Universal Access

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Introduction

All review essays brim with information. Whenever we attempted to devise a coherent framework to organize this information, we found that we left out sizeable portions of the universal access literature. On the other hand, our efforts to exhaustively cover the entire literature generated an organizational structure at such a high level of generality that it lost its analytical edge. The root of these problems lies in the peculiar nature of the literature on universal access. It is sprawling and diffused across many different domains. Everybody seems to have something to say about universal access while there is little common understanding of core concepts and issues. Furthermore, the loosely defined concept has been applied to a wide range of domains ranging from primary education to the rights of the peoples with disabilities. In effect, we found ourselves dealing with an intellectual terrain that would not fit into typological boxes.

The breadth and diversity of the literature are mirrored in the conceptual ambiguity surrounding universal service itself. As various times in its history, universal service has been interpreted to mean an interconnected telecommunications network, universal geographical coverage; subsidized access to telecommunications services and information and communication technologies (ICTs), access for communities with specialized needs, such as the disabled; and so on. In the various literatures that we reviewed, this conceptual ambiguity continues to be in evidence—universal service is shorthand for a variety of socio-economic objectives underlying telecommunications
policy open to selective interpretation based on the ideological proclivities and policy goals of the interest group professing the viewpoint.

A critical review essay therefore has to begin by clarifying the universal service concept itself. We do so by examining the egalitarian impulse at the heart of universalism—the idea that some services need to be accessible to all citizens in a democracy. This egalitarian impulse was concretized into the universal service concept through our historical experiences with four original precedent setting systems—universal postal service, universal education, universal telephone service, and broadcasting. On the basis of this review of precedent setting systems, we uncover a set of core principles about what universal service represents or should represent.

After examining how scholars have conceptualized the universal service principle, we turn to a critical review of a number of policy discourses where universal service currently plays a role. It has been observed that when new socio-technical systems emerge, repeated calls are soon made to extend the universal service concept to new technologies and services (Dordick, 1991; Gillan, 1986; Hadden1991a, 1991b; Information Infrastructure Task Force, 1993; National Telecommunications and Information Administration [NTIA], 1988, 1991; O’Connor, 1991; Office of Technology Assessment [OTA], 1990; Pacific Bell, 1988; Parker, et al, 1989; Williams, 1991; Williams & Hadden, 1991). We review the universal access literatures in the following domains: minorities, people with disabilities, digital libraries, and rural broadband to understand how the universal service concept came to be applied to these domains, and the specific ways in which universal service ideals influenced these policy discourses.
We will conclude by identifying certain broad generalizations about the processes that extend universal service to new socio-technical systems.

Our discussions in this review essay are more or less limited to policy discourses in the United States. This is not to minimize the contributions of other jurisdictions, in Europe and elsewhere, to the universal service debate. For example, the “public service” tradition in British broadcasting and telecommunications influenced developments in many other countries, including the U.S. The public service concept showed clear evidence of the universalist impulse, interpreted to mean the obligation of state-funded, monopoly communication systems to provide fair and equitable service to all individuals, communities and social groups. However, a discussion of the public service model implicates alternative political, social and economic traditions that would considerably expand the scope of this review essay. Moreover, the public service tradition itself is giving way to systems more closely patterned on those in the United States, as broadcasting and telecommunications are deregulated, privatized and made competitive. We therefore made a deliberate choice to restrict coverage of our review to the U.S. situation, fully aware that it would limit the value of this contribution to an extent.

**Precedents**

The concept of universal service as we recognize it today seems to embody some of our most deeply held beliefs about justice and fairness, equal opportunity, individual empowerment, and ultimately the fundamental equality of all human beings. In fact, “equalitarianism” has deep roots in human nature (Lipson, 1993; Scanlon, 2000). In Western thought, the origins of “equalitarian” thinking are shrouded in antiquity—in the philosophy of the Stoics, Roman law (the *jus gentii*, or law of the peoples), and the Christian gospel (Lipson, 1993). Scanlon (2000) identifies some of the most common reasons why inequality feels intolerable to us. First, inequality denies basic rights to
people: for example, extreme poverty can deprive individuals of the means of sustaining life. Second, even if inequality does not consign some people to extreme poverty, it may lead to otherwise just institutions to treat some people differently: for example, by denying some people the right to obtain legal redress. Third, inequality may limit individual potential by leading some people to feel inferior – the shame and humiliation of being unable to afford something that everyone has. Finally, inequality may lead to unfair differences in “starting places” in life – the last-named rationale being the basis of John Rawls’s influential *Theory of Justice* as well (Rawls, 1971). Though not all of these arguments for equality do not have an identical hold on our conscience—the deprivation of extreme poverty seems much more unconscionable than the shame of being unable to afford something—they collectively make a strong case for equality.

In spite of such august antecedents, the idea of human equality has also faced tremendous challenges. Influential thinkers, ranging from Plato, Hegel, Carlyle and Nietzsche have argued that some individuals, classes, or races, through superior natural endowments, temperament or training are better suited to the task of governance, and should therefore be anointed in positions of power and influence: philosopher kings, hereditary nobles, and master races are all instances of these assertions of privilege and inequality (Lipson, 1993). However privilege, hereditary or otherwise, today stands discredited as an organizing principle of social and political life. The last few centuries have seen the gradual, though slow and heavily contested, establishment of the fundamental social and political equality of all human beings. Universal service is an example of a policy arena where the triumph of the equalitarian ideal is especially evident.
To examine how abstract socio-cultural ideals can influence the making of policy, we observe the historical development of a set of precedent-setting “proto-systems” in which the principles of universal service as we know it today evolved. There is perhaps an element of judgment in our identification of precedent setting proto-systems. But the consideration set is so small that any divergence in opinion is likely to be limited to the addition or subtraction of a single system. We identify the precedent setting proto-systems to be universal postal service, universal education, universal telephone service, and broadcasting. The postal service, the first universal system, is especially important because it set the stage for subsequent debates about universal provision of other technologies and services. Universal education, on the other hand, in spite of much celebration of the ideal it represents, was in reality a product of a long and contested incremental process. Universal telephone service and broadcasting, the more recent systems, provide the more immediate conceptual foils for newer systems. The former has been the source of much of the vocabulary in the universal access discourse and the later of the “public interest, convenience or necessity” standard. In the following discussion on the development of each of these precedent setting systems, we will examine the values and ideas that shaped their development in the United States. In each instance we demonstrate how universal access principles developed through heavily contested and incremental processes.

*Universal Postal Service*

While the U.S. Constitution gave the Congress the right to “to establish the Post Offices and Post Roads,” preoccupation with other pressing matters prevented the Congress from legislating on postal issues. The 1790 and 1791 Acts extended the rules and practices developed during the colonial and revolutionary eras on a temporary basis
(Kielbowicz, 1989). It was the Post Office Act of 1792 that set the stage for the future development of the postal system. In fact, the debates that took place then and the compromises that were forged set the contours of all the subsequent debates about universal provision of other technologies and services.

From the very beginning, the development of newspapers was intertwined with that of the postal system. Newspapers constituted a great bulk of the post office traffic—70% in 1794 and rising to 90% in 1832 (McChesney, 2004). Yet they contributed less than 10% of the total revenue (Kielbowicz 1989). Their postage was heavily subsidized with revenues from regular mail: according to one estimate, in 1765, a letter carried postage about 46 times that of a newspaper (Kielbowicz, 1989).

In spite of objections from some quarters, there was wide consensus that newspapers should continue to receive postal subsidies. The question was whether or not only certain newspapers should be allowed into the mail. Since it was problematic for a democratic government to decide which newspapers should be allowed, Congress decided to allow all newspapers; in essence an open access policy was adopted. The real issue of contention was whether a flat rate should be used or should the rates be graduated by distance. The representatives from the big cities and those who wanted to maximize the flow of information tended to favor a flat rate. On the other hand, the advocates of distance sensitive rates sought to protect small town and rural papers. They were concerned that with a flat rate metropolitan newspapers will overwhelm those in the hinterland (John, 1995; Kielbowicz, 1989). The final legislation was based on a compromise. It created two zones for determining postage for newspaper delivery. The rate for delivery within 100 miles was set at 1 cent and for greater distances 1.5 cents.
Interestingly, from our standpoint, some even argued that this modest delivery fee would allow only the “rich and better sort” to participate in the body politic as the poor would be unable to afford newspapers (Kielbowicz, 1989).

More fundamentally, the 1792 Act represented a fundamental shift in mindset. Since the fifteen-century, when the Hapsburg emperor granted a postal monopoly to the Taxis family, the European monarchs had been using the post as a source of revenue (Noam, 1992). William Blackstone, author of influential Commentaries on the Law of England (1765), characterized the postal service as “most eligible method . . . of raising money” (quoted in John 1995, p. 26). For the first time in modern history, the 1792 Act sought to plough back earnings into the expansion of the postal system. This project inadvertently got a major boast with the transfer of the power to designate postal routes from the executive branch to the Congress.\(^2\) Members of Congress started asking for the expansion of the system into their districts and the pre-1792 Act logic that each route should be self-supporting no longer held sway: by 1840, the flow of subsidies from New England and the mid-Atlantic states to the South Atlantic, the Northwest and the Southwest was well established (John, 1995). Though local politicians in the North and East often grumbled about the need to subsidize routes in the interior, they were not able to stop the growth of cross-subsidies. The higher prices that resulted from cross-subsidies motivated the rise of private carriers who could undercut the post office rates. In spite of repeated calls for banning private carriers, Congress, unlike the European governments, refused to ban them outright. But in the North and the East, areas generating surpluses that made subsidies possible, the post office, with congressional support, cracked down on private carriers, mainly via court orders.
The history of the postal system witnessed the growth of many of the policy innovations that were later to become part of universal service: cross-subsidies, geographic rate averaging, open access and the metropole vs. hinterland conflict. These developments were a product of a potent combination of politics and idealism. The idealism was very real at the time of the birth of the new republic. For example, the routine publication of congressional proceedings to create a well-informed citizenry was unheard of in earlier times. In the same vein many proponents of the postal expansion saw it as something essential for a democratic polity. Ironically, some of the proponents had a paternalistic attitude in the sense that they sought to educate the masses. Others, on the other hand, saw an informed citizenry as an essential check on the government. Finally, there were those, including George Washington, who saw the flow of information essential for binding the nation together.

Universal Education

Today the United States has a well-established system of education across the continental expanse of the country. While there are notable variations in 14,000 school districts in the 50 states, the overall pattern is fairly consistent. It would seem that this system was a product of a grand design. But nothing would be further from the truth.

One could say that the idea of universal education has always been around at least since the American Revolution. George Washington, in his first message to Congress, stressed the importance of education. Many plans for a “system” of education were put forward including those by Thomas Jefferson, Benjamin Rush and Noah Webster. The
American Philosophical Society even organized a contest for plans for an education system (Cremin 1980, Madsen 1974). Thus there was no dearth of ideas.\(^4\)

But no concerted effort was launched to make universal education a reality. There was a failure to “translate sentiments into appropriations” (Ditzion 1947, p. 10). This failure of will was especially evident in Indiana, the first state to specifically mention provision of education on a universal basis in its constitution. In 1816 the state constitution directed its lawmakers to establish an educational system that would be “free and open to all.” At the same time, it asked the lawmakers to delay the undertaking “until circumstances will permit” (Myer 1965, p. 387). This qualifying clause provided a convenient loophole for less determined spirits, and the idealistic enterprise was put off for many years.

However, as before the revolution, the education institutions continued to evolve incrementally. A great variety of institution types popped up across the country. For the ordinary citizens there were dame schools, parochial schools, old field schools, and district schools, which prepared children to become tradesmen or clerks.\(^5\) In the cities, there were venture schools and private schools that imparted practical skills like accounting and bookkeeping. Finally, there were the preparatory schools and Latin grammar schools, which prepared future scholars, doctors, clergymen, and lawyers for college (Sawhney & Jayakar 1999). These schools were supported by “nearly every money-raising scheme known to man” including lotteries, fines for public drunkenness, rate bills (tuition), license fees, and sale of war booty (Madsen 1974, p. 88).

The concerted effort towards a “system” of education finally began in 1830s. As Katz (1968) points out, education reform in the mid-nineteenth century was not
motivated solely by “a potpourri of democracy, rationalism and humanitarianism” (cited in Button & Provenzo, 1989, p. 94). While idealism certainly motivated some individuals to support public education, others had more practical motives. Industrialists, for example, wanted trained manpower for their expanding factories. Others saw the schools as a way of coping with the widespread social dislocations of the time, brought on by increasing immigration and industrialization. A tax-supported public school would be the "principle digestive organ of the body politic" that would Americanize the newcomers (Strong, 1963, p. 89). The propertied elites were apprehensive of the consequences of universal suffrage, which had become a reality during the Jacksonian era. Scared of the "mob rule," they thought that "education could play an important role in reconciling freedom and order," that is, teach the masses to conform to the existing system and not destabilize it (Kaestle, 1983, p. 5). The convergence of these forces allowed people like Horace Mann, the idealistic champion of education who served as Secretary of the Massachusetts Board of Education, to build a coalition of religious, business, and other groups in support of universal education.

With greater public interest, the government’s role too began to change. Earlier the government basically provided support for education via grants of land, special tax provisions, and other such assistance. Now, the government got into the business of building a system of education (Madsen 1974, p. 86). We start seeing this system thinking in the very first annual report Horace Mann wrote as the Secretary of the Massachusetts Board of Education in 1838, where he highlights the disparities in school quality and funding resulting from different districts making uncoordinated choices: “One party pays an adequate price, but has a poor school; the other has a good school, but at more than
four-fold cost. Were their funds and their interest combined, the poorer school might be as good as the best; and the dearest almost as low as the cheapest” (Mann, 1938, p. 48). In today’s parlance Mann was talking about what is referred to as rate averaging and bypass in telecommunications and postal arenas.

This move towards systemization was resisted by those who felt that the state should not intrude in a domain that has traditionally been under the control of parents, church, and local authorities (Madsen 1974). The different religious and ethnic groups, keen on preserving their cultures, were wary of the homogenizing impact of an organized system of education, which interestingly was seen as a nationalistic goal of universal education even at the time of independence. The principle of the state’s authority over education, which is even today an issue with many Americans, had to become a settled question in law for a system of universal education to develop (Power, 1991).

The system of universal education was not created by a single legislative act or executive fiat. It instead developed via a process of incremental local innovations in particular locales and then their diffusion to other school districts and states (Sawhney & Jayakar 1999). Yet, interestingly, while there is considerable variation in institutional arrangements from one jurisdiction to another, there is a certain coherence at the level of ideas which can be characterized as “public provision by small fiscally independent districts, public funding, secular control, gender neutrality, open access and a forgiving system, and an academic curriculum” (Goldin & Katz 2003, p.1). Thus we see that a few core ideas took different shapes in different locales creating diversity of form and while maintaining a coherence of principles, a hallmark of the American experience.
Universal Telephone Service

The Bell telephone company introduced the telephone in the U.S. as a monopoly provider as it had exclusive rights over the early telephone patents. When the Bell patents expired in 1894, a number of competing telephone companies (the independents) entered the market. Bell refused to interconnect with the new entrants, with the result that the entire subscriber universe in the U.S. was fragmented into several non-interconnected networks (Brock, 1981; Friedlander, 1995; Department of Commerce, 1975). Vail’s 1907 call for ‘one system, one policy, universal service’ was a reaction to this chaotic situation and aimed at integrating the fragmented subscriber universe. His vision did not include making telephone service accessible to all consumers as evident by the fact that he disdained to serve rural areas (Fischer, 1992; Friedlander, 1995; Gabel, 1969).

