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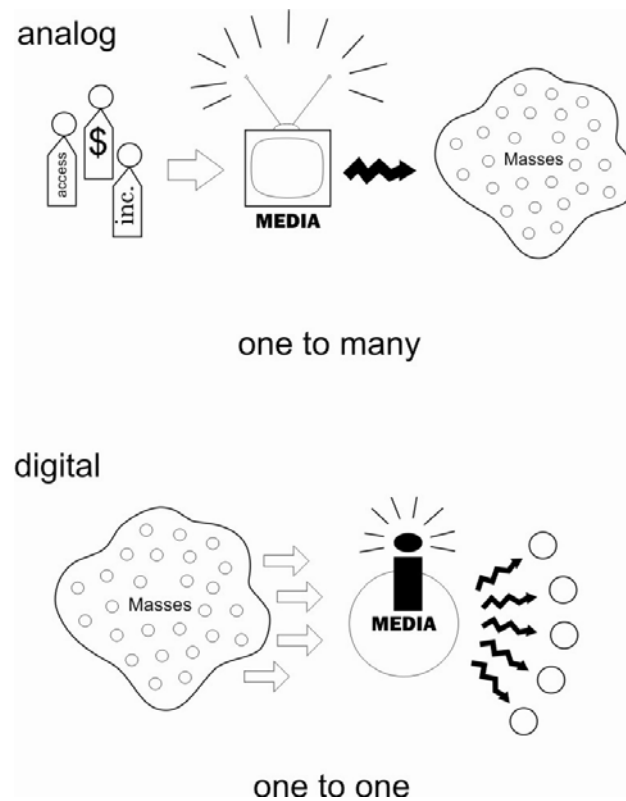
Field Exam 1

3 March 2009

How computer-mediated communication has facilitated the change from a one-to-many asynchronous structure to a one-to-one (or some-to-some) synchronous interaction?

There have been dramatic changes in communication throughout history from the invention of an alphabet, which introduced a standardization of language and enabled communication between different cultures, to the democratization of knowledge with the printing press, and even the telegraph which enabled a message to travel long distances in an instance and redefined the very word, "communication." The invention of the computer led to a level of connectivity that would once again redefine communication. The computer has evolved into a relatively low cost, free in some cases, device that connects to a network, also available for free, of nodes that represent people. The network is the internet which facilitates synchronous interaction between an infinite number of nodes. Communication is facilitated by applications and interfaces and distributed through the computer network. The affordability of emerging technologies and ubiquitous user interfaces has burst opened the door to the general public and created virtual worlds and socially networked communities. Computer-mediated communication has enabled and encouraged a new level of communication that allows one-to-one, synchronous interaction. The World Wide Web has given a new global perspective to connectivity and expanded the conventional definition of broad-cast. Finally, as the digital infrastructure expands; including, fiber optics, Wi-Fi, affordable bandwidth, and computing

capabilities increase with memory capacity and miniaturization, each new communication device enables more personal and relevant communication that is computer-mediated. The computer-mediated communication landscape is best explained by exploring three areas of influence: Access, reach, and technology.



## Access

Access describes the availability, capabilities, and usability of emerging technologies. One primary factor that touches on all three areas of accessibility is the consideration of affordability. In the past, media that was primarily responsible for broadcasting content of public consumption was television and radio. The costs entailed in producing and distributing

content through these mediums are prohibitively expensive. Access to broadcasting stations is controlled by large corporations or individuals with the financial resources to pay the usage fees and build the infrastructures that transmit and receive content. As a result of limited access to these technologies, the messages conveyed as news, entertainment or social commentary is subject to personal influences and ideologies and limited to those selected few that own, operate or control the media stations. In this scenario communication is determined and manipulated to meet the desire of a few and generically packaged and distributed to the masses. This has been the distribution model from the beginning of mass communication. Access is a key factor in opening up the channels of communication. It is important to note that access works on both ends of the media distribution model as it describes the authors' ability to distribute content and access on the receiving end to have selection and choice of what is obtained.

