Integrating Critical Approaches into Studies of Information Needs and Uses

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1. Digital Divide Studies

The overriding project of the social informatics community over the past few years has been to address the gap between those who do and do not possess access to advanced information and communication technologies (ICTs) -- the so called "digital divide." There have been by now a significant number of important studies of the digital divide. The overall body of results produced by these studies has told us a lot about the characteristics of people on either side of the divide, but they remain inadequate for providing a full understanding of their various information needs, uses, and information seeking strategies. A greater depth of understanding of these questions becomes increasingly necessary as advanced ICTs become more critical to people's lives and livelihoods. Analyses of the needs of users in domains such as "digital government," for example, has revealed serious geographic barriers in providing social services. Situations have been identified where people seeking particular types of social services are often required to travel large distances between various social service and health agency offices (Elmagarmid & Bouguettaya 1999). Such barriers could be eliminated through the proper application of information and communication technologies and availability of access points (e.g. computer terminals, telephones, ATMs, etc.), but their identification would have been indirect, at best, using current analytic approaches to digital divide studies.

The designs for most digital divide research instruments reflect a strong bias toward the researchers' relationships to ICTs, which is likely the overriding factor which has hindered greater understanding of information needs and uses within the digital divide. The phenomenon of observer bias has long been familiar to social science researchers. Communication research, in particular, has identified the dynamics of this type of bias with regard to research in information needs and uses. Dervin (1989) pointed out -- even before wide-spread use of the Internet -- that quantitative studies of information use are often based on traditional categories of questions developed from "the observer's perspective." These categories, according to Dervin, usually contain questions that have "market utility" in that they "reveal where to market" by treating the need for the existing technologies as implicit. They focus instead on the use of the functionality offered by them, and less on revealing specific life problems or situations that these technologies might address. These characteristics can be seen in the early proposals for Internet research models (Newhagen and Rafaeli 1996; December 1996) and in the studies that have subsequently appeared.

Most digital divide studies to date assume a consumer-oriented perspective when information is sought from subjects about specific activities performed on the Internet. Human desires -- to play games, play the stock market, or the undifferentiated activity of expressing one's feelings through e-mail, -- are often implicitly equated with and taken to represent the totality of human needs in the discourse around the digital divide. This happens, perhaps, because it is a perspective that is familiar or possible for the designers of these research projects. The designers of these studies, for example, are more likely -- as indicated by their own results -- to be users of such on-line services such as *Amazon.com* or *etrade.com*, or to use e-mail. Examples of this type of bias in these surveys are the categories of questions which are limited mostly to commercial activities on the Internet.

Only a few recent digital divide studies have begun seeking data about information uses which are non-commercial. The third study issued by the National Telecommunications and Information Administration (NTIA 2000), for example, contained categories of Internet usage dealing with on-line education; and a recent study by the Children's Partnerships (Lazarus and Mora 2000) was able to identify very specific content area needs and issues. These studies are discussed below, among others.

The categories of questions in the survey instruments for most of the digital divide studies discussed below overwhelmingly emphasize the collection of data pertaining to the ability of subjects to access the Internet and the level at which they are able to access it. The question about the need to access the Internet is usually implied and, therefore, not addressed in a detailed way. It is assumed that access to the Internet should be available for everyone due to various factors such as the possibility for social mobility and equal access to information and advanced means of communication (see McIver 2000 and Elmagarmid & McIver 2001, for example). This assumption is justifiable, but it is not sufficient for establishing a clear picture of information needs. Questions about why someone does not have Internet access, for example, are often designed to elicit only monolithic possibilities such as "costs too much" and "don't want it" (Lenhart 2000; NTIA 2000:26). It is critically important to go beyond such questions, for example, to understand subjects' perceptions of the cost of Internet service, the cost of service relative to other needs they have, and the potential for cost offsets that might be afforded to them if they had Internet access (e.g. the elimination of certain transportation costs). In understanding why Internet service is not wanted, more in-depth questions must be asked regarding perceptions of possible uses, material needs that a potential user has which might be met by having access, and, conversely, questions which might identify no objective need for Internet access.

