending time together watching TV, but they did not interact with each other while doing so.[16] As families and individuals viewed television, they became accustomed to seeing advertisements on screen, commercials, messages from the government, and programs covering a myriad of topics. Peter Golding wrote of this time period that the media "are communicators explaining institutions to the people involved in them by both vertical and horizontal communication. They are information brokers, conveying messages in and through social processes, and, finally, they are legitimators of values and institutions in the public arena, conferring status and validity, and setting the agenda for political and cultural debate."[17]

TV became so influential that its content became a key part of real life human-human interactions. One researcher described "the adoption of media material as the basis for social interaction among peers, either by providing the leisure activities whose active pursuit knits the peer group together, or in providing information which usefully amplifies the interests of the group."[18] The television technology itself was impactful enough to be discussed in other publications of the mass media and culture. One notable example is that of *Fahrenheit 451,* in which one of the novel's characters watches TV while reading her own scripts out loud, acting out the parts of characters in the programs from her own living rooms.[19] This "interaction" was only a pseudo interaction with the screen, as whether or not the viewer read the script, nothing that was broadcast would change.

It was around this time that actual interactions aided by screens that resulted in changes and real actions began to take place in the computer science world. However, human machine interactions aided by screens were not then what they are today. Interactions occurred using what is known as the command line interface; users would enter specific commands and could see those commands running on the screen, but what they saw was little more than that.[20] The command language was complex and difficult to remember. In today's terms, it was not user friendly. In 1961, Gretchen Herbkersman compared the experience with "talking to a monster."[21] What made the communication process

so difficult was that users had to learn the language of the machine to be able to communicate with the machine – and the language of the machine varied significantly from the language of humans. This difficulty with entering information to the computer was one of the main factors that initially prevented users from communicating with other users via computers.

Another factor that initially prevented users from communicating with one another via computers was the lack of connections between computers. However, by 1969, a desire among researchers to increase computing power and enable collaboration led to the development of the ARPANET, a network of computers over which researchers could share data and run programs from a distance. The base network consisted of four machines located in different places in the United States. This network formed connections that would later form part of the basis of the Internet.[22]

Despite a budding network, many communications experts did not even consider the possibility of the computer or digital networks becoming a medium for general communication. A review of communications textbooks and other scholarly materials from the 60s and early 70s shows that generally, only print, film, radio, television, satellites were considered media for communication. The general public, of course, did not begin to think of computers or networks as tools for communication either. In fact, it was generally thought that the majority of man-machine communication would be the computer producing and giving man information[23] – a prediction befitting of a generation that received the majority of its communications via the mass media. The computer was also recognized as a valuable repository for storing information.[24] As such, some people began to think of the computer as a tool that was an extension of the brain, the way the wheel could be thought of as an extension of the foot.[25]

5.   Increased Connections and the GUI

As time passed and computers continued to progress into the 1970s and early 1980s, more computers were added to ARPANET, expanding the network. Other small networks began to emerge.[26] As the networks expanded, their use as a social medium truly began to blossom, but was very limited to researchers and the few other individuals connected to the network. These early social users began to communicate with each other using the newly minted email and chatrooms.[27] As time passed, the number of network users increased, as did the number of people using the computers and networks as social media. "By 1985, Internet was already well established as a technology supporting a broad community of researchers and developers, and was beginning to be used by other communities for daily computer communications. Electronic mail was being used broadly across several communities, often with different systems, but interconnection of different mail systems was showing the utility of inter-personal electronic communication."[28] The ability to communicate over these networks became a selling point among researchers and developers. Within the education community, some began to recognize that networked computers could change the way in which classes were taught, increasing off-site learning. If information could be shared between students and instructors at different universities, why then, could it not be shared between instructors on campus and students far away? The combination of computers and telecommunications could provide '"teaching at a distance" with greater scopes depth and quality than ever achieved in correspondence teaching.'[29]

In the beginning, however, these messages, communications, and other shared information required the memorization and use of long and specific paths and addresses to access and communicate. Notwithstanding, the user interface began to simplify and this process became easier. In the decade prior, Doug Englebart had expressed a fixed idea that "people should be able to interact with computers directly," and because this idea was not common at the time, "he started to get a reputation as an eccentric."[30] Over the course of the late 1960s, Engelbart would design the mouse, the first of which would be built with Bill English.[31] This mouse became integral to making the man-machine interaction simpler and would play a part in the integration of the graphical user interface, or GUI. The GUI incorporated icons and other visual elements allowing users to select and issue commands by clicking and selecting menu items, text links, or icons.[32] This visual process was much easier and processes were simple enough to remember or infer from context.

