Computer-Mediated Communication

Tinatin Mshvidobadze*

Abstract

This article proposes an approach to defining units of analysis for Internet communication research. To define these units of analysis, I first define the term Internet computer-mediated communication. This definition identifies the characteristics of Internet communication. A set of definitions are shown for developing: media space, media class, media object, and media instance as units of analysis for Internet communication studies. Finally, these units of analysis are illustrated with some examples.

Keywords: Computer-mediated, Internet-based, Server-Client-Content.

Introduction

Researchers in the past decades have taken many approaches to analyzing human communication on computer and networked communication systems. Using a variety of frameworks for defining units of analysis, these researchers have examined an array of communication settings. For example, some research has explored the relationships between the characteristics of media systems and the characteristics of individuals using them. Other researchers have examined the human component of computer-mediated communication processes in detail, examining social-psychological factors, as well as social context factors, and social cues. This body of work presents a mixture of results that are very dependent on the context of the research setting. Integration of results, particularly at the theoretical level, is difficult.

Research focusing on media has likewise lead to insights, but little theoretical integration or comparison of results from study to study. Researchers have examined the diffusion and adoption of interactive media and found factors contributing to media technology adoption as well as patterns of how technology use develops in a community. Other researchers and writers have looked at media evolution to identify societal and individual changes as a result of the use of communication technology. More recently, media researchers have examined the notion of "media richness" to examine media selection in individual and organizational communication. This focus on media uses a variety of frameworks for defining units of analysis, or fails to define any units of analysis. As a result, it is difficult to piece together an integrative model to explain and predict media use, adoption, and evolution patterns, or even classify study results or theoretical statements (Blumler J. G, 2007)

Another approach to researching on-line communi-cation is a focus on language and rhetoric. Researchers in these areas have likewise discovered many insights into the structure and content of computer-mediated communication and how literacy and orality are affected by communication technology. These studies have examined a variety of on-line content and used many schemes for defining or discussing units of analysis.

Over the decades, research in computer-mediated communication has also explored myriad on-line experiences, focusing on human and social characteristics, media, and language and rhetorical content.

Added to this lack of theoretical integration have been the changes and advances in Internet communication technology over the period 1997-2007. While electronic mail and Usenet news-group discussions were the early forms of communication used on the Internet, today the Internet offers a far wider range of tools for information retrieval, communication, and interaction than just text-based discussion and information dissemination. The use of the Internet also has rapidly increased, with some Internet applications, such as the World Wide Web, experiencing very rapid increases in use and range of expression.
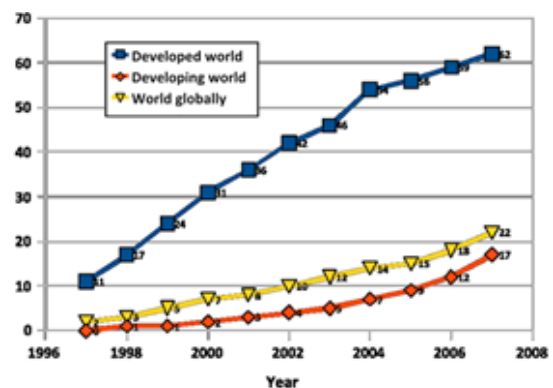

Figure.1. Internet users per 100 inhabitants 1997-2007 source ITU.

* *An Assistant Professor at the Faculty of Social Sciences at Gori University, Georgia,*
E-mail: tinikomshvidobadze@gmail.com

Defining Internet-Based, Computer-Mediated Communication

Whereas electronic mail has been a frequent subject area for previous communication research, the global Internet today offers a far more diverse set of tools and contexts for communication than it has in the past. Communication on the Internet also exists within developed social and cultural traditions. Therefore, what we mean when we talk about specific forms of Internet communication must be carefully defined, so that consistency in research approaches can be made and areas of inquiry for possible research can be identified (Baron T, Naomi S, 2004).

Internet-Based

To say that communication is Internet-based means that, at the data level, it conforms to a particular set of data communications protocols. A protocol is a set of rules for exchanging information. Computer networks use protocols to enable computers connected to a network to send and receive messages. The set of protocols called the TCP/IP protocol suite defines the rules for data exchange on the Internet. This set of protocols, originally developed for a United States Department of Defense research project, integrates a set of services (including electronic mail, file transfer, and remote log-in) that can occur among many computers on local or wide-area networks.

Electronic mail is a popular form of communication exchanged across gateways. Through electronic mail gateways, users on the Internet can exchange electronic mail with other users on (non-Internet) networks, such as BITNET (Because Its Time Network), UUCP (Unix-Unix Copy Protocol), and Fido Net (a network based on personal computer communication over telephone lines).

Defining Units of Analysis for Internet-Based Communication

The discussion to this point should help an Internet researcher identify a research study's parameters for data exchange, client-server communication, message mediation characteristics, and communication symbols. The next step is to more precisely define what specific area of communication on the Internet is being examined (gopher.isoc.org, 1995).

If one researcher states that he or she will study MU* interaction, this could involve observations on a variety of MU* systems, including, potentially, discourse in systems for real-time text interchange, including MUDs (Multiple User Dialogues), MOOs (an object-oriented MUD), or MUSEs (Multiple User Simulation Environment). Even further, the particular MU* studied is extremely important, as MU*s vary in their layout, inhabitants, and activities.