In order to secure full access to the subscriber universe, the Bell System wanted the government to permit it to acquire competing telephone companies in contravention of anti-trust laws. Not only that, the Bell System wanted the federal government to take an activist approach—a conscious, publicly mediated policy decision to ‘unify the service’ “that is, to eliminate the user fragmentation created by dual service” (Mueller, 1997, p. 9). The government’s response to Bell’s acquisition campaign oscillated between opposition and acceptance. Initially non-committal, the government soon became opposed to acquisitions and got Bell to make the Kingsbury Commitment of 1913 whereby it agreed to stop acquiring directly competing independent telephone companies (Barnett & Carroll, 1993). Significant market share thus remained with the independents until 1921, when the Willis-Graham Act again permitted the Bell System to acquire non-affiliated companies. Eventually, the percentage of subscribers belonging to systems not
interconnecting with the Bell System fell to less than 1% by 1926 and the U.S. telephone system was converted into a *de facto* monopoly (Department of Commerce, 1975).

Though there was no explicit commitment to universal service in the 1934 Communications Act, the accounting system put in place by the policy initiatives and court judgments of that era indirectly helped universal service. Even in the 1920s, there had been growing debate about how to allocate the costs of the local exchange. State regulators who had an interest in keeping local rate increases in check, argued for the station-to-station method, which allocated parts of the local exchange costs to long distance service because the local loop was used for completing any telephone call. On the other hand the Bell System, later joined by the Federal Communications Commission (FCC), supported the board-to-board system that would raise all local loop costs from subscriptions. U.S. Supreme Court decisions in 1930 and 1933 supported the station-to-station principle. Nevertheless, the conflict persisted until the National Association of Regulatory Utility Commissioners (NARUC) and the FCC jointly produced the Separations Manual in 1947 (Mueller, 1997). Beginning in 1965, regulators began to use the separations process to gradually increase the cross-subsidies from long-distance to local service, aided no doubt by the substantial cost savings then being realized through the introduction of new technologies in interstate transmission. Thus the elaborate system of cross-subsidies and rate averaging that is now recognized as ‘classical' universal service began to emerge. But it neither sprang forth from deliberate regulatory design, nor at a specific point in time. Instead, it evolved over a substantial period through a heavily contested political-legal-regulatory process in which the Bell System, state level regulators, the FCC, advocacy groups, and the courts played prominent roles.

As Oettinger points out, the vision for universal service was reified after the ‘objective’ was accomplished (cited in National Governors' Association, 1988). The need to justify a monopoly provided the initial impetus for universal service; and the
possibility of internal cross-subsidies within an integrated system provided the means. But the Bell System became acutely mindful of the universal service mission only when competition and antitrust lawsuits threatened to unravel its monopoly. Now, universal service became a useful defense for the preservation of the status quo. Aided by Bell sympathizers and even some consumer advocates worried about the implications of competition for affordable access, universal service came to acquire a long historic pedigree stretching right back to Vail’s original 1907 declaration, which vastly exaggerated its historical precedence.

**Broadcasting**

When the Congress started working on the legislation for broadcasting in mid-1920s, it was faced with a fundamental choice. It could choose a system of a few high-powered stations that covered the country in large stretches or a large number of lower-power stations that covered the country in small patches. The high-powered stations would be able to generate both the resources and the economies of scale necessary to produce high-quality programming. But they would not provide an outlet for local voices, especially in rural areas and small towns. Conversely, lower-power stations would allow for diversity of viewpoints but would not have that many resources. The Congress left licensing decisions to the Federal Radio Commission (FRC) but it did direct the commission to allocate licenses and frequencies “among the different States and communities as to give fair, efficient, and equitable radio service to each of the same” (quoted in Kielbowicz, 2002, p. 12). The Congress also divided the country into 5 zones and stipulated that one commissioner should be selected from each zone.
Unhappy with the FRC’s decisions favoring large companies with high-powered stations, Congress passed the Davis amendment in 1928, which compelled the commission to reallocate licenses equitably among the five zones and that resulted in more licenses for the West and South. However, the Congress repealed the zone system in 1936 because it found that sparsely populated areas could not sustain the number of stations they were being assigned. But even the new legislation continued to call for a “fair, efficient, and equitable distribution of radio service” among communities, albeit “insofar as there is demand” (quoted in Kielbowicz, 2002, p. 12). This doctrine came to be known as localism (Kielbowicz, 2002).

The other big question the commission faced was with regard to the ownership of spectrum. The 1927 Radio Act and the 1934 Communications Act deemed that the broadcast spectrum was a resource in the public domain that broadcasters could use, but not own. However, there were no guidelines or precedents for establishing how the spectrum should be allocated to the users. One of the tasks of the new FRC (and later the FCC) after it was created was to define the standards of conduct for a broadcast licensee. The commission developed the notion of trusteeship. Trusteeship regards the spectrum as a public resource that is entrusted to the licensee to be used for the public good. Taken together, the two concepts formed the “localism and trusteeship” framework (Messere, 2003). Basically, the framework states that the licensee shall act as a trustee of a public resource, the spectrum, who is obligated to serve all programming interests in the local audience and to provide coverage of all local public issues.

The localism and trusteeship framework in turn was based on language in the 1927 Radio Act that mandated the FRC to allocate spectrum on the basis of which
“prospective broadcaster best served the ‘public interest, convenience or necessity’” (McChesney, 1993, p. 18). The FRC explained this public trust model as follows:

[Despite the fact that] the conscience and judgment of a station's management are necessarily personal...the station itself must be operated as if owned by the public... It is as if people of a community should own a station and turn it over to the best man in sight with this injunction: "Manage this station in our interest...." The standing of every station is determined by that conception (quoted in Krasnow & Goodman, 1998, p. 610).

Interestingly, the phrase “public interest, convenience and necessity,” which has its origins in transportation and public utility law, itself provides an insight into the processes by which policy concepts move from one domain to another. According to Krasnow and Goodman (1998), the framers of the 1927 Radio Act were at an impasse about how to describe the obligations of the licensees under the Radio Act, that would sound concrete enough to stand for something definite in the public mind while being flexible enough to encompass all possible uses to which the technology may be put in the future. A young lawyer on loan from the Interstate Commerce Commission suggested to Senator Clarence Dill that “public interest, convenience and necessity” might be the standard and it stuck (Krasnow & Goodman, 1998) even though broadcasting is so different from transportation systems and public utilities. The vagueness or malleability of the concept allowed for this transfer from older systems to the new one and also gave the regulators considerable latitude to develop regulations for the evolving technology.

Localism, trusteeship, and the public interest, convenience and necessity standard created a fairly articulate framework for regulating broadcasting. But its effectiveness is debatable. The emergence of broadcast networks led to concentration of programming power and the ideal of localism was never fully realized.
Each precedent setting system discussed in this section is different in terms of the technological artifacts and human resources it deploys and the type of service it provides. Yet they are kindred systems as their development was animated not only by the quests for profit and market share but also by similar ideas and values—our notions of democracy and equity. Furthermore, they all required the creation of systems for the provision of service, and the redistribution of large amounts of monies in service of these ideas. Any situation that calls for some people to pay more so that others can pay less generates its own peculiar politics even when the exercise is towards widely embraced ideals. It is the reconciliation of the ideals, which cannot be avoided in a proud democracy, and the ground realities of taxes and subsidies, influence and power, and other such prosaic considerations that determine the architecture of these systems.

Through comparing our experiences with the precedent setting systems, some of the common elements of the universal service discourse in these diverse domains emerge. First, there seems to be a consensus in favor of greater information flow and ‘informatization’ of all aspects of public and private life. Second, there is a belief that universal service cannot be provided without an organized systemic framework. The prevailing notion in every case seems to be that the normal processes of diffusion need to be aided and impelled toward universal coverage. Third, there is a concern that the organized systemic frameworks should not let the metropole dominate the hinterland. Fourth, there is a consciousness that government actions invariably favor one faction, group or service provider over another, and a constant jockeying for position. This makes universal access not just a policy exercise, but a political process as well. Finally, in consonance with the “equalitarian” origins of universal service, there is a tendency to
promote uniformity in access across regions and social strata. We will critically examine
these unquestioned assumptions of the universal access discourse in the last section.

**Diverse Literatures**

With the historical background to universal service laid out in the previous
section, we now turn to contemporary debates on universal service. In this section, we
review the universal access literature in the following domains: minorities, people with
disabilities, e-government, digital libraries, the E-Rate program, rural broadband, and
community networks. In these reviews, our main objective is to observe how ideas about
universal access have informed and influenced the discourses in these domains. We of
course have not covered every domain of policy-making where universal service is an
issue, and not even all aspects of universal service within the domains that we do cover.
For example, our review of disabilities literature only touches on issues related to the
elderly. Similarly, we cover issues related to education to a considerable extent in our
review of the literature on the E-Rate program, but this federal initiative is only one of
several that promote access to educational technology. The same would be the case of
rural broadband with respect to the overall rural telecommunications literature. Also, as
mentioned in the introduction, our review is by and large limited to the U.S., except for
cases where developments in other countries set important precedents. In spite of these
limitations, we believe we have covered vast territory that more or less tells the complete
universal access story. We move through the reviews in the order listed above.
**Minority access**

One of the enduring problems in the universal service and digital divide debates has been minority access to telecommunications and ICTs. While a number of studies have found evidence for this gap in contemporary data (NTIA, 1995, 2000; Riordan, 2002; Walsh et al., 2001), others have suggested that this gap has persisted with regard to use of some technologies over long periods of time—telephones, computers and now the Internet—while narrowing and disappearing in others, for example radio and television (Schement & Forbes, 2000). However, in spite of the persistent and significant gap in some technologies, the issue of minority access did not attract much attention historically, since it was considered a part of the overall universal service problem. It was the break-up of AT&T and increasing concern about the survivability of universal service in the new competitive environment that drew attention to the problem of access, and to the issue of minority access as well. This section discusses the empirical evidence of the ethnic digital divide, some of the theories advanced to explain the data, and some of the proposed policy solutions.

Though agencies such as the FCC and the census bureau have collected data on household telephone access, a study of subscribership that includes race as a factor is harder to find. The earliest studies of this nature date to the mid-1980s, around the time of the AT&T divestiture (Gilbert, 1987; Perl, 1983). Another early study of classroom computer use found that schools receiving Chapter I assistance (i.e., those serving districts with higher incidence of poverty, which are also more likely to have higher percentages of minority students) had fewer computers in the classroom (McPhail, 1985). These schools were also more likely to use “drill-and-practice” software while higher
income schools emphasized programming skills. Later surveys have confirmed these findings for telecommunications and computers at home (Lenhart et al., 2003; NTIA, 1995, 2000), and in the classroom (DOE, 2000; NCES, 2002)

In general, scholars have relied on factors other than race to explain the difference in penetration between majority and minority communities. According to these studies, much of the difference in access is due to differences in household income, education, and professional status rather than race (Garbacz & Thompson Jr., 1997, 2003; Taylor, 1994). Other studies have included the impact of race as a factor in determining telecommunications demand (Lenhart et al., 2003; Riordan, 2002; Schement, 1995; Schement & Forbes, 2000; Walsh et al., 2001). In these studies, race and ethnicity emerge as factors explaining both the decision to subscribe to telecommunication service as well as the level of usage, to a high enough degree to lead some to label the Internet the “world white web” (see chap. 4, pp. 95-120 Bolt & Crawford, 2000). However, not all minority communities are confronted with a digital divide—Asian-American and some Hispanic American communities lead even the majority in access to computers and the Internet (Walsh et al., 2001). “(A) digital divide exists, but not all minorities show up on the wrong side of it” (p. 279)

Though the evidence that an ethnic digital divide exists is substantial especially with regard to African-Americans, explanations for the phenomena are less forthcoming. As Riordan (2002) asks: “Are black households less likely to have a telephone because of different tastes, or because blacks tend to have lower income and telephone service is a normal good, or because blacks are discriminated against in the provision of telephone service? Or do blacks tend to live in states with less aggressive policies for promoting
universal telephone service?” (p. 427).13 Though African-American and Hispanic-American households are in the aggregate less well-educated and have lower income than their white counterparts, studies have shown that for whatever reason the gap persists even after controlling for income and education. As described by the National Telecommunications and Information Administration [NTIA] (1999), the access gap between majority and minority communities tends to disappear at the highest household income levels (>-$75,000), but lower income black households have significantly less telecommunications and Internet access than their white counterparts.

Mack (2001) identifies prevalent distrust of science and technology as one of the factors that prevent minorities, especially African-Americans, from subscribing to information and communication technologies. “Throughout history, whites have used science, research and technology to continue their subjugation of blacks. Blacks, in turn have learned to fear and mistrust scientific and technological developments, believing that such advancements are easily manipulated to suit the purposes of the dominant society” (p. 8) (Mack, 2001). As evidence, she cites the nineteenth century “scientific” studies of cranial measurements used to “prove” black inferiority, the infamous Tuskegee experiments, the use of dubious measures of intelligence to track black children into remedial classes, etc. In another study, the researchers found that African-American university students tended to believe that “the Internet and WWW were tools used by the U.S. government to track and monitor individuals” (Ervin & Gilmore, 1999, p. 404). This mistrust of government, and technology, kept them from going online even when access to computers, Internet and the world wide web was not an issue.
Another factor identified in the literature is “redlining”, the systemic denial of service in inner city neighborhoods by telecommunications companies (Kahl, 1997). The service providers argue that no redlining is practiced, but even if it occurs in rare instances, it is a purely business decision due to insufficient demand in these locations. Pockets of urban poverty themselves are a consequence of the housing policies followed during the segregation era, that excluded minorities from owning homes in the ‘white’ areas of that time. Other studies have found little evidence of redlining based on income or on black or Hispanic concentration, but some confirmation of the practice in Native American and Asian communities (Prieger, 2001). Other factors identified having significant negative impacts on access were inner city or rural location, while market size, education, and Spanish language use increased access probability.

Poor consumption choices, bad credit and unscrupulous marketing practices by telecommunications firms have also been identified as factors. In one ethnographic study, poor minority households in Camden, New Jersey were found to have subscribed to premium cable and telephone company services that they did not need and could not afford (Mueller & Schement, 1996). As a consequence, several households were also found to have lost their service owing to non-payment of bills.

Another factor that has been commonly cited, especially for Internet access, is the difficulty of mastering the technology (Kuttan & Peters, 2003). In one Pew Foundation study, 46% of non-users said this was a major or minor reason why they were not online (Lenhart et al., 2003). For Hispanics especially, but all minorities in general, the lack of language- and culture-specific content might also be an issue (Kuttan & Peters, 2003). Bolt and Crawford (2000) agree that “when minority youths go to a software store or log
on to the Internet, they do not see reflections of themselves” (p. 100) but argue that not too much should be made of this “content theory” (p. 102): African Americans have not let that stop them from participating in many other aspects of society, and content tailored to ethnic and linguistic minorities is increasing online anyway. African-Americans were also found to be apprehensive about privacy to a much greater extent than Caucasian-Americans or Hispanic-Americans (Ervin & Gilmore, 1999).