Availability of computer access is becoming more affordable as technologies lower in price, and entrepreneurs continue to produce affordable products with greater processing power. Nicholas Negroponte, co-founder of MIT, Massachusetts Institute of Technology's Media Lab, has dedicated the later part of his career to produce affordable computers at \$100 with his One Laptop Per Child project. The lap tops are currently available for \$200. There are countries where individuals will never own a computer but still communicate over the internet via some other device such as their cell phone. The concept of one-to-one broadcasting is becoming ubiquitous as GPS systems transmits data in our cell phones or rental vehicles and delivery companies use tracking devices to follow packages. Availability won't always consider affordability or even permission by users as technologies utilize the concept of one-to-one

communication in inventory control and pricing of consumer goods. The RFID (Radio-frequency identification) tagging system is a technology that is already in use and will become standard practice in retail and other commercial endeavors with the ability to convey large amounts of original information from unique sources.

### Capabilities

The capabilities of computer-mediated communication are vast and include the overall impact of society and cultures around the world that have been transformed by a new level of connectivity. As not to overstate the reach of such media, Casey Lum describes the impact as, “giving form to a culture’s politics, social organization, and habitual ways of thinking.” (Lum 62) Almost from the beginning, the computer as a communication tool has broken down barriers, obliterated hierarchies, and opened the door to individual expression never before experienced. The computer can facilitate personal interactions and empower participants to engage and inform at massive levels, but the greatest impact, and most impressive capabilities of this medium is what it doesn’t do. This medium is unlimited, without boundaries, and as soon as someone attempts to harness or restrict the capacity and fluidity of this network, like damaged brain cells, the internet surpasses that region and forms networks around the “damaged cells” and continues the natural communication between new nodes. This lack of limitations allows real-time interactions with unlimited capacity. Another attribute of the computer-mediated communication is the lack of judgment and an absence of pre-determined classifications. A willing viewer can find pornography next to cartoon characters and information on local restaurants a click away from a chat discussing the topic of starving

children in Asia. In a one-to-many communication structure, the sender needs a captive audience and a way to force the viewers to receive the message. The internet doesn't contain the easily arranged viewers or centralized control of channels that could facilitate such domination. The very fact that communication travels through networks formed by users, natural barriers arise that deter unwanted broadcast. It is important to note that hackers will always find ways to manipulate the system and send unwanted messages, but the lack of restriction also empowers the recipients to place deterrence or re-network connections that avoid unwanted communications. Finally, the computer-mediated communication capabilities that most influence one-to-one interaction are the absence of communication constraints. Open communication is possible because of the multi-nodal structure of the net, and the individual connections provide a rich tapestry of ideas, thoughts and opinions circulating in forms of text, images, audio and raw data intermingled as a collaborative efforts or conflicting intentions. The greatest capability offered by such media is, all communication can co-exist in this common area, which Lawrence Lessig describes as an "innovation commons." (Rheingold 153)

## Usability

The user interface design, or usability, is one area of computer-mediated communication that appears to lag behind leading innovations, but plays an integral part in the user experience and capabilities of participants. Even with industry leaders such as Apple and Lotus 1-2-3 that built products with design leading technologies over the years, the industry standard continues to emphasize function, and engineer applications to offer more features. In

1990 Mitch Kapor presented a paper called “A Software Design Manifesto,” which was published a year later in Dr. Dobbs Journal. In this paper, Kapor called for a design approach to creating digital content and laid out the importance of design thinking and products that focus on the user experience equally or more than functionality alone.

The electronic spreadsheet can arguably be labeled as the first software application that popularized the personal computer and was created from a design perspective. A company called VisiCorp founded by Dan Bricklin and Bob Frankston developed the first electronic spreadsheet called VisiCalc, released in 1979. This application alone instantly turned the personal computer from a hobbyist toy into a business tool. (Young, p194) In 1983 two software designers from Boston, Mitch Kapor and Jonathan Sacks created an electronic spreadsheet called Lotus 1-2-3 that was far superior to the VisiCalc application. The Lotus spreadsheet was associated with the IBM personal computer which for a short time dominated fifty percent of the personal computing market before Compaq computers and the advent of the PC clones. Lotus 1-2-3 was faster than the VisiCalc application and Kapor would argue that the Lotus software success was due to user focused design, usability, before user focused software design was a consideration.