This simpler interface and lowering equipment prices also helped make computer access and use easier for the general public. Computers began to trickle into more businesses, libraries, and to an extent, homes, where people used them to "store, retrieve or manipulate information, and not merely technical data."[33] Reporters began to send articles to and from offices over phone lines using computers rather than via telegraph. Various users began to use videogames. For these public users, like the research and development users, the computer was generally considered a tool.[34] However, the general public was not using the computer and networks as social media; they continued to think of its use as more closely related to the mass media – more a tool to receive information than to send it.

Despite the general public's perception, some writers and technological thinkers began to explore new ideas where interactive communication would occur. Simon Ramo proclaimed that "Developments in electronics are making it certain that in the coming decades man will have far greater ability to handle the information basic to all of his pursuits—production, distribution, education, accounting, banking, medicine, law, government. Equipped with these technological aids, he will be able to sense, acquire, store, process, communicate, display, categorize, deliberate, perform logical operations upon and utilize information with vastly greater capacity, speed, versatility, interconnection, and geographical spread than is possible for the unaided human mind and senses."[35] Peter Stoler wrote, quoting an interview with the futurist Edward Cornish, "the dissemination of news [will not] be the only aspect of communications affected by the technological revolution. Also likely to be affected and changed is the way in which people now disseminate the information necessary to buy and sell things and the institutions involved – newspapers, classified ads, the yellow pages of the telephone directory. People will be able to use computers to communicate more directly and more quickly via electronic 'bulletin boards.' 'This is going to change things dramatically,' says Cornish. 'Sellers will be able to find buyers more quickly; buyers will be able to find sellers just as fast.' In fact, Cornish believes, the majority of communications will be handled by computers. 'Computers will do everything, even find mates for us,' says he. 'Computer dating services are already catching on. Soon, we'll be able to use computers to let people know we exist, to correspond. We can hide behind out computers while we're getting acquainted, then get to know each other personally."[36] These predictions are eerily accurate of our day; what more is interesting is that Ramo also predicted that using a computer network, "The public could tune in on the issues and take part by expressing their reactions electronically in two-way communication — 'instant democracy.' Information technology could be used to achieve a more informed citizenry with an extent of participation in decision-making never imagined in all the previous 'pretechnological' history of man."[37] What Stoler, Ramo, and Cornish began to recognize, ahead of their time, were some of the ways in which computers and networks could be applied as social media.

6. The Home Computer Invasion and the Birth of the World Wide Web

During the mid to late 1980s, technological innovation helped to make the computer and the computer network more accessible to a greater population. More individuals became exposed to computers in school or at work and recognized their potential. With increasing new products on the market, more people began to buy computers for their homes – for both entertainment and more serious pursuits.[38] The user interface continued to simplify, as exemplified by the iterative changes in early Microsoft Windows and Apple software. In fact, these two companies were the leaders in innovative interfaces that were easy to use when compared to what had existed up to that point. The interface changes and improvements in programming were beginning to lessen the gap between the language that the machine understood and the language that the user spoke. For the most part, users no longer needed to memorize or be able to look up and type in long strings of seemingly random characters to access or produce information using the computer. Instead, they could click on a descriptive image or a responsive menu. In response to these interface changes, the public began to think of computers differently. Computers were no longer thought of as quite the advanced, complicated scientific machine that they were before. In the public's mind, they became something attainable and usable. [39]

During this time, many of the computers in offices, research facilities, and some homes were being connected to the Internet, but actually using the Internet was not as simple as using the computer machine itself. The experience of using the Internet could vary widely from one machine to another and it required a knowledge of a complex system of addresses to be able to send or access remote information. One Wall Street Journal writer, Walter S. Mossberg, described the Internet as "a formless, mostly unregulated system for linking computers. For now, it is useful mainly to technically adept folks at government agencies, colleges and universities, and some large companies. Most other computer users -- in other words, most people -- can't gain access to it without great effort and some cost. And once they enter the net, they must deal with a system of commands and acronyms that isn't easy to learn."[40] Many "lacked… real information about how the technology was supposed to work."[41]