Given these multiple reasons, no theme emerges in the literature as the single most important factor leading to the ethnic digital divide. The consensus in the literature seems to be that minority access to telecommunications and ICTs is a vexing and significant problem, not amenable to easy solutions. While a number of federal and state programs exist to address the digital divide (for example, Lifeline and Linkup, the E-Rate, the High Cost Areas program, etc.), none are exclusively directed at minority communities. Nevertheless, minorities end up being the major beneficiaries because of the household income and poverty provisions built into these programs. For example, grants to schools from the E-Rate program are indexed to the percentage of area children eligible for the school lunch program, which directs E-Rate funds to the poorer school districts in which many minority children attend school.

In addition to these general digital divide initiatives, scholars have also advocated schemes that fund community-level ICT programs. Citing one public/private partnership program called “network neighborhoods” funded by the Housing and Urban Development (HUD) agency, Mack (2001) stated that such initiatives can “enhance their computer literacy, launch new careers, make the transition from welfare to work, have expanded access to necessary health services, and participate in inter-generational
learning activities” (p. 171). Since one of the major reason minorities do not venture online is the absence of culturally and linguistically appropriate content, Mack also recommended content creation as significant step to bridging the digital divide.

However, not all scholars are in agreement that policy action is required at all—some argue that gaps in access are a natural part of technology diffusion, and sometimes disappear without any form of governmental action. For example, several surveys have shown that the gap in Internet access that existed between men and women has practically disappeared, with women in some studies showing up with a small majority in the Internet population commensurate with their numbers in the overall U.S. population (see especially, Chapter 4, Social Inequalities) (Norris, 2001). Schement and Forbes (2000) point to the case of the radio and television, where no policy promoting household ownership was ever implemented in spite of the obvious advantages of citizen access to news and information. They argue that though the status quo may be unsupportable, so would any generalized policy prescription that does not recognize the complex interplay of factors that leads to the digital divide. Another observer takes a more radical position, that policy action is not required just because a gap exists: for example, just because the poor eat fewer steaks or drive cheaper cars does not imply that the government should intervene to restore the balance. Instead, “If there is an issue, it is: What priorities should a society have in making decisions on what are necessities, what are frills, and what falls in a debatable middle ground?” (Compaine, 2001, p. 116).

However, the consensus in the literature is not in favor of a “hands-off” approach. Policy-makers and researchers agree that a persistent gap in ICT access is neither fair nor
socially desirable, and that something needs to be done—yet, the ethnic digital divide is a problem that permits no easy solutions.

**People with Disabilities**

Though the notion of universal service has been around for quite sometime, it was only recently that access for people with disabilities became an issue. There were perhaps two main reasons for this lag. One, the movement for the rights of the disabled came into its own only recently. Two, the increasing role of ICTs in everyday life raised the importance of the issue of access within the disabled community. We will first discuss these two factors before delving into the literature on universal access for people with disabilities.

In the nineteenth century many people with disabilities, including some with only physical disabilities, were often seen as “feebleminded.” Such thinking was one of the factors that prompted a number of states (at one time, as many as 26) to administer sterilization laws that were upheld by the U.S. Supreme Court. It was against this backdrop that the modern day disabilities movement, along with other civil rights movements, arose during the social turmoil of 1960s (Pfeiffer, 1993). The early efforts focused on issues related to discrimination and affirmative action, housing, public transportation, education, and other essential services. As critical everyday functions such as banking moved onto electronic platforms, ICTs started gaining the attention of the disability community. By this time the thinking within the disability community had gone past the paradigms, which, according to some observers, the rest of society had been imposing on them. Goggin and Newell (2000) identify these paradigms as medical
(passive recipient of expert care), lay (objects of pity), charity, and management (a demanding constituency that needs to be managed). While Goggin and Newell stereotype the paradigms because not all institutions and individuals behave the same way, their caricatured sketch does drive home the point that the dominant paradigms locate the problem in the shortcomings of the disabled.

In opposition to the paradigms based on “able-ist” norms, the disability advocates have been putting forward a paradigm based on rights. This paradigm broadens the focus beyond the disabled individuals and expands it to the social systems within which they have to operate. For example, British theorists “propose a distinction between an individual’s impairments (the bodily dimension) and disability which is socially produced (as in the barriers society unfairly creates for the person with impairment, for instance)” (Goggin & Newell, 2004, p. 412). Accordingly, the attention is directed towards eliminating the barriers that exacerbate if not create problems for people with disabilities. The rights paradigm calls for an awareness and sensitivity to the needs of the disabled at the time of system design instead of the then current practice of developing adaptive devices after the system has been created. In other words, the needs of the people with disabilities should not be an afterthought (Stephanidis, 1998; Vanderheiden, 1990).

Disability advocates argue that this initial system design approach is not only a nice idea but also a practical one because the rapid pace of technological change is increasingly making the retroactive approach untenable. Soon after posteriori adaptations are made for a new technology, it is made obsolete by an even newer technology and the same cycle has to be reinitiated (Stephanidis & Emiliani, 1999). A better approach would be to proactively develop “generic solutions,” as early as possible in the design process, that result in products and services that are usable by the widest possible range of users, including people with disabilities. This approach, which would minimize the need for a
posteriori adaptations, is “grounded on the notions of universal access and design” (Stephanidis & Emiliani, 1999, p. 24).

Universal design is based on the idea that designing for the “typical” or “average” user, which what “conventional” design does, results in products that do not meet the needs of the largest possible population of users as many groups, especially the disadvantaged ones, get left out. In contrast, designs intended to serve the needs of a disadvantaged population have benefits for the general population as well (Stephanidis & Emiliani, 1999). For example, curb-cuts designed to accommodate wheelchairs help parents with strollers, delivery workers, bicyclists and travelers with roll-on bags. (Shneiderman, 2000). In the ICT realm, pay phones designed for comfortable use by wheelchair and scooter users also help parents with strollers. In addition to helping people with dexterity and mobility problems, telephones with big buttons and hands-free operability are useful for the elderly. TTY services (teletypewriter) not only enable the hearing impaired and speech impaired subscribers to communicate with each other but also the rest of the community with them (Goggin & Newell, 2000).

Critics of universal design question its practicality and cost justification. They argue that a design that seeks to satisfy everyone may end up satisfying no one (Stephanidis & Emiliani, 1999; Shneiderman, 2000). They also warn of the “innovation restriction scenario” wherein focus on accommodating the low end in terms of technology and skill inhibits innovation at the high end (Shneiderman, 2000). The proponents of universal design counter that the approach does not preclude multiple designs for different groups when they are necessary (Stephanidis, 1998; Stephanidis & Emiliani, 1999). With regard to costs, sufficient data is not available to settle the question one way or another. Also, disability advocates point out that the disabled and the elderly
make up a sizeable and growing portion of the market that would be unwise for business to ignore. However, we need to keep in mind that long term costs of making the system accessible via posteriori adaptations is very high and is likely to continue to increase in the future (Stephanidis & Emiliani, 1999)

In terms of telecommunications regulation, until recently universal service was seldom interpreted to include the needs of people with disabilities (Bowe, 1993). The carriers tended to see their universal service obligations limited to providing physical connectivity to the entire population. Whether or not the service was actually usable by people with special needs, such as those with disabilities, was generally not seen as their responsibility. A landmark case in Australia (Scott, DPI v Telstra) before the Human Rights and Equal Opportunity Commission identified the key issues very clearly (Goggin, 2004; Goggin & Newell, 2000; Ransom, 1994). Prior to this case, there was no legal requirement for telecommunications providers to provide access to the disabled: the 1991 Telecommunications Act mandated universal service, but excluded accessibility; while the 1992 Disability Discrimination Act explicitly left telecommunications outside its purview. The main telecommunications provider in Australia, Telstra, was thus able to claim that its service obligations were limited to the provision of technical equipment, and that the accessibility of the equipment to all people was not its responsibility. The Commission sided with the plaintiff and ruled that if the standard equipment failed to make the service usable by any subscriber group, Telstra should provide alternative equipment (Bourk, 2001). Subsequently, the 1997 Telecommunications Act obligated carriers to provide a functional equivalent of voice telephone service to subscribers who needed it (Goggin & Newell, 2004).
In the US it was the Americans with Disabilities Act 1990 (ADA) that explicitly dealt with the telecommunications needs of people with disabilities. Title IV of ADA guarantees to users of TTY service “full and equal access” to the public telephone network. The TTY service allows people with disabilities to send text messages to relay operators who then read them out to non-TTY users and correspondingly relay back the spoken message as text. Thus the ADA addressed the needs of hearing-impaired and speech-impaired users. It, however, still left out many people who had problems due to cerebral palsy, visual impairment, learning disabilities, and other disorders. Deborah Kaplan, director of technology policy of World Institute on Disability (WID), organized an effort to extend similar benefits to other disabled groups (Bowe 1993). She based her strategy on the Television Decoder Circuitry Act that represented a new way of thinking. Instead of requiring hearing-impaired to buy special devices, the Act mandated manufactures to produce products that were accessible. Since manufactures were required to install special chips in all televisions, the resulting economies of scale brought down the additional cost to as little as $5 per set. Kaplan sought to do the same for the public telephone service by requiring services such as speech synthesis and speech recognition to be part the overall fabric of the network. These capabilities would allow visually impaired users to listen to information, hearing impaired to print out voice messages, and quadriplegics to dial numbers by speaking them aloud (Bowe, 1993). The Consumer Federation of America challenged this approach, which was akin to universal design, by asking why ordinary Americans should bear the cost of providing services that benefited people with disabilities. Kaplan countered by arguing that costs when spread out across the entire subscriber base would be only a dollar or two. Furthermore, the benefits would not be restricted to people with disabilities. The elderly, the rural population, and others would also benefit (Bowe, 1993).

The 1996 Telecom Act does not incorporate disabilities issues in the universal service section, Section 254. It deals with the disabilities issues in a separate section,
Section 255. In developing the rules implementing Section 255, FCC adopted the “readily achievable” concept from the ADA, obligating carriers to make changes for people with disabilities when they are “easily accomplishable and able to be carried out without much difficulty or expense” (quoted in Kanayama, 2003, p. 189). While the industry groups applauded the FCC’s decision to devise its own analytical factors (feasibility, expense, and practicality) for determining “readily achievable,” the advocates of people with disabilities expressed dismay. They argued that some of the enhanced services used by people with disabilities such as voice mail and electronic mail—labeled as information services in the 1996 Act, and therefore not covered by Section 254—should be covered by universal service. They also recommended that the FCC should base the selection of new services for universal service at least partially on the extent to which these services were commonly used by the disabled (Kanayama, 2000). Largely due to these efforts, the final implementation rules applied to landline telephones, as well as to cell phones, pagers, call waiting, operator services, and many other products and services.

The recommendation that the FCC identify the features “commonly used by people with disabilities” is noteworthy. One of the criteria that policymakers have often used for inclusion of new services in an expanded universal service package is that its value be demonstrated by wide acceptance by ordinary consumers (Sawhney, 2000, 2003). For example, the second criterion laid out in the Telecommunications Act of 1996 asks the FCC to consider a new service for the universal service package when it has “through the operation of market choices by customers, been subscribed to by a substantial majority of customers” (Section 254 (c)(1)). Here the disability advocates were arguing that the “consumption norms” (Preston & Flynn, 2000) within a disadvantaged group, instead of within the entire population, be used as the criteria for including a service in the universal service package.

Another front in the battle for universal accessibility is the definition of websites and web-based telecommunications services as “products”, “promotional vehicles”,
“services” or “sites of accommodation”. Definitions are important because classifying an ICT one way or the other brings different laws into operation, and places different obligations on service providers. Again, an Australian case (Maguire v Sidney Organizing Committee for the Olympic Games) heard before the Human Rights and Equal Opportunities Commission identifies the issues clearly (Shneiderman, 2000). Maguire, a blind person, complained to the Human Rights and Equal Opportunities Commission (hereafter the Commission) that a number of features on the website maintained by the Sidney Organizing Committee for the Olympic Games (hereafter the Games Committee) were inaccessible via refreshable Braille display and screen reading technologies used by visually impaired Internet users. The issue before the Commission was whether or not this difference constituted discrimination under the 1992 Commonwealth Disability Discrimination Act, which prohibits discrimination in service provision. The Games Committee countered that its website was not a service but a promotional vehicle, and therefore not covered by the Act. When the Commission refused to buy into this argument, the Games Committee pleaded that the cost involved constituted “unjustifiable hardship,” which was grounds for exemption under the Act. The Commission rejected this argument as well, and required changes to be made well before the Games were to commence (Russell, 2003).

While the decision in the Maguire case was significant, it did not have as wide an impact as one might have expected. In the United Kingdom, the issue still remains unresolved whether the Internet constitutes a “service”, falling within the remit of the U.K. Disability Discrimination Act 1992, or a “product” not subject to it (Russell, 2003). In the United States, the ADA states that people with disabilities cannot be discriminated against in accessing “places of accommodation,” examples of which include hotels and grocery stores. The question of contention now is whether or not websites constitute “places of accommodation.” In a case brought about by Access Now, an advocacy group, against Claire’s Stores, the court observed that it was highly uncertain whether websites
fell within the remit of the ADA. In another case where Access Now filed suit against Southwest Airlines, the court dismissed the case because the court concluded that websites were not “places of accommodation” as per the ADA, which was concerned with access to physical spaces and not virtual ones. The court felt that if a similar law was needed for cyberspace the Congress should pass necessary legislation (Russell, 2003).

Interestingly, in a case that did not involve web accessibility (Carparts Distribution Center v. Automotive Wholesaler’s Association of New England), the court determined that the term “public accommodation” was ambiguous and could denote intangible “accommodations” such as a health benefit plan. The court said that “It would be irrational to conclude that persons who enter an office to purchase services are protected by the ADA, but persons who purchase the same services over the telephone or by mail are not. Congress could not have intended such an absurd result” (quoted in Russell, 2003, p. 243). In another case (Vincent Martin et al. v Metropolitan Atlanta Rapid Transit Authority [MARTA]) where the complaint was that the transport authority’s website was not accessible and its alternate means of access via Braille schedules was not easy to use, the court determined that MARTA was “violating the ADA mandate of making adequate communications capacity available, through accessible formats and technology, to enable users to obtain information and schedule service” (quoted in Russell, 2003, p. 243).

These variations in interpretation stem to some degree from differences in the laws that apply to each situation. The MARTA case was brought under title II of the ADA, which prohibits “public entities” from denying service to people with disabilities. Furthermore, this section specifically mentions transportation services. On the other hand, Section 504 of the Rehabilitation Act prohibits discrimination by government agencies. While the legal position is not entirely clear, it seems that under Title II and Section 504 government agencies are required to make their websites accessible but
private companies under Title III do not have to do so since they are not a “place of public accommodation” (Russell, 2003, p. 243).

One common thread running through the disability literature is the constant refrain that we need to extend universal access beyond simple availability of a connection to accessibility. Otherwise, as disability advocates warn us, we will end up with a “two-tier” society of “haves” and “have-nots” (Stephanidis et al 1998; Stephanidis & Emiliani, 1999) or, as Kanayama (2000) says, of those who “can” and who “cannot.” While this broad theme resonates with those in other universal access literatures, the disability literature is notably different. Unlike other literatures that evoke and extend long established universal access principles, the disability literature introduces new concepts into the universal access discourses. For instance, the notion of a universal design comes from civil engineering, architecture, and interior design. The disability papers open new windows of the mind for readers steeped in the universal access literature, even if the basic ideas are borrowed and not original.