Usability design influences the users’ experience and gives the application purpose. An example of design that facilitates one-to-one interaction is regions on a site that invite users to post personal images and accompanying spaces for comments. Web sites will use gimmicks, games, such as “pokes” on Facebook, or pull personal interests to form small communities such as Meetup.com to engage users and develop a reason to interact with the web site and

promotes continued participation and return visits. These design elements lead to increased web traffic and ultimately increased revenue from advertisers. What a user sees when they view a page heavily affects their overall experience. Google as a search engine, attempts to personalize the individual search experience by collecting relevant links. The site presents a clean, uncluttered front page to emphasize what's important, the users' satisfaction. Google emphasizes this priority and a user interface that directs the viewer by limiting their front page to 28 words and no advertisements. MySpace.com, on the other hand, predominately displays banner ads and forces viewers to navigate around blinking, animated, distracting promotional ads throughout the site. This is a design feature that could drive some users to their competitor's sites such as Facebook which uses their page design to emphasize connecting with friends and posting comments on each others' wall over intrusive advertisements.

The design of computer media can have a huge impact on users and dictate the way participants interact. Even the most accessible and feature-laden applications can be overlooked with poor design. As Mitch Kapor displayed over twenty-years ago, designing to meet an individual's needs and not attempting to appeal to everyone can still lead to a product that satisfies many and ultimately revolutionizes an industry.

In consideration of usability, and design of an interface that facilitates communication, it is necessary to acknowledge that a digital literacy is present and representative of any computer-mediated expression. A digital literacy continues to evolve with the emergence of new media. Text-based communications and visual design are experiencing a transformation within electronic media. Not only are platforms shaping design, but tools and applications are

dictating new, efficient modes of creation and communication. For example, text messaging has redefined the relationship to keyboards as users type with their thumbs. Even though most digital media utilizes a screen and a visual presentation, traditional design elements are not the predominant influence. Even if design is slow to take a lead role in communication design, a digital literacy is erupting and evolving as quickly as the next technology appears. This literacy is dynamic enough to form to emerging media and satisfy a digital medium that rewards immediacy over contemplation, and variety despite limited insights. This literacy complements a one-to-one, synchronous interaction as it engages many participants on many personal levels.

## Reach

Reach refers to the number of people, across unbound geographic regions, in real-time, available to receive and respond to any transmitted message. Reach also includes target markets, relevant data to specific demographics, and the idea of people pulling relevant data as opposed to having information pushed at them as described by Nicholas Negroponte in his book, *Being Digital*. (Negroponte 84) Reach might be the one attribute enabled by computer-mediated communication that is most responsible for the next generation of the internet development referred to as web 2.0. This has given rise to the social networks and online communities that interact in the moment, as events occur, and share synchronous connections through instant messaging, twittering, VoIP (Voice Over Internet Protocol), online gaming collaborations, or interactions as avatars in virtual environments such as SecondLife. Reach is the result of access, affordability and usability that is enabling internet communities to form. Reach is a dominant factor that is driving the current business model of most internet

enterprises. Google is a prime example of a web site that relies on wide appeal and reach. As Google improves its reach, the company prospers with a lucrative advertising model that relies on traffic and usage/clicks. Social web sites such as Facebook and MySpace realize that success depends on people connecting with friends and family and to attract online users, a community must form and hopefully exponentially grow as connections between people expand. The current leading social networks rely on advertising for revenue and avoid user fees as this has proven to reduce participation and would certainly drive traffic to their competitors. As soon as two people connected via the internet, communication issues arose. In the world of web 2.0, facilitated communication and computer-designed applications are imperative to enhancing the user experience and utility of emerging technologies.