All of that would change, however, with the creation and adaption of the World Wide Web by Sir Tim Berners-Lee. Berners-Lee recognized the potential that the Internet had to connect people and information, but also saw that many people did not use it because of how difficult it was. Thus, Berners-Lee sought to simplify it. Taking advantage of a new technology called hypertext, in which text in one place referenced information in another, Berners-Lee created the HTML, URI, and HTTP technologies. Each of these technologies were essential to what we know today as the web and creating a platform across which users could share and access information easily and more quickly. Berners-

Lee had created a technology that made accessing the Internet a fairly uniform experience across many different devices. This technology was made open and available to the world in April 1993. By 1994, the Web, more or less as we know it today, was up and running.[42]

   With the creation of the Web, what the Internet was used for by academics and researchers changed little, though the ease by which the Internet was accessed did increase the number of academics and researchers using it. They continued to send messages and interact in chatrooms, communicating through a machine.[43] For these users, the Internet was not a mass medium. The users from the general public, however, responded to the Web differently. In the beginning, the general public was still somewhat slow to use the Web. Not only did it take time for more home computers to be connected to the Internet, but it still took time to learn how to use the Web.[44] As more and more people made the Internet connection, however, many members of the general public applied the mass media model to the Internet. Early Web pages, while incorporating colors and graphics not used with print publications, were often similar in format to newspaper and magazine layouts. Individuals and media companies began to create and publish information online meant to be accessed by wide consumer audiences. Few, if any, websites contained built in comment sections or other ways to provide feedback. In this way, the average users of the Internet in the 1990s were, in the words of Marshall McLuhan "striving to force the new media to do the work of the old."[45] Textbooks, such as *The World Wide Web: A Mass Communication Perspective.*[46] were soon available on the market, explaining how the Internet could be used as a mass medium.

7. The Social Media Age

Nonetheless, the general public did also begin to take advantage of chatrooms, new "weblogs" (blogs), and messaging services, beginning to use computers and the Internet as social media.[47] Though it took a significant amount of time longer for the public to do so because of the difficulty of using computers and the Internet and because they were initially slowed by the way in which they regarded technology, it did occur. In 1997, a group of researchers discussing the history of the Internet wrote, "The Internet is at once a worldwide broadcasting capability, a mechanism for information dissemination, and a medium for collaboration and interaction between individuals and their computers without regard for geographic location."[48]

   Social media as we know it today rapidly began to emerge with the creation of online social networking services such as Friendster in 2002,[49] LinkedIn[50] and MySpace[51] in 2003, and Facebook in 2004.[52] While there were many early social networking services in the beginning, many failed to stay relevant. Part of what helped users become engaged with these social media was that interfaces continued to grow more simple, ever lessening the difference between the language spoken by man and the language understood by machine. It was not just the interface needed to use the computer itself, but the interfaces within the websites that simplified. Facebook simply asked users to fill in the blank "<Username> is _____," and hit the Enter key or click on "share." Finding friends simply required knowing their names and typing them into a search box. Approval of another's status was as easy to show as clicking a thumbs-up like button.[53] Many social networking services also allowed – and continue to allow – users to express feelings and share them with others using emojis,[54] small graphics that consist of faces wearing different expressions or items such as tacos, fire, or poo.

   However, improved interfaces have not just enabled the use of the Internet as a social medium. Some interfaces have changed to reflect the use of the Internet as a social medium. There are websites that publish articles, notices, videos, images; other websites stream "radio," television shows, and movies.[55] Each of these websites has aspects that reflect the old media; for example, the headers across the top of pages imitate the headers in newspapers, sidebar menus reflect tables of content, and even the name "web pages" comes as a relic of the print world. Yet, these sites have evolved to incorporate interface elements produced to enable social interactions. Websites publishing material traditionally found in the mass media now include options on the page to share content via social networking sites; Twitter – a social media website – now streams NFL games live, giving users the option to interact with other users while they watch programs on the same platform.[56] Many websites that are used to publish articles or video embed a Facebook comment section after the main content.[57]

8. Conclusion

The mass media culture created before the 20th century and maintained during the 20th century affected the way that the general public responded to the invention of the digital computer, the Internet, and the World Wide Web. While

the technology itself was not easily accessible in its early stages and human-computer interfaces were difficult to use, the lack of social media also slowed down the general public's recognizance of the potential to use the technology to communicate and interact with others. Rather, many simply used the computer as a tool for data storage and processing. However, as technology got easier to use, the public, like researchers before them, used digital networks to form the foundation for social networks. As relationships were created and maintained over the Internet, the interfaces used on Web pages began to change and reflect the social media usage of the Internet.

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