On the down side, the disability literature has a very strong advocacy flavor and along with it come the shortcomings of that mode of thinking. While the writers challenge the fundamental assumptions of the institutions they seek to change, they rarely pause to critically reflect on their own. Their moral self-assuredness prevents the development of a more balanced scholarly perspective. For instance, Stephanidis et al (1998) argue that universal access principles should not be limited to computers and their interfaces but should be extended to “information itself and how it is created, collected, represented, stored, transferred from one place to another, and used” (p. 109). Chung et al (2000) goes a proverbial step further and argues that the concept of accessibility should be stretched beyond Internet software to other barriers such as jargon and complicated
site structure. There is little thought expended on whether or not such extensions are feasible and, if feasible, whether they are cost effective. Interestingly, not a single paper situated advocated disability initiatives within the overall universal service package. How do disability programs relate to other programs, say for the urban poor, and how should the monies be distributed among them? Without this broader framework, disability research rarely rises above the level of advocacy.

**E-Government**

Described variously as “e-government”, “electronic government” and “digital government”, the movement towards greater utilization of ICTs to deliver government services to citizens, businesses and other government agencies is accelerating today. Though e-government became a popular buzzword only in the late 1990s with the tremendous growth of the Internet, the utilization of ICTs in government is by no means new. As Alfred Ho points out, computers and networks have been used to improve efficiency and internal communications in government agencies for a long time (Ho, 2002). However, the “focus of e-government in this [early] era was primarily internal and managerial” (p. 435). But as private businesses began to deploy e-commerce services in the 1990s and consumers grew accustomed to the conveniences of 24/7 service, the same expectations came to be set for government as well (Edmiston, 2002). In 1993 the National Performance Review included a report authored by Vice President Al Gore declaring the aim of “reinventing government” through the use of information and communication technologies and identifying key action items and initiatives to make e-government a reality (Gore, 1993). The Bush administration’s E-government Act of 2002
created a special Office of Electronic Government to coordinate e-government initiatives at the federal level ("E-government act, public law 107-347", 2002). The 2003 E-government Strategy statement further concretized the Bush administration’s approach to electronic government. Internationally as well, e-government initiatives have attracted a lot of attention from organizations such as the World Economic Forum (Brown, 2002), Organization of Economic Cooperation and Development (OECD, 2003), and the European Union (Chadwick & May, 2003).

Proponents of e-government claim that it represents a fundamental transformation in the way government and its relationship to citizens are organized. Earlier, each governmental department was specialized in the provision of a few specific services, with little communication with other agencies providing other services or between different levels of government at the federal, state and local levels (Fountain, 2001; Ho, 2002). The use of ICTs, initially intended only to improve internal processes and procedures, gradually began to transform the nature of government itself. As Ho (2002) points out, government departments began to experiment with “client-based” models more in tune with user expectations, and “one-stop service centers” (Ho, 2002, p. 436), where multiple services would be available at the same service point. The emerging model of user-friendliness, flexibility, direct communication and fast feedback presents several points of contrast with the old model of command and control, rule-based decision-making, procedural efficiency and hierarchy.

Scholars have described four stages of implementation of e-government (Layne & Lee, 2001). In the first “cataloging” stage an online presence for a government department is created and users might be able to access some limited “fact-finding” and
searching functions, for example for forms or e-mail addresses. In the second stage, it becomes possible for users to implement transactions using information and communication technologies. This stage requires modifications to databases and retraining of workers to move from service delivery to supervision of electronic systems. In the third stage—vertical integration—departments providing similar services are connected across different levels of government, for example vehicle registration, health and human services, etc. (Layne and Lee, 2001). When existing services are moved online, new functionalities may also be created, for example a common website to obtain business licenses from both state and local governments. The fourth stage visualizes horizontal integration—when agencies doing different things connect their systems and databases to provide “one-stop-shopping” for different government services. Other scholars have divided the process of e-government accomplishment into different stages, but following the same logic: for example, the managerial, consultative, and participatory stages (Chadwick & May, 2003); or the billboard, partial service delivery, portal and interactive democracy stages (West, 2004).

In spite of the rhetoric surrounding e-government, progress in implementing e-government was relatively slow. In the year 2000, a survey of municipal governments in the United States showed that the vast majority had one-way communication/information dissemination (the “cataloging” stage), while some had limited two-way communication (query and response) capabilities. Relatively few permitted transactions to be executed online, and still fewer had vertical and horizontal integration across levels of government and functions (Moon, 2002). Since then, a number of government departments have unveiled significantly more advanced web-based services, with several coming in for
praise (Freed, 2005; Stowers, 2004). One example is the U.S. federal governments FirstGov.gov which promises to make 186 million webpages of federal and state government information accessible to users within three clicks (Office of the President, 2003). The U.S. Internal Revenue Service (IRS) too has significantly ramped up its electronic tax filing and document delivery services in recent years. The annual American Customer Satisfaction Survey conducted by the University of Michigan has given high rankings in its e-government category to agencies such as the National Library of Medicine (for MedlinePlus) and the Social Security Administration (for their Medicare Prescription Drug Costs information site and the Internet Social Security Benefits Application) (Freed, 2005).

Questions about universal service and the digital divide have been a prominent element of the e-government discourse. While some scholars see e-government as an opportunity, notably the ability to extend services cost-effectively to underserved areas such as rural areas, inner cities etc. (Edmiston, 2002), others are more concerned about citizens’ lack of access to computers and the Internet. Though computer and Internet penetration in the home and workplace have been steadily rising, reports such as the National Telecommunications and Information Administration’s (NTIA) Falling through the Net (NTIA, 2000); the Benton Foundation’s Bringing a Nation Online (Benton Foundation, 2002); and others (NCES, 2002; OECD, 2003) highlight that a significant gap still exists in terms of race, income and place of residence. Deploying more and more services online can result in denial of service to the most needy, if significant sections of the disadvantaged populations do not have access to the Internet.
Recent studies have found that an “e-government” divide on the basis of race, income and education exists even among those with Internet access: “Visitors to government websites are more likely to be white, to have higher incomes, and to be more educated than other Internet users” (Thomas & Streib, 2003, p. 95). Interestingly, the same study found that the young, contrary to expectations, were more likely to visit government websites: a finding that the authors explain by citing the intense curiosity of youth about “this new face of government” (p. 95). Also, the study did not find urban-rural differences in the frequency of accessing government websites among those with Internet access—perhaps because only the more motivated rural user subscribes to Internet service, in the context of the higher prices and greater difficulty of obtaining access in rural areas.

The digital divide may also be compounded if greater expenditures on creating an online presence constrain some government agencies to scale back on traditional face-to-face services. An OECD report titled The E-government imperative points out that disadvantaged groups such as the poor, the disabled, the indigent who often have greater need for government services like welfare, unemployment and disability are also specifically the groups that have difficulty accessing and using government websites (OECD, 2003). Thus, the OECD report argues that a widespread move towards e-government presents a doubled threat to these groups—doubled because they have no access to the enhanced services available online, while the physical facilities they relied on earlier sometimes get scaled back as governments divert more funds for online services.
Given all these potential pitfalls, one observer questioned whether the government should emulate the private sector’s movement towards e-commerce at all, arguing that businesses have the luxury of choosing their customers, whereas government is obligated to serve all Americans irrespective of whether or not they have a home computer or Internet access (Klima, 2003). The consequence of government services moving exclusively online would be more severe, than in the case of private businesses. It was partially in response to this criticism that the 2002 E-Government Act specifically included a provision (Sec. 213) to enhance the effectiveness of community technology centers, public libraries, and other institutions that provide Internet access to the public and to promote public awareness of the government services accessible over the Internet from these sites ("E-government act, public law 107-347", 2002). The OECD too states that it is important for governments to persist with efforts to bridge the digital divide, on the grounds of e-government alone (OECD, 2003).

Darrell West (2003) has identified six other areas of concern to e-government in relation to universal service. First, online services may present significant problems of access for the disabled. Though there have been a number of efforts recently to improve accessibility by producing standards and incorporating “universal design” principles into government websites, significant issues of compliance remain at the city and municipal levels. In a cross-reference to the disability discourse, some scholars of e-government have sought to identify government websites as “sites of accommodation” where federal laws applicable to accessibility should prevail (West, 2003). Second, studies conducted by West show that the content of government websites is presented at a reading level (eleventh grade) significantly higher than the competency of the average American
(eighth grade) (West, 2003). Again, federal and state government websites do better than municipal websites in this regard. Third, only a minority of government websites provided access to bilingual content, in English and foreign languages. Fourth, government websites were found to have limited interactivity. Though most sites provided email addresses of government officials, West argues that this puts “government in a reactive mode” (p. 9) capable only of responding to citizen complaints after they have occurred. Instead, he recommends that government websites incorporate proactive feedback mechanisms such as online surveys and satisfaction forms, which few currently do. Fifth, West found that there was considerable variation in accessibility standards across different agencies but not always in conformity with their targeted clientele. For example, health and human services websites used predominantly by the poor had a majority of content at the 12th grade reading level. Finally, West condemns the move of a few government departments to charge user fees for government services or to move some types of content into premium sections requiring a subscription or registration. This is a worrisome trend because it would lead to “a two-tier society based on those who can afford information and those who cannot” (West, 2003, p. 10).

While West’s analysis raises important points about universal service in the context of e-government, his criticism also appears to be somewhat one-sided: in some cases he expects government departments to accomplish tasks for which they have no budgetary resources. In others cases, departments that are chartered as quasi-governmental agencies have always been allowed to charge for services; thus, charging for e-government services does not create new grounds for complaints of discrimination.
Further, e-government is at a rudimentary stage of development, and the evolution of online services is far from complete. Criticism, in some cases at least, may be premature.

Jae Moon (2002) and Alfred Ho (2002) discuss a geographical dimension of the digital divide related to e-government, namely the ability and willingness of municipal governments to deploy online services. Moon shows that larger cities are more likely to innovate with e-government and finds that the type of administration also matters. Cities with a politically elected chief executive (mayor) tend to be slower with e-government deployment than cities with professional managers answerable to elected councils. Ho confirms the results for city size, and finds additionally that affluent cities and those with smaller minority populations tend to be quicker with e-government deployment. Though minority populations tend to be higher in large cities, the average per capita income is also lower in minority households resulting in a comparatively smaller tax base for cities with larger minority populations. The net effect is that at every level of city size, cities with higher proportion of low income and minority households tend to be slower with e-government initiatives. Ho’s research also shows that cities with large minority populations tend to take an “administrative” approach to e-government deployment, rather than an informational or user-centered approach. The administrative approach, motivated by resource constraints, tends to favor e-government initiatives that improve production cost-efficiency (process management, document flow control, etc.) rather than focusing on user needs or satisfaction. “(R)acial differences not only influence private usage of computers and the Internet, they may also affect the progressiveness of city governments in web development” (Ho, 2002, p. 439).
In summary, there is tremendous variation in the provision of e-government services at the federal, state and local levels; some government agencies serve as exemplars in providing such services and some are clearly laggards or anti-models of service. There are also contrasting theoretical models about the impact of e-government on public administration and governance. While some scholars hail it as a paradigm shift, others are much more cautious. Concerns about universal access to the e-government services are one of several reasons why those in the latter camp advocate a more measured approach. In a parallel move, advocates of universal service have pointed to e-government as a reason to devote more policy attention and financial resources to bridging the digital divide. The discourse on e-government thus brings together and in some cases amplifies many of the concerns researchers and policy-makers have voiced about universal service, the digital divide, disability, and socioeconomic justice.

**Digital Libraries**

The dream or fantasy of creating one source of all the world’s knowledge has been with humankind since time immemorial. The ancient library in Alexandria reputedly had (or aimed to have) every work known to exist. Its scribes copied, bought or stole works from every corner of the known world and added them to the library’s collection (Harris, 1995). In the eighteenth century, the French encyclopedists led by Denis Diderot nurtured the ambition to create an alphabetical listing of all human knowledge, and to make it accessible to all. That dream animated twentieth century thinkers such as H. G. Wells, who proposed the development of a world encyclopedia or world brain (Wells, 1938). Vannevar Bush, scientific advisor to President Roosevelt, wrote an essay in July
1945 describing the “memex” or “memory extender” – a mechanical device in which all of a person’s records and information could be stored in a way that allows quick and flexible retrieval (Bush, 1945). Others inspired by Vannevar Bush’s vision extended the concept—notably, J C. R. Licklider who in 1965 visualized an entirely computer-based “library of the future” (Licklider, 1968). These notions, however, remained unrealized until the Internet came into existence. The enormous potential of the Internet to catalog information, and make it simultaneously available to millions of users anywhere on the globe has put a universal storehouse of knowledge within reach. No wonder the idea of digital libraries has recently gained considerable traction.

The term “digital library” emerged out of a series of workshops sponsored by the National Science Foundation in the early 1990s as part of the Digital Library Initiative (Fox, 1993). As discussed in Borgman (2000), it did not take long for the idea of digital libraries to take root in the United States and gain policy support at the highest levels of government. Digital libraries were designated as a “national challenge application area” under the High Performance Computing and Communications Initiative (HPCC) and were also identified as a priority under the National Information Infrastructure Initiative. The National Science Foundation took a lead in coordinating digital library initiatives internationally. Other countries, such as the United Kingdom, have also made a major commitment to digital libraries. The Group of Seven industrialized nations (formerly the G-7, now the G-8) have viewed digital libraries as a prominent component of the Global Information Infrastructure initiative (Borgman, 1999).

A variety of meanings have been attached to the term “digital library”: for example, a digital library may be defined as institutions that catalog information and provide electronic access to it; the databases of texts, images, data, audio etc.; the
software for search and retrieval from distributed networks; or specific services provided using a combination of all of the above (Borgman, 1999, 2000). Given the multiplicity of meanings, there is no consensus on what a digital library is, or should be. Depending on how narrowly or broadly one wants to describe a digital library, it could be as narrowly defined as a digital version of the traditional library with a physical location, permanent collections, authorized access and human assistance in case of need; or the vast, spatially distributed, freely accessible but non-authoritative environment of the Internet itself could be regarded as a digital library (Harter, 1997). In either scenario, universal access questions have been raised about a number of aspects of digital libraries. Loosely based on the work of Stephen Harter (1997), we identify them as location, content issues, user access, the role of intermediaries and pricing. We discuss each of these aspects in turn.

Traditional libraries have a specific location for their collections, serve a clientele that is also generally concentrated at a proximate location, and are quite often funded by entities (taxpayers, universities, foundations etc.) that have a concentrated physical presence. Digital libraries have no physical presence—indeed, one of the advantages of digital libraries is that they do not require proximity as a condition for access. Once content has been digitized, cataloged and placed online, it can be accessed from anywhere in the world. And since access can be provided at very little additional cost to a much broader set of users, it makes economic sense to provide access universally once the content has been created. Indeed, the trend in the digital library movement is the creation of a “global interconnected library network” comprising collections at different national and international locations (Schatz & Chen, 1999, p. 49).