Most of this research can be roughly categorized into two groups. One category of research is the set of quantitative studies which have focused on identifying predictors of access (or lack thereof) to the Internet. A second category of research -- which complements the first -- has examined ancillary policy and infrastructure issues using qualitative and phenomenological approaches. We present an overview of a number of studies in both of these categories.

1.1Quantitative Studies

A number of critically important studies exist in the first category. The most influential studies in this category are, perhaps, the *Falling Through the Net* surveys conducted by the National Telecommunication and Information Administration (NTIA 1995, 1998, 1999, 2000). These surveys were conducted in conjunction with the Census Bureau. Progressive modifications were made to the Census Bureau's Current Population Survey (CPS) over the course of the four studies. The CPS has historically been carried out three times a year and includes questions on telephone service, household income, race, age, educational attainment, household type and geographic region. Questions were added to the CPS at the request of the NTIA, including questions about computer ownership;

access, location of access, and reasons for using the Internet; reasons for discontinuing use, and geographic category. The surveys were gathered by the Census bureau through interviews of representatives of age 15 or older in 48,000. The sample households were selected from the 1990 Census. The sample covered all 50 states and the District of Columbia. Various cross-tabulations were made between survey information and variables of race, income, household type, educational attainment, region, and geographic category (NTIA 1999: xv). The NTIA studies have revealed significant gaps in access to the Internet existing along dimensions of race, income, and educational attainment. As a collection, they constitute the only major longitudinal quantitative study which has provided a view of trends in Internet usage and changes in the "digital divide" between demographic groups.

The Taubman Center for Public Policy and American Institutions at Brown University recently released the results of a detailed study of over 1800 state and federal Web sites in the United States: *Assessing E-Government: The Internet, Democracy, and Service Delivery by State and Federal Governments* (West 2000). This study focused on identifying the major functional shortcomings of Web-based digital government through a site-by-site examination of features and a survey of Web managers of those sites. According to their report, the areas that need to be improved include disability access, the use of security and privacy policies, foreign language translation, and consistency and standardization of Web site designs across government organizations.

The Gartner e-Market Intelligence Group has also performed a quantitative survey of the digital divide: *The Digital Divide and American Society* (Smolenski 2000). This survey uses data collected by their own polling organization. The emphasis of the Gartner study, like the NTIA studies, was on identifying predictors of access to the Internet. The variables selected for the survey have a high degree of overlap with the NTIA studies, but differ in the treatment of economic status. Whereas the NTIA surveys look at income and educational attainment as separate variables, the Gartner study defines an index for socioeconomic status based on economic class (e.g. Lower, Lower Middle, and Upper) and educational attainment. The Gartner study also differs from the NTIA surveys in that they examine attitudes towards technology by race, community type and socioeconomic status.

The Children's Partnerships performed a "strategic audit" of conditions on the Web. Their report -- *On-line Content For Low-Income and Underserved Americans* (Lazarus and Mora 2000) -- is unique in that it focuses primarily on Web content as an overlooked barrier within the digital divide and it does so from the perspective of youth. The report recognizes that Web content has a "profound impact on young people". Their study was conducted over nine months and involved group discussions with over 100 low-income Internet users, interviews with approximately 100 technology leaders in local communities and an analysis of 1000 Web sites, as well as a literature review.

The Pew Internet & American Life Project released the results of a study: *Who's not online: 57% of those without access say they do not plan to log on* (Lenhart 2000). This report contains the results of a survey of over 12,000 adults (age 18 or older). This study is unique in that it attempts to answer the questions of which citizens are planning to gain access to the Internet and which ones are not.