Chris Anderson in his book, *The Long Tail*, explored the idea and value of the one-to-one distribution model in commercial endeavors. Negroponte, 11 years earlier, discussed the idea of the “Daily Me” in reference to dedicated news (Negroponte 153), and “narrowcasting,” a term coined by J.C.R. Licklider in the mid-1960s. (Negroponte 95) None of these concepts were practical applications in 1995, when Negroponte wrote his book, *Being Digital*, seven years before the first social network, Friendster was founded. From the beginning, the vision for the internet was connectivity and communication, but it would be at least ten years after the Macintosh was introduced in 1984 before the first blog appeared and the idea of personal expression was posted. At that point the conversation was asynchronous and virtually one way, but very quickly the lines of communication would open and become multi-directional.

## Technology

Technology considers the resources, tools, and applications that are facilitating how content is created and received. Applications can be further defined by functions offered and aesthetic design including visual language and affordance. Computer-mediated communication began with limited access as scientists and engineers used a technical text-based language and code to accomplish their work. The initial public computers were sold as kits and primarily thought of as gadgets for the technical hobbyist with limited application. It wasn't until tools, such as the mouse and operating systems that integrated icons and symbols were developed, that the computer truly became accessible and had an appeal to a broad and diverse audience with unimaginable applications. The desktop metaphor ensured mass appeal as it made a complex technology accessible and user friendly. One of the first applications that started the meteoric rise of computers was the spreadsheet as mentioned before. As a conceptual model, the digital spreadsheet was credited as a new idea that led the PC revolution. (Winograd 228) Terry Winograd goes on to say that Lotus 1-2-3, "moved the microcomputer from the hobbyist's and student's desks into the mainstream of the business world. (Winograd 228) These types of technologies helped build mega-corporations such as Microsoft, and move them closer to their vision of, "a computer on every desk and in every home..." (Gates) But, it was the introduction of the World Wide Web to the general public and communication tools such as web sites, email, chat rooms, wikis, and blogs that have provided the foundation for a new type of media and a new form of communication that has truly transformed the static modes of media. As a sign of the speed in which technology is changing and the computer industry

transforming, younger generations already view email as too slow and passé, and prefer synchronous exchanges such as text messaging, twitter, and video messaging.

## Resources

Resources that are enabling a more personal level of connectivity and the one-to-one communication model are dependent upon a number of factors. These include lower technology costs, longer battery life, improved memory capacity, miniaturization of components, and innovations that are utilizing technologies not reliant on expansive, expensive infrastructures, such as the move from LAN (Local Area Network) lines to Wi-Fi. These resources lower the cost to consumers and allow more people to share the technologies; as well as present greater opportunities for expression, and represent a more diverse population of users that are forming online communities. Entrepreneurs such as Nicholas Negroponte are pushing the business models and manufacturing capabilities to produce low cost computers and integrated technologies that continue the movement of a connected global network.

## Tools

The first tool that moved the computer from a piece of equipment to the communication device we currently use was the mouse. From its early inception in 1963-64 by Doug Engelbart a computer pioneer, to its public introduction in 1982, the mouse has transformed computer interaction. Before this time, the graphical user interface was limited to text and the only way a user could interact with the machine was by typing on a keyboard. This one component changed the way we interact with the computer and drastically altered all future considerations for operating systems and user interface design. The mouse introduced a