Jay's House MOO is very different from Diversity University MOO, for example. Yet, activities among MU*s do share some commonalities that may allow for some cross-comparison of research results. The purpose of this section is to define the units of analysis that help researchers identify what types of communication they are studying on the Internet.

The Server-Client-Content Triad

Server-A computer and associated software that provide access to information through the Internet in response to requests from client software based on a particular protocol for data exchange. An example is a World Wide Web Server using the NCSA (National Center for Supercomputing Applications) software.

Client-Software that operates on a user's computer for accessing information distributed from servers according to one (or more) protocol(s) for data exchange. An example is a Netscape Communications Corporation World Wide Web client. The Netscape client can access Web servers, and also FTP, Gopher, Telnet, and other protocol servers.

Content-Information is exchanged, distributed, or available for retrieval or transmittal on networks. Examples are the content of the Usenet newsgroup alt. Hypertext, or the text exchanged among users in the Communications Center (a particular room) in the Diversity University MOO.

Media space-A media space consists of the set of all servers of a particular type that may provide information in one or more protocols, the corresponding clients that are capable of accessing these servers, and the associated content available for access on these servers.

For example, we can consider one Internet media space to be Gopher space: the set of all information (content) provided by Gopher servers, accessible by people using Gopher clients. Note that Web clients can also access Gopher servers, so that Web clients are components of Gopher space (Lea M,1998).

Another example of an Internet media space is defined by Internet Relay Chat (IRC): IRC space consists of IRC clients accessing the text exchanged among participants from any one of many IRC servers. A user wishing to enter IRC space would need a client, such as Telnet, or a specialized IRC client, to access information on a server. The user potentially has many servers to access worldwide. The discussion on servers, generated and observed by users employing clients, constitutes IRC space. Note that IRC space is disjointed from Gopher space: A Gopher client cannot be used to observe IRC content, nor can IRC clients be used to observe IRC content.

Web space, or the set of all Hypertext Transfer Protocol (HTTP) servers, Web clients, and content on HTTP servers, is itself composed of several spaces. Using the Java

programming language, developers can create specialized protocols that can be used to deliver information from Web servers to Java-enabled clients. This delivery mechanism for these specialized Java-defined protocols is still the Web server. However, only Java-enabled Web clients can be used to observe Java-defined content. Therefore, the space defined by "Web hypertext, Web servers, and Web clients" is not the same as "Web hypertext plus Java-defined content, Web servers, and Java-enabled Web clients." These two spaces share common components (the non-Java content of the Web) and could then be considered to overlap.

This definition of a space corresponds to informal descriptions of other media. Colloquially, we might say that television is a medium, and mean that television is not just a collection of TV sets (clients), nor all of the broadcast TV stations (the servers). Instead, our concept of television as a medium encompasses all TV sets, all broadcast (and cable and satellite) systems, and all programming and production in combination with viewers' observation of this content through television sets (clients). Similarly, on the Internet, a space is not just one client type or the collection of all servers of one type, but the entire set of clients and servers along with the content on those servers potentially observable by those clients (Levinson P., 2007).

This definition of an Internet media space is useful to capture the idea that there are many different (sometimes overlapping, sometimes disjointed) spheres of activity on the Internet. A space, defined this way, is a seamless forum, in which users can observe any of the content from the servers in that space using their clients.

However, each Internet media space encompasses a vast amount of activity, probably too vast for a single research study. So just as communication researchers may want to focus on a subset of a television for study, such as television news programs or late-night talk shows, so, too, might the researcher in Internet communication need to focus on a subset of an Internet media space. The definitions below subdivide two analysis units to describe more precise units: I use the term media class to define a particular set of content, servers, and clients; the term media object defines a specific unit in a media class with which the user can observe and interact.

Conclusion:

Articulating the vast possibilities for communication on the Internet can be approached using a system of definitions. A definition for Internet communication relies on the precise meaning and technical implication of the words, Internet, computer, mediated, and communication. In approaching Internet communication as a range of media, we can define units of analysis: media space, media class, media object, media instance, and media experience, based on an articulation of levels of abstraction. Using the multiple

levels of abstraction inherent in these definitions, communication researchers can define a variety of research settings with a consistent treatment of units of analysis. The overall benefit of this definition of Internet communication is that the diverse landscape of Internet communication can be defined, opening up possibilities for cross-study comparisons as well as theoretical integration.

In addition to using the above definition of Internet communication and the definition framework for media classes, objects, instances, and experiences, communication researchers can define their research setting using consistent terminology and units of analysis. Specifically, the benefits of this use are:

(a) To provide ways to define units of analysis for measuring variables in many communication contexts,

(b) To allow consistent articulation of units and of analysis for study and for cross-study comparisons, and

(c) To allow media class and object definitions to articulate the differences in levels of abstraction for measuring experiences based on different media objects.

More work remains in exploring how this system of definitions can be applied to more general on-line communication contexts. The client-server component of this definition is based on a communications system employing client-server communication on the Internet. The growing interconnections among Internet communication and non-Internet services will open up more possibilities for communication and an even more diverse on-line communication environment.

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