The UCLA Center for Communication Policy has issued a report of an ongoing study: *The UCLA Internet Report: Surveying the Digital Future Surveying the Digital Future* (UCLA 2000), which differentiates itself from others by comparing behaviors and perspectives of Internet users with non-users. The study also attempts to follow changes in technology (e.g. from telephone/modem Internet access to access via broadband/cable modem). The UCLA report presents the results of a four year effort at examining the impact of the Internet on American households and other areas of life impacting family members. Over 2,000 households have been surveyed, with plans to re-survey them annually.

Other important studies of the digital divide in this category include: Hoffman and Novak's early study of race as a factor in the digital divide of Internet access by race (1998); and the unscientific *WWW User Survey* series by the Georgia Institute of Technology Graphics Visualization and Usability Center (GVU 1994-1998).

1.2 Phenomenological and Policy Studies of the Digital Divide

The Benton Foundation in association with the National Urban League released the results of a mostly phenomenological study -- *Losing Ground Bit By Bit: Low-Income Communities in the Information Age* (Benton Foundation 1998) -- which was informed by statistics and policy reports from a wide variety of sources. The study characterizes the digital divide from a number of perspectives including an examination of the potentials for schools and libraries to provide access. This study is unique among others in that it examines social priorities impacting the digital divide, policy areas which must be addressed to bridge the divide, and a survey of programs which appear to be effective in increasing Internet access.

The RAND Corporation examined the issue of implementing universal e-mail service in the United States, the results of which were reported in the publication *Universal Access to E-mail: Feasibility and Societal Implications* (Anderson et al 1995). This study provides: a historical overview of universal service, mainly in the context of telephony; surveys uses and access points for e-mail users; an examination of the potential social advantages and disadvantages of universal e-mail service; and it provides an estimate of the economic impacts of such a service.

D'Elia and Rodger (2000) performed a study of adult library users and the relationships between their use of library and Internet services. Their report -- *The Impacts of the Internet on Public Library Use* -- shows that a high percentage of library users are Internet users (75%) and that those who use the library are also likely to use the Internet (60%). The study employed an extensive survey instrument designed to capture data from previously-defined "consumer market" segments (e.g. people who use the library and have access to the Internet and use it).

Other important policy studies include *The Digital Divide Confronts The Telecommunications Act of 1996* by the Consumers Union (Cooper and Kimmelman 1999); *E-Rate: Keeping the Promise to Connect Kids and Communities to the Future* by the Education and Library Networks Coalition (2000), an examination of the impacts of the E-Rate provision of the Telecommunications Act of 1996 [1]; and *Computers and Classrooms: The Status of Technology in U.S. Schools* by the Educational Testing Service (ETS 1997), a detailed analysis of pre-college student access and use of computing technology.

2. Starting Points for a Critical Theory Approach to Information Needs

Kling points out (2000:3) that social informatics research can take not only analytic and normative approaches, but also a critical one. The collection of studies surveyed in the previous section cover both the analytic and normative approaches. They are analytic in that they attempt to construct or support theories about the digital divide and they do so largely through quantitative means. Some of the studies are normative as well in that they make policy recommendations. Critical components to these studies are lacking or minimal, however.

A critical approach is a research paradigm in which the subjects' perspectives are central to the formation and conduct of research activities. This includes the identification of the units and means of analysis, as well as

1 The E-Rate provision requires telecommunications companies to provide schools and libraries access lines required for high speed Internet access at special discounts.

determining the points of focus within the units of analysis. Such approaches generally fall within the category of social science research methods known as critical theory, which evolved out of the well-known Frankfurt School (see Morrow 1994). Critical theory research generally examines first the social and historical contexts of a social setting and then begins to make inquiries from a moral standpoint. Researchers may then engage in any number of activities to answer questions, including examining documents and existing statistics to document patterns, making observations of people or social settings, and conducting surveys. The efforts of a critical theory research project are meant ultimately to affect social and political change in order to create more just social settings of its subjects.