digital language that instantly moved past text, code, and the linear, logical progression to individual choice and random selection. The mouse allowed the computer user to move with fewer restrictions and encouraged software designers to program options outside of a linear, text driven interaction. Today, emerging tools that are having the greatest impact on computer-mediated communication are personal devices that serve multiple functions. At one point in the evolution of digital devices a lap top computer represented the portable alternative to carry the power of computing away from the desk and the pda's (personal digital assistants) gave a bit more flexibility at the expense of computing power. At this point, the cell phone is positioned to serve the multi-functional operations of voice, text, and data transfers, plus the power of full computing and connectivity. This is apparent as social networks such as Facebook and Myspace design their user interfaces to fit on the cell phone screen. Howard Rheingold fully explores the impact of cell phones and "the new social form made possible by the combination of computation, communication, reputation, and location awareness." Rheingold observes a phenomenon of "Mobile ad hoc social networks" (Rheingold 169) which he calls "smart mobs." These communities formed by one-to-one connections, many times over-communicate information with uniquely designed tools that transcend the desk top computer. Features such as GPS (Global Positioning System) tracking gives a new spatial and real time interaction with the technology as it allows people to locate and connect at specific sites; as well as, commercial locations can make individual connections by attaching advertisements such as the week's barista special as the viewer searches for the ideal coffee spot nearby. The one-to-one communication that is best represented by new technology is best illustrated by the new applications introduced on mobile devices. Not only are games and entertainment being

tailored to the smaller screen, but lifestyle applications that fit this new mobile, in-the-moment world. Location software, and search functions that allow the user to locate and interact with non-digital, brick and mortar establishment, and other technology users. A new level of connectivity and interaction are facilitated by mobile-computing devices, currently utilizing smart phones.

## Applications

Applications that have moved the structure of communication to a one-to-one forum are text messaging, instant messaging, chat rooms, and blogs. These applications allow individual users to create and post their own content to which anyone else can respond. In some instances the application facilitates synchronous interaction such as instant messaging and other times in the case of email, the communication is linear and static in nature.

Applications also include software and operating systems that provide the infrastructure for user interaction. As discussed, the user interface and aesthetic design plays a major role in facilitated communication and the emphasis for application design appears to be on creating platforms that can be viewed on any size screen. Initially, scale wasn't a concern and as monitors have enlarged and display screens shrunk, the same amount of information is being forced to form to the current devices of choice.

Not only is mobile computing dramatically changing before our eyes, but operating systems and applications are on the verge of transforming the computer industry once again. Operating systems are changing to fully integrate all types of communication that will enable users to fold-in all aspects of their lives from business applications, to entertainment, and social

networks and digital communities. Ultimately, the influences of our computer-mediated interactions will be transparent and ubiquitous. In another move from the one-to-many model currently used in operating systems, the term “cloud” will become as common as Windows is to desk top computers and the part that should scare Microsoft is that no one has claimed a stronghold on this emerging technology. The cloud refers to a common area on the internet where a user’s operating system and all applications are cached. Instead of users purchasing a prepackaged operating system and accompanying applications, the cloud will allow users to select and choose applications and features that best suit their needs. They will be able to pay for specific applications that are desirable and not incur the costs of other unused features. The concept of the cloud is to redirect the movement of smart phones to small computers and provide an alternative to the challenge of creating more powerful, mobile devices. Then applications and operating systems can remain robust with the capacity to offer unlimited features while the mobile devices stay small and simply access the power of the cloud without requiring the extra processing power.

## Conclusion

Computer-mediated communication has enabled information to travel faster, further and more efficiently than ever. Emerging technologies have enabled users to create content as easily as they consume it and empowered full participation as virtual platforms and digital applications provide user-friendly tools and intuitive connections that unite people without limits. Media that provided public consumption was initially controlled by large companies or those with privileged access and broadcast through mass media such as the radio or television.

The message was composed by few and distributed to a mass audience who accepted whatever was provided. Cultural norms were shaped and societal habits formed around these broadcasts, as illustrated by the term “primetime.” As the computer evolved and computer-mediated communication has become ubiquitous in society, new channels of information have opened and variety and selection of content; including raw data, news, entertainment, and social connections have expanded to the masses of active participants. Access to this form of broadcast has given the power to create content, and affordable tools and available resources, has allowed all interested parties to be active observers. Content can be chosen based on interests and relevance with spectators invited to participate, as opposed to forced to watch. Computer-mediated communication allows information to move between individual nodes or broadcast for mass consumption. The walls have been removed and participation redefined as we live in the midst of a communication epoch.

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