However, this lack of a physical presence also leads to problems. For example, the creation of digital libraries involves cross-subsidies. Domains that create digital content and make them available are essentially providing a service to those regions that do not originate their own content. Local libraries that are taxpayer supported are
especially placed in a quandary. They have the choice of creating local services (reading areas, physical collections, computer terminals etc.) or digital services (digitization, archiving and storage, server maintenance, telecommunications). Should scarce tax resources be spent on creating content that will primarily serve an outside audience (given that more users are likely to be from outside, than from the local area)? Given the interconnected nature of digital content, there will always be a tendency to free ride—this is the institutional version of individual user’s incentive to free ride on peer-to-peer networks such as Gnutella (Adar & Huberman, 2000). Significant, one of the questions early planners in the United States asked was what economic advantage the United States would gain from the creation of digital libraries, when its competitors too would have access to the same content over the Internet (Fox, 1993).

Turning now to content issues, one of the functions of the traditional library is to authenticate content in terms of its authorship, fidelity to the original text, legality in terms of copyright, and ideally, the accuracy of information (Harter, 1997). Digital libraries cannot reasonably be expected to provide this service to users. First, digitized content can be easily modified and distributed by anyone with the requisite know-how, making it more difficult for libraries to authenticate the source of every item. Second, no digital library can be expected to archive all of its content on its own storage resources—it is just more practical to interlink databases and institutions. But this also implies that no digital library would have complete control over the content that it makes available to its users. Third, the threshold for unauthorized duplication and distribution is much lower for digital content, making copyright protection a more serious problem in digital environments.
Thus digital libraries have special problems in authenticating content in its various aspects—authorship, genuineness, legality, accuracy etc. However, the solutions that have been proposed often pose problems for universal access. Industry groups have promoted the idea of technological protections for digital content, under the broad rubric of Digital Rights Management (DRM). A number of technologies—encryption, “marking”, “fingerprinting” etc. have been evolved to protect copyrighted content (Godwin, n.d.). These technologies of “content management” have gained legal sanction through the Digital Millennium Copyright Act (DMCA) passed in 1998 during the Clinton Administration. Though many observers have argued in favor of “engineering solutions” as appropriate mechanisms to handle content in a digital environment (Anderson & Lotspiech, 1995; Seadle et al., 2002), others have argued that such technological fixes reduce access to digital content, as well as restrict some of the “fair uses” permissible under copyright law (Gillespie, 2004; Jackson, 2000).

For digital libraries, the above discussion suggests a limited number of choices in terms of content management. The first is to function as an information portal and provide users with links to a wide variety of sources, with no responsibility for content: this would be Harter’s (1997) “broad” definition of the digital library. However, this would deprive the users of all the authentication services they have come to expect from traditional libraries. The second choice would be to take institutional responsibility for content, and the attendant need to authenticate, digitize, update, catalog, store and provide access to digital content. In this option, the digital library will more closely approximate the functioning of the traditional library, but only at greater expense and at the cost of some of the unique advantages of the digital environment.
The third aspect of universal access to digital libraries is user access. Traditional libraries have usually served a well-defined user population, either on a geographical basis (the town public library), or on the basis of academic/ professional specialization (the law library)—general depository libraries like the Library of Congress being the exception. Limiting the type of user who could access a library made sense because it enabled the library to manage user demands, develop librarians’ expertise, build up a more focused collection and optimize the use of financial resources. In addition, tailoring library collections to a specific user base that is physically collocated and largely united in interests and motivations makes the library one of the manifestations of community solidarity.

The users of a digital library need not necessarily share in a social network, even though they share certain interests in common. “In the context of a user community for a digital library, community members are united by their interests in the content and collections, but they may not have a social network (they do not necessarily know each other), nor are they necessarily in the same physical location” (Borgman, 2000, p. 164). While this disjuncture creates unique challenges (discussed below), it is also not without its positive aspects. Digital libraries open up the possibility of providing access to groups that share a common interest, but not a physical location, who could not be served earlier because of the need for proximity. A critical mass of users could not be assembled that share an interest in highly specialized topics such as Cambodian textiles, or fractal geometry, or Satyajit Ray’s movies, except in the largest cities or biggest universities. The “death of distance” (Cairncross, 1997) in the networked digital environment makes access to specialized subject collections a possibility for a dispersed user base. One such
example is an international, multilingual collection of children’s literature called the International Children’s Digital Library (ICDL) (Hutchinson et al., 2005).

Nevertheless, a geographically dispersed user base has its own unique challenges for digital libraries in assessing user needs and providing access technologies. Hutchinson et al (2005) discuss some of these issues when a digital library caters to an international user base: diverse expectations of cultural acceptability and relevance; different standards of copyright; the need for translation and transliteration services; platform independence; etc. Further problems arise if the digital library needs to charge for its services, or restrict access to some types of content, or to certain categories of users. The library would then need to put in place systems for password protection, user authentication and payment processing. Moreover, privacy protections prevalent in traditional libraries might be more difficult to enforce in a digital environment where every transaction is recorded by multiple servers and routers, some under the control of the digital library but others not. And every layer of software complexity creates additional problems of access for users whose local systems are not capable of handling the required protocols.

The role of intermediaries is also a matter of concern in the case of digital libraries. In traditional libraries, users have access to human experts in cataloging and information retrieval. The importance of such services for access cannot be minimized: one source for example found that fully one-third of an academic researcher’s time is spent in searching for information sources (Fox, 1993). Library professionals perform a number of specific roles in the traditional library environment such as interacting with users, interacting and modifying information resources, and adding value to the user-information resource interaction by mediating between the two (Brewer et al., 1996). In
the online environment, a large number of information search and retrieval services are provided by software agents. Thus the design properties of digital libraries, including both functionalities and analytical categories becomes important (Borgman, 1999). Functionality includes “retrieval mechanisms, navigation tools, display capabilities, import and export of content to other applications and various user-interface features” (p. 164), while analytical categories refer to “aspects of organizing knowledge, intellectual content, access points and hierarchies” (Borgman, 1999, p. 164). In many respects, users need to be more sophisticated and skilled in online environments than in traditional libraries in order to more fully utilize the wealth of information available in digital libraries.

However, the increasing sophistication of software agents is a mitigating factor: witness the emergence of a search engines like Google, and the acceptability that it has earned even in academic research environments. Nevertheless, challenges remain in integrating databases and services from multiple digital libraries, to provide the user with a seamless search and retrieval environment, i.e. “semantic interoperability” (Schatz & Chen, 1999, p. 48). A recent article described European initiatives for integrating dispersed digital libraries by using “mobile agents” (software that accept queries from users and ‘travel’ to multiple nodes to gather information) and ensuring interoperability between databases (Sanchez et al., 2002). In December 2004, Google itself announced that it was inaugurating a project to digitize and make publicly accessible the resources at major university libraries including Harvard, Michigan, Stanford and Oxford, as well as the New York Public Library (Markoff & Wyatt, 2004).
New pricing models in digital libraries present another barrier to universal access. Traditional libraries have functioned largely on a non-profit basis, supported by subsidies from local governments, large institutions like universities and research laboratories, federal funding agencies, charitable foundations and private contributions. They have tended to provide most services for free. Unfortunately, the transition to the digital environment threatens to unravel free service because of the accompanying transformation of the economics of information production and distribution. Traditionally, the cost of producing the “first copy” of any information good is relatively high, compared to the costs of reproduction, while the distribution costs are low but significant when information goods are embodied in physical media like printed books and audiocassettes. Therefore the marginal cost pricing recommended by economic theory fails to work in the case of information goods—the high fixed costs would not be recovered if prices are fixed at the low marginal costs of duplication and distribution. Producers have traditionally used a number of strategies, including above-marginal cost pricing, price discrimination, “repurposing” (re-produing in a different format; e.g., customizing textbooks for different reading levels) and “windowing” (distributing the same content over multiple platforms over time, e.g., theatrical and video release for movies). In such a market, libraries paid higher prices for the purchase of information goods such as books and scholarly journals, but in turn were allowed to lend to an unlimited number of users at no additional cost. As Shy (2001) has demonstrated, profits to intellectual property producers could be higher in the presence of legitimate re-use through lending libraries and video stores (see specifically Section 7.2, Economics of Libraries, pp. 170-75).
Producers face challenges in implementing these traditional strategies in the digital environment. First, the costs of duplication and distribution that were low but significant in the physical environment are practically zero in the digital market. (There are still costs associated with digitizing and archiving content, but these are not per copy costs but upfront expenditures similar to the first copy costs.) Second, digital information can be infinitely duplicated and shared with no loss of utility to current users—therefore, it has all the economic attributes of public goods and can be potentially distributed as such, thought clearly some information is protected as proprietary by law and is not distributed for free. Information goods are also much more easily shareable between users, reducing opportunities for price discrimination and windowing. Third, digital information is location-independent. Thus theoretically, when digital libraries interconnect, one copy of a book or a journal would suffice to serve the entire user base at all the nodes. Due to these factors, none of the traditional strategies to recover the first copy costs would work in the digital environment. New models of distribution need to be evolved in the Internet age (Eisenhart, 1996).

Digital libraries are beginning to be required to move to some form of usage-based pricing in the new production environment. “Naïve statements that ‘information wants to be free’ are being replaced by the recognition that resources available without charge are being paid for by someone” (Borgman, 2000, p. 195). Pricing could be query-based or time-based: query based when the user pays for each download or other transaction, and time-based when there is a flat fees for a subscription period (Adam et al., 1996). In addition, financial transaction systems such as “micropayments” will also need to be more widely available and used.
An alternative vision of publishing is crystallizing around the notion of “open access,” currently limited to scholarly journals. Noting that most of the production work in scholarly publishing (writing, reviewing and some editing) is done on a cost-free basis by volunteers, open access advocates argue that scholarly literature should be available for free to researchers (Walsh et al., 2001). As journal prices continue to rise, the open access has attracted a lot of attention on academic campuses but is still far from a mainstream trend—as of 2004, only about 1-2% of the market is open access (Wysocki Jr., 2005).

A move towards for-fee digital library services will have profound implications for the digital divide and universal access. First of all, marking a break with traditional practice, users will be expected to pay for digital library services, making affordability one of the factors for access to information. Second, even if users are able to afford digital library services, they also need access to the financial instruments such as credit cards or electronic bill-pay in order to complete transactions. Third, as already mentioned, every layer of complexity in digital libraries has an impact on access—usage based systems need additional protocols for user identification, accounting, and privacy protection. Commenting on a pilot project of the NSF-funded Digital Libraries Initiative, one commentator states the need to authenticate users has created an enormous, and unanticipated, barrier for access (Bishop, 1998). Nevertheless, the digital library has provided extremely wide and in-depth access to more resources than most users can feasibly utilize.

As the above discussion shows, the traditional library metaphor dominates our thinking about the digital library. It bounds our imagination of what is possible in the
digital realm and creates expectations regarding universal access by analogy to the practices in traditional libraries.

**Community Networks**

Community networks are different from virtual communities in that they seek to strengthen ties within a local community as opposed to creating a virtual one in the cyberspace (Carroll and Rosson 2003, Chapman and Rhodes, 1997, Pettigrew, Durrance, and Vakkari 1999, Morino, 1994, Schuler, 1994, Tonn, Zambrano, and Moore, 2001). “Unlike virtual communities which can attract dispersed people with shared interests or characteristics, community networks serve geographic communities often encompassing diverse interests of stratified groups” (Virnoche 1998, p. 205). While they are limited to a particular community in space, the scope of their intended activities tends to be quite expansive. For example, the Seattle Community Network seeks to generate community cohesion, develop informed citizens, provide access to education and training, and create strong democracy (Schuler, 1994). Universal access is an important goal of community networks but their overall scope is much broader. In this review we will focus on only that portion of the community network literature that centers on universal access issues.

The early community network projects were directed towards providing cheap access, often via the establishment of a non-profit ISP (Internet Service Provider). As the technology evolved, they had to grapple with new issues. For example, in the years preceding the Web browser, there was considerable debate within the community network groups on how much should they invest in interactivity. Many activists advocated the use of only text-only interfaces. One activist even took the position that
“BCN (Boulder Community Network) is an information source. People can get interactivity somewhere else” (Virnoche, 1998, p. 209). Others argued that this approach would create another level of disparity wherein the upper classes will have two-way capabilities and lower classes will remain passive recipients within a one-way broadcast framework (Virnoche 1998). The development of the Web browser made this debate moot. More generally, with the plummeting costs of Internet access, community networks found that they could not compete with commercial providers (Chapman and Rhodes 1997). Even though facilitating physical access remained a challenge, the community networks started thinking more about education, outreach, and other such activities.

The broadcast model versus two-way communication debate continues in content related issues. According to Chapman and Rhodes (1997), much of the content on the Internet a decade ago was not relevant for the poor and hardly any of it was produced locally in their neighborhoods. “Despite the rhetoric about shedding labels of gender, race, and social class upon entering cyberspace, the Internet reflects the culture of its principal inhabitants—upper middle-class white males” (Chapman and Rhodes, 1997, online). In principle everybody agrees that local content is critical, but the creation of meaningful local content is very difficult in practice, with the result that some commentators even today rue the lack of genuine local content online. As Pigg and Crank (2004) point out, the hope that ICTs are still in an upward trajectory of development and that suitable “local-based” applications will eventually develop has been belied in the past decade: they opine that “waiting [further] means taking the significant risk that the global influences so pervasive in cyberspace will never provide the opportunity for
“local” networks and content to gain a significant foothold” (p. 69). Though commercial providers do provide some local information, such as restaurant and shopping information, the general sentiment is that commercial providers cannot serve the community in ways that community networks can (Beamish, 1999, Carroll and Rosson 2003, Schuler 1994, Virnoche 1998, Weston 1997).

On matters related to physical access and local content, the public library and its services are a subject of much discussion. Public libraries in African-American communities have received special attention (Bishop, Tidline, Shoemaker, Salela, 1999, Pinkett 2003). Jue et al (1999) used GIS technology to identify which libraries serve the poor. With regard to local information, Pettigrew, Durrance, and Vakkari (1999) point out that public libraries have for more than 30 years provided information and referral services. They note that earlier all the local information was collected in files within the library. The Internet has changed the nature of this service because now library Web sites can link to other local Web sites. Chapman and Rhodes (1997) point out that while community networks almost always use libraries as access points, they are not perhaps good places for furthering access. While libraries may be physically proximate to the poor, they are psychologically distant. They recommend access places frequented by the poor on a daily basis—laundromats, eating places, alternative schools, youth centers, sports facilities, shopping centers, and even bars.

Beyond physical access and content, there is considerable fascination with the possibility of increasing social capital with a community network. Oldenberg’s notion of a “third place” other than home and workplace where people meet and talk has found considerable favor with different authors (Cohill 2002, Schuler, 1994, Tonn, Zambrano,
and Moore, 2001). Correspondingly, the question whether or not community networks actually increase social capital has been a major preoccupation of researchers (O’Neil 2002, Tonn, Zambrano, and Moore 2001). Researchers have also sought to understand how to generate and sustain social engagement (Millen & Patterson, 2002; Tonn, Zambrano, & Moore 2001). Interestingly, Borgida et al (2002) point out that the preoccupation with whether or not community networks increase social capital is somewhat misplaced. Researchers also need to study how the existing social capital itself impacts the deployment of community networks. They illustrate their point via a comparative study of network development in a Minnesota town that has historically had a communitarian culture with that of a more market oriented one.