The imperative for the new digital divide project is to improve our understanding of people's information needs and uses in the context of advanced ICTs, and, thereby, to inform the more effective design and deployment of these technologies so as to meet and facilitate those needs and uses. Existing research models developed in the fields of communication, information science and gender studies can be re-contextualized to ICTs to provide a foundation for a critical approach. We survey these below.

2.1 Information Use, Needs, and Information Seeking Strategies

Information needs and the way in which people use information has been studied extensively outside the context of the digital divide. Perspectives include studies of information poverty (Haywood 1995; Schiller 1996), *information use environments* (Agada 1999; Metoyer-Duran 1991), and *insider/outsider models* (Chatman 1996). The latter two perspectives provide research models which are of interest to a critical theory approach. Information use environment models examine information needs and uses by examining the contexts of the subjects (i.e. people or communities) who are seeking and using that information. Insider/outsider models examine information needs and uses from the perspective of the subject's position relative to sources of needed information. Some conceptualizations contained in these models overlap and facets of insider/outsider models have been used to explain phenomena revealed by information use environment-based studies.

An information use environment is defined by the facets of a social or physical context which impact access to and use of information by an individual or community (Agada 1999:74). Information use environment models assume that problem solving strategies and tactics of groups and individuals, supported by information gathering and use, are guided by characteristics of the group, including social norms, communication skills, perceptions of media, and motivation levels. Knowledge is classified into two levels, the first level being information that originates within the group. Second level knowledge is often considered suspect in marginalized communities (Agada: 75; Chatman 1996). Tactics used in the information use environments of marginalized communities, such as many African American communities, have been found to include risk avoidance, secrecy, and deception. It appears that these factors have not been incorporated into the digital divide studies we have surveyed.

Chatman has used insider/outsider models to explain these tactics. People within a group may believe that only members of their group can fully understand certain types of first level information. They may, therefore, feel at risk if such information is revealed, causing them to resort to secrecy and deception to avoid this perceived risk. Conversely, members of marginalized groups may also resort to such tactics based on second level information. Research by Chatman has shown that people within such groups may feel at greater risk than others, for example,

in sharing information about jobs and other opportunities learned from second level information. Research on the digital divide should employ insider/outsider models to examine the degree to which information technologies change the perceived need for risk avoidance, secrecy, and deception. These models might also be used to examine the extent to which people understand the privacy and deception capabilities and realities of these technologies. Not all people are aware, for example, that various levels of information about their Web accesses can be logged in various ways -- and usually are.

Research on information use environments has been used to study a number of types of communities; however, it has been only recently through the work of Agada that this approach has been applied to the study of a demographic group which suffers disproportionately from the digital divide -- the African American community. The use of this type of model is supported by results of studies on other minority communities which suggest that people in subcultures tailor information gathering strategies and tactics around the use of trusted intermediaries called gatekeepers, and that the life context or environment of a person is often a better predictor of information needs than socio-economic status (Agada 75). A similar but less comprehensive study of a low-income African American neighborhood in Texas was reported in 1997 (Spink et al 1997).

The intersection of the results from the most recent NTIA study and Agada's study suggest new questions around the role of cyber-technologies in gatekeeping functions. The demographics of gatekeepers in Agada's study, for example, were similar in income and educational attainment to those in the NTIA study for African Americans most likely to have access to the Internet, yet the Agada study showed that the Internet was infrequently chosen as a source of information. These result must be taken into account in the development of a more comprehensive critical theory model for understanding the digital divide.

2.2 Access to Information

Access to information has been studied on several levels, including the properties and characteristics of access, as well as the means and availability of access. Means and availability of access are linked to information usage skills, demographics, and geography. Properties and characteristics of access are centered around questions about the nature of information itself: its representation, communication processes used to convey it, and ways it is collected from one's surrounding environment. These questions have been examined at both conceptual (McReadie and Rice 1999a & b) and implementation levels (December 1996). The latter study focused specifically on Internet technologies. McCreadie and Rice have assembled from the literature a comprehensive, cross-disciplinary taxonomy of conceptual units of analysis for information access (1999a). Their taxonomy is organized along the following dimensions: conceptualizations of information, conceptualizations of access, facets of information seeking processes; and influences and constraints on access.

2.3 Conceptualizations of Information

Information can be conceptualized, according to McCreadie and Rice, as: commodities, data collected within some

environment, representations of knowledge, or as part of communications processes. Commodification of information presents a number of issues highly relevant to people lacking access the Internet. The costs to buy information and entry costs for the markets in which it is sold present potential barriers. Entry costs into information markets include outlays for hardware, software, and access lines (e.g. telephone or DSL), which the NTIA studies show to be a significant barrier. The valuation of information also presents a unique problem: its value is more uncertain than other goods until it can be used (or consumed). The cost of information -- in addition to being a potential financial barrier above that of access to information markets -- may, therefore, present a barrier to those less able to afford to take chances spending money on commodities when their usefulness is uncertain. Existing studies appear not to be sensitive to this possibility. The value of information to demographic groups on each side of the divide is vastly different.

Information as data in environment

Information as data in environment includes artifacts, natural phenomena and unintentional communications. Surveillance is a key means of capturing this type of data. The processing of unintentional communication through data collected from an environment (e.g. traffic, a class, or an e-mail program) can only be based on the observer's inferences, which are guided by their socialization, character and other social factors. The unique characteristics of different information and communication technologies must be studied in this context for its impacts on the digital divide. Digital government is an especially sensitive area in this context given some citizen's fears of government surveillance.

Information as representations of knowledge

Information when conceptualized as representations of knowledge is prevalent in the library and information science communities (McCreadie & Rice 1999b, p. 78). This conceptualization usually views formally printed (and recorded) publications and pointers to them as information. Models of information systems based on this conceptualization risk providing people with only a conduit of access to limited forms of information, eliminating sources of information outside of traditional publishing and library collection processes. Many communities value or privilege other forms of information such as oral history, for example. This model normally precludes the collection of these forms of information if they have not been captured through traditional publishing. The Smithsonian Folkways series is an example of the use of traditional institutional processes to capture oral information. The information as representations of knowledge model also has the potential to limit data formats and languages of information available to people. This can already be seen in the context of the World-Wide Web, where the content is overwhelmingly in English and the availability of fonts for non-latin languages is limited.

2.4 Conceptualizations of Access to Information

McCreadie and Rice conceptualize access to information variously as access to: knowledge, technology, communication streams, control, commodities, or participation.

Access to Knowledge

Access to information can be viewed as access to knowledge, which may be printed documents, electronic files, oral information, etc. Access from this perspective raises issues of information- withholding, rules for manipulation, and geographies of knowledge. Many citizens have long been of concern over issues of information-withholding. This has resulted in the Freedom of Information Act (FOIA) of 1966 and amendments to it in 1974, 1986, and 1996. The most recent amendments pertain specifically to electronic information, requiring that government agencies implement means to respond to FOIA requests by providing electronic documents (United States Public Law 104-231). However, other efforts exist to provide Web-based information to the public from the Securities and Exchange Commission, the Federal Elections Commission and other entities (Taub 1997), but these efforts are not directed at basic access. Organizations such as Common Cause and FECInfo are concerned about presentation of raw information obtained from these agencies in formats that will be useful to most people. These efforts are related to the conceptualization of access to information as access to communication or content. This perspective raises issues of retention, comprehension, and format which must be studied in the context of the digital divide.