According to Chapman and Rhodes (1997), the concept of a local community tends to be stronger in poor neighborhoods than in rich ones. The people in poor neighborhoods tend to spend more time locally because they are less mobile and also because the physical boundaries of their neighborhood are often their greatest defining features. Within this peculiar context, community networks are better placed to strengthen local connections than create new ones to far away places.

“[T]he organizers of the Austin Free-Net are seeking to lay a virtual environment over real geographic places, to supplement existing connections between people, institutions, and programs with electronic ones. We are producing a web of network links and communication patterns that resemble those one finds in the community already” (Chapman and Rhodes, 1997, online).

In a similar vein Morino (1994) observes that “community networking in the social sense is not a new concept, but using electronic communications to extend and amplify it certainly is” (online). Contractor and Bishop (2000), on the other hand, argued that community networks should go beyond “substitution” (moving existing practices to
ICT platforms) and “enlargement” (intensifying existing practices) to “reconfiguration” (changing social practices). In effect, they argued against the “extend and amplify” model because they think that without “reconfiguration” the existing digital divide will only deepen because the rich will also benefit from similar advances but at a greater rate.

Contractor and Bishop (2000) employ the asset-mapping concept from the community renewal literature to develop a reconfiguration strategy. According to this “inside out” development perspective concept, the community renewal process can be catalyzed by making the community members aware of the assets—individual, association, and institutional—that already exist within the community (Kretzmann & McKnight, 1993). Contractor and Bishop (2000) explore how community networks can reduce the high coordination costs of asset mapping. They report the use of a new “community ware” tool they developed to facilitate asset mapping. Pinkett (2003) points out that there is an extensive literature on community building that predates our relatively recent fascination with ICTs. Yet, one rarely sees community network researchers draw on this literature. The Contractor and Bishop (2000) paper, despite some weaknesses, is one of those rare exceptions.

Most writings on community networks have a celebratory tinge. If there are any criticisms, they are about inadequacies in how the ideals have been implemented and are directed towards correcting problems. For example, Tonn, Zambrano, and Moore (2001) evaluated 40 community networks and came to the conclusion that the networks do not seem to be increasing social capital but feel that networks could do so if appropriate actions are taken. Very rarely does anybody challenge the very concept of a community network. Virnoche (1998) noted that “there is an underlying assumption within
community networking—and more generally within the electronic democracy movement—that the infusion of Internet technologies in peripheral populations is inherently positive. To do anything but share the technology would be discriminatory” (p. 216). She stresses the need to think through the potential negative impact of information technology, especially on an already vulnerable population. Beamish (1999) also challenges the notion that technology will automatically make life better for the poor. What benefits do we expect access to provide and how do we know that these supposed benefits are indeed being delivered? She stresses the need for clarity of objectives and evaluation of results. She thinks that perhaps the biggest problem with community networks is the tendency to consider access to technology as an end in itself, rather than the means to an end.

While Virnoche (1998) and Beamish (1999) offer these thoughtful critical reflections in the passing, Stoecker (2005) subjects community networks research and the emerging field of Community Informatics to a sustained interrogation. If the goal is to develop strong communities, he questions the need for a field that knows a priori the solution to the social problems of the day—computer. Stoecker characterizes Community Informatics as a “distraction.” He argues that we should not think in terms of Community Informatics projects but instead think of community development projects that incorporate Community Informatics. In other words, Community Informatics should at best be seen as a “support field” and ICT as only one development tool among others that include housing, family services, and small business incubators. He goes on to question the vested interests involved. On the one hand, he sees many academics making careers out of community networks. “Yes, we all like to complain (me included) about
the sacrifices we make, since our skills could easily get double the salary in the corporate market. But we still have pretty privileged lifestyles, jetting around the globe to meet with other experts in this emerging field, and writing journal articles and books for each other” (Stroecker 2005, p. 19-20). On the other hand, he sees the community networks integrating the marginalized groups into the capitalist order. For instance, community technology centers are focused on “job training—integrating people into the lower rungs of the capitalist economy rather than helping them to question it” (Stroecker 2005, p. 19).

Similarly, community portals become sites for commerce whereby “the entire community, rather than just its individuals, become integrated into the capitalist economy” (Stroecker 2005, p. 19).17 Stroeckers brings almost every aspect of community network research under his critical lens and forces us to rethink the fundamentals. He believes that the potential of community networks can only be realized if we are clear headed and channel our energies in the right direction.

The community networks literature highlights a major weakness of our thinking on matters related to universal access—the belief that universal access is inherently good. But here we also see the beginnings of a profound critique that has implications not just for community network research but universal access research in general.

**E-Rate**

The proposal to include Internet connectivity for schools and libraries in the universal service program originated from a bill titled “National Communication Competition and Information Infrastructure Act” (HR 3636), introduced on November 22, 1993 in the House of Representatives by Representative Ed Markey of Massachusetts and Representative Fields of Texas (Dickard, 2002).18 Though the bulk of the bill dealt
with cable services provided by telephone companies, there was one section that included a broad commitment to universal service (sec. 102). ("National communication competition and information infrastructure act", 1993). Beyond this, there was no specific provision for telecommunications funding for schools and libraries in the bill’s original version. The first reference to universal service support for schools and libraries appears in Section 229 of the final version of the bill, which ordered the FCC to “promote the provision of advanced telecommunications services by wire, wireless, cable, and satellite technologies to (1) educational institutions; (2) health care institutions; and (3) public libraries” ("National communication competition and information infrastructure act", 1993). However the Markey-Fields bill, as it came to be called after its principal sponsors, failed to become law when the 103rd Congress ended without the Senate taking up the bill (Dickard, 2002).

Meanwhile, the idea of federal support for Internet access in schools and libraries was percolating elsewhere as well. In September 1993, President Bill Clinton constituted the National Information Infrastructure Advisory Council (NIIAC) to advise the Secretary of Commerce about the development of the National Information Infrastructure (NII) (Carvin, 2000). In 1995, the Council developed a project called the KickStart initiative, to help local communities launch neighborhood-networking initiatives, centered on schools, libraries, and community centers. The Council stated that a short term goal should be to “deploy information superhighway access and service capabilities to all community level institutions that serve the public such as schools and libraries by the year 2000” (NIIAC, quoted in Carvin, 2000, p.7).
Legislative proposals such as Markey-Fields and public-private initiatives such as KickStart served to mobilize support for federal funding of Internet access in schools and libraries. Simultaneously, organizations like the Consortium for School Networking (CoSN) and the International Society for Technology in Education (ITSE) worked at both the grassroots and national levels to raise support for such initiatives (Carvin, 2000). Thus, when deliberations began in Congress in 1995 for the first major rewrite of the Communications Act of 1934, school technology funding received bipartisan support. Senators, Olympia Snowe, Jay Rockefeller, Bob Kerrey and James Exon sponsored a motion (the Snowe-Rockefeller amendment) to include a provision called the “E-Rate” in the new law. With strong White House backing, the amendment found a place in the final Telecommunications Act passed in 1996.

The final contours of the E-Rate program took shape in the Federal-State Joint Board on Universal Service, to which the Congress referred the universal service provisions of the Telecommunications Act for implementation. Funding for the E-Rate program proved especially controversial, with conflicting proposals put forward by the telecommunications industry, school groups, and community organizations. Industry groups favored block grants through local or regional authorities, and offered to contribute vouchers. School and library groups preferred discounts, preferably on a sliding scale indexed to the level of poverty prevailing in the community. The administration weighed in on the side of the educators, with the result that the final Joint Board recommendations to the FCC included E-Rate discounts based on economic disadvantage (Carvin, 2000).
The E-Rate program is available to all community libraries as well as public schools, and to non-profit private and parochial schools with less than $50 million in endowments. These schools receive discounts for telecommunications access ranging from 20 percent to 90 percent of total eligible spending. The percentage of discounts is indexed to the poverty level prevailing among the school’s students—specifically, the percentage of students enrolled in the school lunch program. The schools can use the funds for a variety of purposes related to telecommunications and Internet access. But in order to prevent abuse or diversion of funds to non-eligible uses, an elaborate list of covered and non-covered expenditure categories have been developed over time. In general telecommunications services and Internet access services are eligible for support from the E-Rate fund. In addition, internal wiring such as cabling and file servers for serving multiple users is also eligible (USAC, 2003b). End user equipment, software (unless it is file server or e-mail software) and content are not eligible for support. Further, schools have to acquire service only from “eligible” telecommunications providers that have been approved by state and federal regulators to offer telecommunications services in that area. Any commercial vendor can install internal wiring and connections.

Currently, a non-profit organization called the Universal Service Administration Company [USAC] implements that E-rate program. Incorporated in 1997 on an FCC initiative, the USAC has four divisions – High Cost, Low Income, Rural Health Care and Schools and Libraries – active in each of the areas in which Congress had mandated universal service support (USAC, 2003a). The Schools and Libraries Division (SLD) is responsible for the E-Rate program. The SLD is responsible, in addition to other duties,
for generating projections of funding demand for the E-Rate program; determining discount levels; administering the review process; and disbursing funds.

The source of funding for the E-Rate program, as well as for all other universal service initiatives administered by the USAC, is the federal Universal Service Fund (USF). The 1996 Telecommunications Act mandated that all telecommunications service providers must contribute in an equitable and non-discriminatory manner to a fund that will support universal service programs for low-income customers, high cost areas, schools and libraries, and rural health-care providers. In 2002, the USAC collected $5.27 billion dollars from telecommunications providers and distributed over $5.3 billion through its various universal service programs (USAC, 2003a). The E-Rate program alone is authorized to distribute a maximum of $2.25 billion per year to schools and libraries—actual disbursements in the last five years have varied between $1.41 billion to $1.68 billion annually.

The process that culminated in the creation of the E-Rate program gained strength from a number of trends a long time in the making. Schofield and Davidson (2002) identify three of these trends as “government policy, business interests and community enthusiasm” (p. 2). The government was probably the last of the three to take an interest in advanced telecommunications access in schools—this interest was especially manifest in the Clinton administration which set up the National Information Infrastructure Advisory Council (NIIAC) in September 1993 to coordinate efforts for the creation of the national information infrastructure. Business interests had played an important role as far back as the mid-1980s, in producing well publicized reports, such as A Nation At Risk and the SCANS Report, that advocated a major role for technology in solving the ills of
the educational system (Schofield & Davidson, 2002). These initiatives were not entirely altruistic, because major computer manufacturers and telecommunications providers saw in these efforts a business opportunity as well. Community enthusiasm was also clearly evident in events such as NetDays held in the mid-1990s, in which parents, educators, community volunteers, and technology companies came together to connect schools to the Internet and install computers in classrooms. Over a quarter of a million citizen volunteers participated in the first NetDay in 1996 (Schofield & Davidson, 2002).

The creation of the E-Rate program to fund telecommunications and Internet access in schools and libraries was the result of these converging governmental, business, and community interests. However, a program that used mandatory contributions from a specific industry (i.e. telecommunications) to support education was rather unprecedented and signified a key compromise between historically opposed ideas in public policy. In a sense, the e-rate program bridged these contradictions and provided a politically viable action plan to policy makers. Three key dimensions of this compromise can be identified: between the building of “social capital” or individual skills as the objective of education; between community autonomy and national coordination; and between consumer benefit and industry deregulation. In the discussion section, we will address these contradictions further.

**Rural Broadband**

With every significant technological advance, we have seen calls for policy interventions to bring about urban-rural parity so that the rural populations are not left behind. At the turn of the last century, the big issue was Rural Free Delivery, i.e. delivery
of mail to each rural homestead so that rural folks, unlike city dwellers, would not have to make trips to the post office to pick up their mail (Roper, 1917; Fuller, 1964). Thereafter there were calls to extend telephone service to rural areas. Interestingly, the first big push for rural telephony was a grassroots phenomenon, with farmers setting up their own systems (often using barbed wires as transmission lines) when the Bell System ignored their repeated pleas for rural service. This initial and significant burst of network growth was extended further via loans provided by the Rural Electrification Administration and internal cross-subsidies from urban to rural services (Brock, 1981; Fischer, 1987; Mueller 1993). With the arrival of digital technologies, especially ISDN, alarms were again sounded about rural areas getting left behind as the researchers dutifully documented the inequities in the deployment of the new technology (Gabe & Abel, 2002). Interestingly, while documenting the disparities in the deployment pattern of the new technology, Gabe and Abel (2002) observed that “the patterns of ISDN investment and digital divide uncovered in the study may apply to other forms of telecommunications infrastructure available today and in the future” (p. 1246). Soon enough, there were studies recording the inequities in access to the Internet (Downes & Greenstein, 1999; Greenstein, 1998; Grubesic, 2003; Malecki, 2002, 2003; Nicholas, 2003; Strover, 2001). Today, the discussion has moved onto broadband, and as we will see below, we have a virtual replay of old concerns with regard to yet another new technology.

In fact authors writing on rural broadband have characterized it as the “newest dimension” (Prieger, 2003) or a “different dimension” (Skerratt & Warren, 2003) and declared that “the ‘have’ and ‘have not’ dichotomy extends to access to broadband” (Bertot, 2003, p. 185). In keeping with the earlier pattern, there have been empirical studies showing an urban-rural gap in the patterns of broadband deployment (Gillet &
Lehr, 1999; Grubesic & Murray, 2002; Strover, Oden & Inagaki, 2001; NTIA, 2000). These studies have been accompanied by others that examine the different factors such as demand (Hollifield & Donnermeyer, 2003); costs (Glass, Chang & Petukhova, 2003); competition (Grubesic & Murray, 2004); technological development (Glass, Talluto & Babb, 2003); and effectiveness of current policies that impact broadband deployment (Gabel & Kwan, 2000; Grubesic, 2003; Strover, 2003). Other studies proposed strategies for broadband deployment that include varied solutions for different locales (Parker, 2000), community networks (Matear, 2002; Rowe, 2003; Skerratt & Warren, 2003), and demand aggregation (Leatherman, 2000; Parker, 2000; Hollifield & Donnermeyer, 2003).

Then there are authors who make a case for policy interventions to further broadband deployment, a technology seen as having widespread benefits across different sectors—health care, education, e-government, entertainment, and commerce (Leatherman, 2000; Parker, 2000; Kalhagen & Olsen, n.d.). Others focus on implications for a specific sector such as rural small businesses (Allen, Johnson, Leistritz, Olsen, & Sell, 1998, Locke, 2004). In terms of the big picture, the case for rural broadband is made around the following four points. First, comparing broadband to railroads and highways, authors express the fear that communities unconnected to broadband networks will face the same fate as those that were bypassed by railroads and highways in an earlier era (Parker, 2000; Worstell, n.d.). Sometimes comparisons are also made to early rural telephony. Parker (2000) characterizes upgrading to broadband as “fundamental as the transition from telegraph to telephone service at the turn of the previous century” (p. 281). Second, authors have called for investments in rural broadband evoking the principle of urban-rural parity (BJK Associates, 2001; Crandall & Jackson, 2003; Hollified & Donnermeyer, 2003). For example, Hollified and Donnermeyer (2003) argue that “to remain competitive in the global information economy, rural-based businesses and individuals must acquire emerging technologies such as broadband connectivity with their urban competitors. Similarly, rural-based schools, non-governmental organizations
(NGOs) and government institutions also need access in order to provide services to their constituents comparable to those available to urban-based citizens” (p. 136). Third, authors have justified for investment in rural broadband by pointing out the system-wide benefits or network externalities. For example, Crandall & Jackson (2003) argue that rural broadband would enhance telemedicine, which in turn would reduce the time and cost of medical service delivery for the whole healthcare system. This argument is different from the equality of access argument. Here, Crandall and Jackson are arguing that rural broadband will offer benefits to the larger system by reducing costs of delivering services in addition to improving the lives of rural residents. Finally, some authors make a case for including broadband in the universal service package drawing an analogy with an earlier technology, which essentially sums up the above three arguments (Matear, 2002; Solomon & Walker, 1995). For example, Matear (2002) argues that “just as universal access to traditional communications media, such as the post office and the telephone, is considered an essential service, so also should access to high-speed Internet, particularly in areas that currently lack the infrastructure to make this possible” (p. 461).