Rules, or lack thereof, for manipulating information maintained by organizations has also been a major source of conflict. Access to knowledge may result in access to distorted or incorrect information; and depending on the rules, access to knowledge may not afford the referent the ability to correct this information. One commonly cited example is in credit reporting. People have historically had difficulty in determining the content of their reports and in having them corrected. The Fair Credit Reporting Act of 1970 has been amended in recent years with the goal of providing reasonable rules of access and manipulation of one's credit information (United States Congress 1999). Other areas afford less protection, however. Many debates have taken place in recent years around rules for disseminating personal information collected from the Internet. The third NTIA study attempted to gauge the privacy concerns of Internet users and found a diversity of concerns regarding privacy (NTIA 1999: chart II-58). Lack of concern about security and privacy in the use of information and communication technologies may derive in part from a lack of technical knowledge about potential risks, but other social and cultural factors must be examined.

Access to knowledge may also require access to the geography in which that information exists. Such geographies include work environments, libraries, and schools where access points likely exist (e.g. computers).

Access to Technology

Access to information has most often been viewed as access to technology, as discussed above. This perspective raises issues of cost and expertise to obtain and operate the technology. Access to technology is a necessary but insufficient requirement for using Internet-based information. This perspective says nothing about other requirements for the exchange and use of information, such as control of a medium, comprehension of content, and the costs of content.

Access to Control and Participation

Access to information can be viewed as access to control of content formation and participation in the exchange and use of that content. Political and economic systems influence access to control. Studies of this perspective of access to information have taken place in journalism (Bagdikian 1997) and communication (McChesney 1995, 1996), among other areas. Impacts on marginalized communities in this context have been discussed most frequently in the context of broadcast and telecommunications, where public policy has attempted to address minority ownership of these media (Kennard 1998). The scales of economy of Web technology put control of content formation and delivery across a mass medium in the reach of the average person for the first time.

Access to Participation

Access to information may also be viewed as access to participation. This includes the ability to advocate, debate and interpret information. This perspective is often used in discussions of political democracy. Democracy requires an informed citizenry, which can be achieved in part through access to information generated by participatory processes. This perspective raises issues of availability of points of access, procedures, privacy, and insider/outsider status with respect to the processes or bodies in which participation is relevant[2].

2.5 Influences and Constraints on Access

Influences and constraints on access to information include physical, cognitive, affective, economic, social, and political factors (McCreadie & Rice 1999a: 61-71).

Physical constraints

Physical constraints include geography, demographics, and environment. Constraints related to physical environments were information technologies are usually understood in terms of the ergonomics of work and accessibility of information technology for people with disabilities. Economically disadvantaged communities (i.e. those most likely to lack access to the Internet) are disproportionately impacted by disability issues in general. It is reasonable to assume this is the case for information technology as well. Approximately 1 in 12 Americans between the ages of 16 and 64 (working age) are classified as disabled under the Americans with Disabilities Act (Bowe 1990). The impacts of these types of constraints on the citizen-government digital divide must be examined.

Cognitive constraints

2 For example, a voting stockholder of a telecommunications company would be an insider with respect to participating in decisions about the deployment of services.

Cognitive constraints on access to information include comprehension, awareness, literacy, competency, and satisfaction. Affective constraints include attitudes, confidence, and comfort in accessing information. These influences and constraints have been examined in the context of models of information use environments discussed above.

Economic constraints and influences

Economic constraints and influences on access to information are related not just to cost, but perceptions of value of the information being sought. Valuations of information, as discussed above, are difficult because the commodity to be consumed often has unknown content and usefulness (e.g. tomorrow's newspaper or investment report), but they also depend on beliefs about whether access to useful information is possible (McCreadie & Rice 1999a: 68).

Social influences and constraints

Social influences and constraints on access to information include cultural norms, class, background, and social networks. Central to social influences on access is that certain groups or organizations may claim privileged access to sources of information (Chatman 1996:194-195). They may have power to establish and control the discourse around the formation, access and dissemination of information coming from those sources. Their position of privilege may also influence technological development related to information sources.

A key example of claims to privileged access to information is the culture of software and hardware development around the Unix operating system and networking technologies that lead to the formation of the Internet (Raymond 2000). These developments have taken place within a social network of individuals around the world that developed its own etiquette, processes, discipline, and lingo to perform this work. The Unix/Internet culture has arguably both aided and hindered average individuals' access to cyberspace. On one side, early Internet culture (i.e. 1969 - 1994) contained overwhelmingly libertarian and communal attitudes toward the collective and collaborative development of technologies and the standards upon which they are based, and toward the sharing of technologies and information. One the other side Internet culture is also known for its arrogant attitudes about competence and knowledge of etiquette, creating an insider/outsider dynamic as discussed above.

The results of these aspects of Internet culture can be seen in the development of the public domain *Linux* operating system as a major rival to the Microsoft Windows operating system. Linux is at the same time free and difficult for the average computer user to learn and install. Social norms held by the Microsoft user community dictate different attitudes about usability, trusted software sources (e.g. public vs. corporate developers), and willingness to pay for costly software. The results in the case of Microsoft have arguably resulted in the development and reinforcement of an alternate set of social influences and constraints on access to information -- via the Microsoft software platform -- to that of the Unix/Internet social network.

Social influences on access to information might be seen, in part, as having potential impacts on groups of people

who lack access to the Internet in terms of the economic and usability impacts resulting from the ways in which social networks such as the Unix/Internet community develop technology and make it available. Some may yield economic and usability hindrances or barriers to information access as a result of technical design choices and attitudes of the developers towards participation and education of outsiders.

2.6 Gender

It is well-understood, as Jansen (1989: 196) states it, that "technological designs are also social designs" (see also Muller et al 1997). The social designs in information technologies and processes used to achieve them reflect society's gender biases -- among others. Design processes which do not take gender issues into account because of such biases run the risk of producing information technologies and services which do not adequately address women's needs. Further compounding the resulting problems of design processes which do not adequately address issues of gender may be the required use of resulting technologies, either by employers, legal mandate or social norms. Gendered industrial impacts of information technology are mostly related to gendering of skills. Skills are largely gendered. This has been the case in sectors where information technologies are used intensively (Jansen 1996:198; Greenbaum 1995: 38-42). Problems of deskilling and, conversely, the need to "upskill" then arise when information technologies are introduced or changed. Women and minorities have historically been at the greatest risk in this context (Greenbaum 1995: 87-90). Jansen notes that while there is a plethora of research on many aspects of information technology's impacts on society, including economics, efficiency, and work, studies of gender questions in this area are rare (1989:196). The NTIA studies reveal significant gaps in access to information technologies along dimensions of gender. Extended studies of gender should, therefore, be a major focus for our expanded research on the digital divide.

3. Conclusions

This paper motivated the need for the integration of a critical theory approach to digital divide studies. The major emphasis within the digital divide project of the past few years has been on analytic and normative studies. These studies have been critically important to informing our understanding of this issue; however, these studies have been incomplete as a whole in that they give too little attention to the varied perspectives of their subjects. Many of these studies have assumed that their subjects' actual information needs and uses fall within a narrow selection of categories, usually dominated by commercial activities such as on-line shopping or job-related tasks. Such activities are more likely to be known and undertaken by elite groups and may not have high priority for economically and social marginalized communities. Studies in these areas outside the context of the digital divide have shown that needs, uses and attitudes toward information and information technologies are highly subject to priorities around basic human needs such as employment, shelter, education and health care. These are categories which have been largely ignored by many of the digital divide studies surveyed in this paper. A critical theory approach to digital divide studies -- which priviledges the perspectives of the subjects -- is necessary for deducing

the specific natures of such needs and priorities. This paper surveyed selected areas research within communication and information which can be called upon to build a new digital divide project. These include the areas of: information needs and uses; conceptualizations of information and access to information; and gender studies of technology.

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