Rarely does a researcher seek to evaluate the actual impact of broadband availability on rural population (LaRose, 2003). It is generally assumed, with the exception of few skeptics (Prieger, 2003; Xavier, 2003), that rural broadband is inherently good. This bias is deeply rooted in the rural telecommunications literature. Writing in 1990 before broadband entered popular vocabulary, Samarajiva and Shields note that this bias perhaps arises from the fact that “those who engage in the academic and policy discourse are already committed to telecommunication through sunk costs of education, job choice, etc.” (p. 234). They question whether investments in rural telecommunications are justified when there are pressing needs for resources for education, housing, and other basic necessities of life. More fundamentally, they question the long-distance bias of rural telecommunications project wherein connectivity to the nearest metropole is privileged over that to the neighboring rural communities. While we
do not see a critique at this level in the rural broadband literature, Prieger (2003) and Xavier (2003) do make notable points. Prieger (2003) criticizes studies that document the digital divide because they “commingle non-adoption of broadband access by households and non-implementation of the technology by carriers” (p. 346). He examines the deployment patterns of broadband carriers and finds that what matters on the supply side is the demographic divide rather than urban-rural divide. Xavier (2003) argues against the inclusion of broadband in universal service package because there is little evidence that it is an essential service right now, he remains open to the possibility that it might become so in the future. He says that the aim of his paper is to “exert a moderating influence on (the, at times, exaggerated) calls for government support / subsidies to broadband deployment” (Xavier, 2003, p. 8).

A Trans-generation model

One of our objectives in undertaking this review essay was to understand the process by which the concept of universal service is extended to new socio-technical domains. We call this process “trans-generation,” a word of our own coinage that implies the transference and regeneration of the concept to new policy discourses. The analysis of seven discursive domains in the previous section provided numerous examples of instances when scholars had used precedent, analogy, appeals to values, economic rationalizations etc. to make a case for universal access in new policy domains. Scholars may make explicit comparisons to precedent-setting systems: for example, by comparing rural broadband to the railroads and highways. Second, authors have used appeals to egalitarian ideals in calling for parity between different communities (in the case of minority access, or access for the disabled); rural and urban areas (as in the case of community networks and rural broadband), and between rich and poor school districts (in the case of the E-Rate). Economic arguments too have been used: for example, lower
costs of healthcare through telemedicine as justification for investment in rural broadband, cost savings in teacher training in the case of school telecommunications access. Here the possibility of realizing system-wide benefits or network externalities mitigates the financial pain egalitarianism demands. Finally, some authors make a case for including a service in the universal service package drawing an analogy with a previous system: for example, the characterization of electronic databases as ‘digital libraries’ invokes the mission of traditional libraries to serve all citizens in the community.

In the transference of the universal service concept to new policy domains, a divergence appears to occur between the actual historical precedent and what it is later reconstructed to be, thus leaving an interpretative “veil” between later observers and the actual precedent. Our review of different policy discourses in the previous section suggests that the “precedent veil” demonstrates a certain “anatomization effect” or decontextualization. Historically, regulatory concepts developed in interrelated clusters in the course of development of the precedent-setting systems. However, when new technologies are introduced, individual concepts get picked as if they were freestanding concepts. Often the original meaning of these concepts is forgotten and the interrelations between them are overlooked. The historical precedent becomes a repertoire of free-floating concepts dislodged of their historical context. Example: the “public interest convenience and necessity standard” current in broadcast policy owes its conceptualization to public utility law, where it originally covered the obligations of tramcar and railway line operators (Caldwell, 1930). As radio regulations were being framed in the 1920s, policy makers picked up the phrase that everyone would recognize as standing for something concrete while being flexible enough to cover all possible future applications of radio technology.
We also observe a process that may be labeled “reduction to historical shorthand” in the transference of the universal service concept to new issue domains. The complexities of the development of the precedence setting proto-systems get reduced to an “imagined history.” Though not necessarily false, this imagined history reconstructs the sequence of events to confer coherence and purposiveness to a process that is chaotic and conditional. The precedence setting systems are seen as being products of a grand design and inspired action. The incremental and contested nature of their development is overlooked. For example, As Mueller (1993), has shown that when Vail called for “one policy, one system, and universal service” in 1907, he meant universal interconnection among different telephone networks and not service to everyone as has been long accepted by the telecommunications policy community.

We also observed several instances in which the meaning of technological precedents that originated in one domain of discourse took on new aspects when applied to new domains. We label this process “stretching” and define it as the tendency of subsequent commentaries to broaden the scope of concepts, regulatory constructs, or policy terms beyond their original applicability. In all these instances, “stretching” was used to create a case for the extension of universal service to new socio-technical domains. A few examples would help to clarify the process: the starkest are observed in the literatures on disability and digital libraries. While in the disabilities cases stretching led to successful outcomes, in the case of digital libraries it has proved to be a restraining factor in the development of new ideas.

In the disability discourse, disability advocates in Australia were successfully able to argue that Telstra’s universal service obligations did not end with simply providing
connectivity. They argued that any technical equipment was merely a means of enabling subscribers to communicate with others. If the standard equipment was unable to do so for a subscriber group, then the telephone company was obligated to provide alternate means. This stretching of the notion of universal access from hardware provision to usability first convinced the Human Rights and Equal Opportunity Commission and then the legislature to redefine the universal service obligations of the telephone company.

Perhaps the most outright examples of stretching were the arguments for making websites accessible to people with disabilities. Quite clearly the lawmakers were thinking of only physical spaces when they wrote the Americans with Disability Act (ADA) as all the places mentioned in the statute were physical. Yet disability advocates have been able to make a strong argument, though not always a successful one, that websites should also be considered to be “places of accommodation” and hence within the purview of the ADA. There is no doubt that as more and more transactions and services move online, the case for accessible Web sites becomes ever more pressing. The big question is how far should the accessibility requirements go for websites? In 1996, the Department of Justice’s Civil Rights Division issued an opinion, which does not have the force of law, that the ADA applies to Web sites. A separate law requires that federal sites created after August 7, 2000 should be accessible to people with disabilities. In 2000, the National Federation of the Blind and the Connecticut attorney general got four tax preparation services to agree to make their Web sites accessible (Heim 2000, Sager 2000). As Sager (2000) notes “although the law was not written with cyberspace in mind, it looks like ADA may be ready to make the jump online” (p. 62).
The extension of conceptualizations of a traditional library to the new Internet-based digital library is also an instance of stretching. What we call the digital library has none of the attributes of the traditional notion of the library: a quiet and friendly neighborhood place with helpful professionals on hand, where you can browse among the bookshelves and check items out at no cost. Most importantly, traditional libraries have the image of free and open access that electronic databases don’t. “The metaphor of the traditional library simply does not apply to the Internet; most of the values and properties of the traditional research library are absent” (Harter, 1997, online). In the words of Douglas Greenberg, “the term ‘digital library’ may even be an oxymoron: that is, if a library is a library, it is not digital; if a library is digital, it is not a library” (quoted in Borgman, 2000, p. 38). Yet, we persist in conditioning our expectations of digital libraries (electronic information databases) on our experiences with traditional libraries. Here though, the advocates of universal service have been less successful than in the reconceptualization of websites as “places of accommodation.”

Critique and discussion

Having completed the reviews of the literature on precedent-setting systems and the new domains of discourse where universal service is playing an important role, we can now turn to a critique of the field. Our main concern in this critique will be to identify and analyze the assumptions about universal service that are sometimes unstated, and often unexamined, but exert an influence on the direction of the discourse. Our analysis of these underlying assumptions also identifies certain tentative directions for future research in the field.
Value of informatization

The first of these unstated assumptions is that information flow and exchange are socially and economically beneficial, and that greater “informatization” is an indicator of progress. The idea that information flow is something inherently good has a long and impressive pedigree, and harks back to the enlightenment ideal of the worth of all knowledge. We see this ideal resurface again and again as the nation engaged with the proto-systems. George Washington saw postal networks as a way of binding the nation together. Madison thought it was essential to check the power of the government. Others thought it would facilitate commerce. Furthermore, the nexus between democracy and information is taken as a given. Each successive effort to universalize a new service was driven by the desire to increase information flows in the country, something that was expected to strengthen democracy and increase general welfare.

As new socio-technical systems emerge, we see the policymakers repeatedly adopting this principle without a second thought. It is only when a writer like Schivelbusch questions the notion that “communication, exchange, motion brings humanity, enlightenment, progress and that isolation and disconnection are evidence of barbarism and merely obstacles to be overcome” (Schivelbusch, 1978, p. 40) that we give pause to think otherwise. In the literatures reviewed, we found only a few scholars arguing against information flow and exchange—and even they take care to qualify their criticism. For example, Larry Cuban (2001) criticizes the euphoria surrounding the introduction of computers into the classroom and finds that computer and Internet use has only a minimal impact on educational quality. However, his complaint is not against computers per se, but against the unplanned, thoughtless introduction of technology into the classroom, the misplaced sense of complacency that educational technology seems to
engender, and the diversion of resources away from more pressing needs. Similarly, Compaine (2001) has argued against universal service programs in telecommunications; but his objection too is to those who apparently argue that every disparity in telecommunications access between different groups needs an organized government response and the concomitant expenditure of public resources and not against information flow and exchange itself. It is only in the rural broadband literature that we find a stronger critical voice questioning the universal service project: here scholars have questioned whether the expected impact of deploying rural broadband has actually materialized (LaRose, 2003); or whether an observed digital divide is the result of conscious non-adoption by some rural households rather than deliberate denial of service by telecommunications carriers (Prieger, 2003); or if rural broadband is an “essential service” right now meriting its inclusion in the universal service package (Xavier, 2003).

Universal service scholars as a research community have been too quick to subscribe to the inherent value of information flows and use. Though there are undoubtedly benefits to greater information access and use, the apparent reluctance of many universal service scholars to critically examine this idea and articulate contrary viewpoints is a weakness of the current policy discourse. For example, Samarajiva and Shields (1990) point out the long-distance bias of rural telecommunications projects wherein connectivity to the nearest metropole is privileged over that to the neighboring rural communities. They observe that in an asymmetrical relationship, the weaker communities could be harmed by this connectivity as local businesses maybe unable to compete with the now more accessible counterparts in the metropole and also the local community is likely to lose autonomy as its economy is integrated with the metropolitan economy. Samarajiva and Shields thereby take issue with the vast majority of researchers
who consciously or unconsciously make the assumption that telecommunications networks are a force for good. In their opinion, telecommunications enthusiasts make erroneous assumption that two-way communication is power-neutral. The notion of "communication as dialogue" is often incompatible with the entrenched power structures.

Interestingly, the stand taken by Samarajiva & Shields is widely accepted at the global level where it is feared that information flows can lead to electronic imperialism. However, within a nation, integration, which is what universal service seeks to achieve, is without question accepted as something inherently good. Our aim here is not to deny the value of information flows, but only to advocate a more critical perspective in our discussions of universal access.

**Systemic framework**

A second unexamined assumption in the universal service debates is that *universal access cannot be provided without an organized systemic framework*. According to this viewpoint, universal access is most feasible when it is incorporated within the overall design of a system, and when purposive programs are put in place for its achievement. Even services that start in a bottom up manner, education for example, need to be systemized at some point to facilitate universal access. The systemic framework allows transfer of resources from one user group to subsidize another. These cross-subsidies were critical for the development of the universal postal service (subsidies from regular mail to newspapers and from the North and East to South and West), universal education (subsidies via property taxes from the rich to the poor), and universal telephone service (subsidies from businesses to residential users and urban to rural users). While broadcasting did not require an explicit system of cross-subsidy, cost of programming is recovered via advertising charges largely from urban sponsors.
Among the literatures reviewed, the need for an organized systemic framework is most explicitly an issue in the case of e-rate and rural broadband, which depend on subsidy flows from one part of the system to another. In fact, without these subsidy flows, neither would be possible. While the need for an organized systemic framework was not explicitly discussed in the case of minorities and people with disabilities, its existence is an implicit assumption because cross-subsidies, rather than direct government grants, have been the traditional way of funding initiatives in these areas. In the case of peoples with disabilities, Kaplan provides a new twist when she argues that speech synthesis and speech recognition technologies should be incorporated in the very design of the network and the costs should be spread out across the entire subscriber base. It is important to note that the economies of scale advocated by Kaplan (cited in Bowe, 1993) would generate different kinds of subsidies than what have traditionally been used in the telephone industry. In the traditional system, the price at which some subscribers could access telecommunications services was raised (even though the cost of producing those services did not go up), so that the resulting profit margins could cross-subsidize other subscribers who could not afford service. In Kaplan’s model, the cost of producing telecommunications services go up because technical enhancements are made mandatory for all equipment—though economies of scale would tend to mitigate this effect to some extent. In both cases, the prices that some subscribers pay will go up, but it is important to note the different ways this comes about. But in both cases, a systemic response is clearly required.

These repeated calls for systemic solutions to problems of access may indicate a distrust of, and impatience with, the normal processes of diffusion in which subscribers
individually adopt new technologies, based upon costs and benefits (Lentz, 2000). This in turn leads to providing services to customers through universal service programs, that they may not need or be able to use appropriately: for example, schools are only now learning how of computers and Internet in schools made available through E-Rate subsidies. This distrust also extends to service providers, that they may deliberately, or through lack of understanding of consumer needs, deny access to consumers. This is not to deny that cases of ‘redlining’ do occur, but universal service scholars seem at times to be too eager to identify each and every gap in access as a market failure requiring the creation of systemic solutions. Few scholars have argued that some gaps would disappear over time while some others may persist (Schement & Forbes, 2000); and of those that persist, some may be due to genuine differences in consumer needs (see Lentz, 2000 for a review of articles taking these positions). More research, informed by the extensive literature on diffusion studies, is required on which gaps actually constitute a digital divide, and how long they need to persist before a systemic solution becomes necessary.

Uniformity of Access

Closely tied to the call for systemic solutions is a third assumption of the universal service discourse: there should be uniformity in access across regions and social strata. This requirement sustains itself on both philosophical and practical grounds. Philosophically, uniformity in access resonates with our notion of information egalitarianism and equity. Practically, uniformity of access provides a convenient and more politically defensible benchmark. Disparity in the quality of service between the rich and the poor and the urban and the rural areas has been a concern with many of the
precedent setting technologies discussed in this paper: in the case of postal rates for example, there was real concern about the impact on rural newspapers. In the case of telephones, the FCC and industry put in place an elaborate system of cross-subsidies and geographic rate averaging to ensure that rural and urban consumers would pay the same rates for telephone access.

In the new domains of discourse, this principle is most clearly evident in the e-rate and rural broadband literatures, areas where mitigating the rural disadvantage is of primary concern. Geography is also an important issue in the minorities and e-govemment literatures because of concerns about redlining and the need for parity between the poor parts of urban areas, usually inner cities in the U.S., and the rest of the system. Concerns about equity across social strata permeate all the literatures. We very often hear warnings about a “two-tier” society, “second-class citizens,” “haves” and “have-nots.” In the case of people with disabilities, Kanayama (2000) even provides a new twist to the familiar theme—gaps between those who “can” and those who “cannot.”

Though eminently well-intentioned and with definite practical advantages, this insistence on uniform access also has its downside especially in a multiple services environment. In the old precedent-setting systems that provided a few services, it was possible to define a narrow set of services that would be supported by universal service subsidies. For example, universal telephone service centered on dial-tone access to local service, disparagingly referred to as Plain Old Telephone Service (POTS). Telephone networks today provide multiple services, analogously labeled Pretty Advanced New Stuff (PANS)—to include all of these options in the universal service package would be financially impossible, but which services should be included? Also, whatever package is
identified, it is evident that not all consumers would find all the included services equally useful, nor would all the services they may want be covered by universal service: therefore, there are likely to be both waste and unmet demands when universal service policies support only a uniform bundle of services.

Identifying and implementing a uniform service package in a multiple services environment also presents challenges. The FCC has evolved complicated procedures of periodic reviews and trigger mechanisms to identify which services should be supported by universal service programs, without letting go of the fundamental notion that the universal service package should be uniformly available. Proposals that there could be regional variations in universal service packages (Hart, 1998), or that consumers could be allowed to pick and choose the services that they want from a common menu (Schement & Forbes, 1999) have been put forward, but find few takers. Universal service scholars need to explore further the possibility that universal access need not be uniform access across geographical regions and social strata.

**Placelessness**

In sharp contrast to scholars concerned about geographical gaps in access to telecommunications and information technology, there is another perspective that claims that *universal service programs need no longer be concerned with geography, because place has been made irrelevant in the new information and communication technology environment*. Though the latter perspective is less widely held that the former, some observers see the promise of the Internet to be the “gateway to placelessness” (Knoke, 1997, p. 18), where physical location does not matter, and a user can access content from anywhere on the globe. The whole world converges into a global village. Some scholars of digital libraries voice much optimism about global access to knowledge due to the
digitization and distribution of information. By implication, universal access programs need not be concerned about physical location or geography at all in the coming age of information plenty.

Yet, research in some of the new domains seems to indicate that an individual’s place of residence matters in more ways than one in determining access. First, we should consider the possibility discussed before that some communities may not have Internet access of the quality and at prices available elsewhere. Second, local service providers may differ vastly in their ability to deploy services. For example, as Alfred Ho’s (2002) work has shown, cities with lower revenue bases and higher concentrations of minority populations lag other cities of similar size when deploying e-government services. Many cities never advance beyond the first stage of “cataloging” (Layne & Lee, 2001) in deploying e-government due to revenue constraints. Thus neither an excessive focus on geographical differences in access nor a denial of the relevance of geography is likely to help the universal service discourse—the truth, as in so many other cases, lies somewhere in between.

Local versus metropole

The fifth assumption in the universal service discourse is more in the line of an expectation: the organized systemic framework for universal service should not let the metropole dominate the hinterland. A universalized information and communication system by its very nature is an integrative force. Yet universal service scholars and policymakers are concerned that the metropole should not dominate the hinterland. There is a peculiar paradox here that policymakers have repeatedly grappled with, in the history of the nation. Historically, Americans have been distrustful of national government and strong defenders of local autonomy. America’s faith in community can be traced from “Thomas Jefferson’s national visions of a continental republic of small landholders,
through the late 19th century populist agitation’s (sic) that challenged the nationalization of regional and local economic resources, to the more recent notion of the locally-controlled information networks” (Shuler, 1999, pp. 362-63). Localism as a policy goal has been a strong influence on broadcast policy-making. The emphasis on local control is especially strong in education too, with local communities fiercely defending the right to raise local resources through taxation and to set local curricula.

At the same time, there was also a tendency toward national coordination and harmonization especially in matters that had interstate ramifications, such as transportation, broadcasting and telecommunications. This tendency was evident in education also. By the early decades of the 20th century, states had acquired considerable public and judicial sanction to set reasonable educational standards for local school districts, eventually paving the way for nationwide systems of education. This trend has been taken one step further in the second half of the twentieth century, with federal authority over school testing, teacher accreditation, and educational equity. The tension between local autonomy and national coordination was also manifest in the flat rate versus distance based rates in the postal system: advocates of distance sensitive rates sought to protect small town and rural papers against metropolitan newspapers, which they felt would overwhelm those in the hinterland under a flat rate. Similarly in broadcasting history, some scholars argued that all stations should be allowed to use only low-power transmitters so that stations in small and large markets will be able to co-exist.

Interestingly, domination by the metropolitan areas was an issue only in some of the later literatures reviewed. It was particularly evident in the E-Rate literature, where there was concern that local communities did not have the autonomy to deploy funds in the best way they saw fit. Instead, the purposes for which funds could be used and the
services that could be paid for were specifically enumerated and controlled (Dickard, 2002). The aim of the E-rate program was not to promote the Jeffersonian local autonomy referred to by Shuler (1999). Instead, the aim was to harmonize or standardize telecommunications access across classrooms and school districts, and equalize opportunity: “(b)uilding technology capacity in underserved communities diminishes the competitive disadvantage faced by certain areas, especially inner cities and rural areas” (Carvin, 2000, p. 4). As former Department of Commerce Assistant Secretary Larry Irving argued, Internet access has become the new civil right (quoted in Carvin, 2000, p. 5)—implying thereby that it should be available universally and qualitatively undifferentiated to all citizens.

At the same time, the E-Rate program was able to mollify supporters of local autonomy by providing important incentives. By funding “vital community centers” (Shuler, 1999, p. 364), such as schools and libraries, the E-Rate program creates local community resources. This is especially true of economically disadvantaged communities where E-Rate funds often have multiplier effects on development. As one study prepared for the U.S. Department of Education pointed out, the experience of participating in the E-Rate program proved to be useful for these communities “as they look for other ways to promote e-learning opportunities for their students and thereby better develop the long-run economic strength of their communities” (Chaplin, 2001, p. 15). As the debate on the E-Rate program showed, legislators found it easy and politically advantageous to show their support for local communities: “lawmakers did see public access in schools and libraries as a stepping stone to developing a modern communication infrastructure in communities” (Carvin, 2000, p. 5). Thus the rhetoric on the E-rate program managed to
bridge the seemingly unbridgeable gap between local autonomy and national standardization. The benefit to local communities made the program appealing to legislators even as the strict program guidelines promoted national harmonization at the expense of local autonomy.

Other literatures also showed the impact of the local-versus-metropole controversy. In the community networks debate, there is some discussion that infrastructure investment should be based on local “asset mapping” and inside-out development, rather than through external stimulus. In the digital libraries debate, the local-metropole tension was manifest in a somewhat different fashion, namely the competing pressures on libraries to serve local users through the creation of physical facilities or to serve a global user base using Internet-based resources. This has clear antecedents in long-standing attempts in the education community to quantify the benefits to local communities and economies from education spending (Fisher, 1997; Moretti, 2004). More specifically, scholars have looked at the incentives for local jurisdictions to spend on higher education when the benefits are likely to be transferred to other locations through migration (Justman & Thisse, 2000; Strathman, 1994). Should states and municipalities, and even nations in common markets, such as the European Union, spend money on high school and universal education when graduates are quite likely to move in search of employment? Justman and Thisse (2000) show that decentralized decision-makers (states, municipalities etc.) would indeed spend less on education in the presence of labor migration, than what would be optimal if there was centralized coordination. Strathman (1994) too found that increases in out-migration would reduce spending per student. Interestingly, one of the solutions that emerge from
Justman and Thisse (2000) is centralized funding for education—there is a ready parallel for digital libraries, through federal funding for digitization and content management.

Universal service scholars need to engage more clearly with the fact that a universalized information and communication system by its very nature is an integrative force. One way to reconcile the centralizing tendencies of universal service policy with the exigencies of local autonomy may be to move away from prescriptive policy solutions, towards the evolution of common standards and their promotion through coordinating agencies. Such standards are reminiscent of teacher training and curriculum standards in education. We observed references to standards in many of the discursive domains examined in this paper: for example, in the disability literature we have an agency called the Center for Information Technology Accommodation (CITA), created by Congress in 1998, that would encourage all government agencies to implement website accessibility standards (General Services Administration, n.d.). Private parties have also proposed web accessibility standards; for example, the Priority One guidelines of the World Wide Web Consortium (W3C) (West, 2003). Similarly, in the field of e-government, hierarchies of achievement such as the four-stage model proposed by Layne and Lee (2001), may be regarded as examples of performance standards for government agencies. Such a standards-building approach may even be more compatible with a globalizing world environment in which the powers of national policy-makers are eroding vis-à-vis both transnational groupings and sub-national entities.

**Neutrality**

A final assumption evident in the universal service debates is the expectation that universal service can and should be achieved while maintaining neutrality and balance between different policy choices and interest groups. This is a paradoxical expectation because universal service, with its basis in egalitarianism and universalism, is a utopian
ideal that does not permit any exceptions or exclusions—yet, some policymakers and scholars expect that such an outcome can be achieved while preserving balance and moderation in every other respect. The expectation is that government should ensure a “level playing field” even as it pursues a project with distinct redistributive outcomes. We saw this principle in play in postal history when Congress decided to allow all newspapers into the mail instead of favoring a few. It has also become a recurring issue in the regulation of the telephone industry, where the Congress and FCC sought to ensure that their interventions via subsidies or regulatory actions should not give an unfair advantage to any firm in the marketplace—“competitive neutrality” was made one of the objectives of telecommunications policy in the Telecommunications Act (1996).

However, technological convergence, intensifying competition, the proliferation of services and litigation have enormously complicated the task of ensuring policy neutrality. The regulators now need to implement “light-touch regulation” that neither favors one competitor over another, nor one technology platform over another. This has resulted in increasingly complicated financing mechanisms for universal service programs that are still regularly contested in courts: for example, funding for the E-Rate program from the Universal Service Fund.

But the presence of multiple stakeholders in the universal service debates and the multifaceted impacts of its programs on society may also provide an opportunity to policymakers. In heavily contested policy terrains with multiple objectives and many stakeholders, it often becomes possible to put together winning coalitions whose members have enough overlap in interests to permit agreement on a plan of action. Such coalitions are less likely to emerge when the number of stakeholders is fewer, and the policy choices are less ambiguous. This sort of coalition building has precedents in the
history of the American educational system that, since the beginning, had the twin goals of building social capital and imparting skills. If social capital refers to virtues such as civic responsibility, mutual trust, and democratic participation, individual skills include the elementary ‘three Rs’ and higher-level workplace skills. While not mutually exclusive, these two objectives have battled for supremacy with one or the other dominating at different times. In colonial New England, the driver of educational initiatives was communitarian concern with the religious instruction of the young and the republican ideal of the equality of all citizens (Kotin & Aikman, 1980). Meanwhile, Virginia and other southern states put in place a system of trade education based on apprenticeship that emphasized skills. In the nineteenth century, with rapid industrialization and increasing demands for trained labor, the “Virginia model” of skill-based education seemed to prevail. In the late nineteenth and early twentieth century, the schools’ potential to build social capital through assimilation came to the fore when industrialization, rural-to-urban migration, and massive immigration caused many to fear class conflict and discord. The success of educational reformers like Horace Mann can in part be attributed to the fact that they tapped into these multiple aspirations—the assimilationists’ goal of welding diverse ethnic and linguistic groups into a common American identity, as well as the industrialists’ demand for skilled labor.

Similarly, universal service programs appear to offer something to all sides. On the one hand, they build skills and empower individuals. On the other, they build shared knowledge, social interaction and common cultural referents by creating community resources such as Internet access at schools and libraries, local computing centers, community networks and digital libraries. The fact that its advocates claim that universal
service can attain both skills and socialization has not kept its critics from saying that the balance has been shifted one way or the other: For example, Cuban (1991) states with reference to the E-Rate program that “contemporary reformers have forgotten the democratic mission at the heart of public schooling, ignored the critical importance of social capital in strengthening civic behaviors, and proven too narrowly committed to technocratic solutions of school problems” (pp. 191-192). From the other side, some point out that school Internet access does nothing for basic skill development either: “Opponents point out that schools that cannot teach their students to read and write should not be plugging them into the Internet instead” (DeMuth & Furchtgott-Roth, 1998, p. x). Universal service programs do not obviously satisfy all stakeholders, but the fact that they exist shows that enough stakeholders found something to agree on that the programs could be implemented.

Policymakers have been able to use the same principle to balance the conflicting demands of consumer benefit and industry deregulation. Theoretically, industries in which the conditions necessary for perfect competition are unlikely to obtain because of natural monopoly, imperfect information, scarce resources, etc., have all been subject to regulation. In each situation, the ultimate justification for regulation was the supposed disadvantages to consumers or potential competitors resulting from the unencumbered operations of industry. Industry deregulation therefore raises real or imagined fears that consumers would be negatively affected. With or without a rational basis, consumer benefits and industry deregulation are seen by some observers as antithetical to each other. Thus, for deregulatory initiatives to be politically acceptable, consumer concerns would need to be effectively addressed. The preamble to the 1996 Telecommunications
Act specifically addresses this concern by stating that the objective of the Act is “to promote competition and reduce regulation in order to secure lower prices and higher quality services for American telecommunications consumers and encourage the rapid deployment of new telecommunications technologies.” Thus, while deregulation was the principal objective of the Act, it was not the sole or ultimate objective, which was to secure certain consumer benefits in terms of lower prices, higher quality and universal access to advanced services. However, legislators could not leave these consumer benefits to be delivered indirectly and incrementally by the market without appearing to be negligent in safeguarding the interests of their constituencies. Specific language had to be worked into the Act that would guarantee these consumer benefits by mandating them.

The need for legislators to make deregulation palatable to the electorate explains the seeming contradiction that a piece of legislation that set out to deregulate the industry ended up creating a huge new fiscal liability for the industry (the Universal Service Fund), the proceeds of which would be used to fund a program that radically expanded the notion of traditional universal service (Hausman, 1998). An explanation for this apparent contradiction comes from George Stigler’s widely cited paper titled the “theory of economic regulation” (Stigler, 1971). In this paper, Stigler made the case that “regulation” is a product produced by government and regulatory agencies and consumed by industry. Government produces “regulation” by putting together coalitions of support among the public that would secure passage for rule-making initiatives through the legislative / regulatory process. Industry is the “consumer” of regulation, and “pays” for regulation through campaign contributions and other forms of political support to the government. While the government might be keen to oblige one of its constituents
(industry), it can only produce regulation behind which it can put together a viable and effective coalition. (This is a key difference with “capture theory,” that says that government decision-making is captured by industry interests with the result that government can be made to produce any outcome at the bidding of industry). The “supply of regulation” is therefore limited to the outcomes for which the government can put together winning coalitions.

In the light of Stigler’s theory of economic regulation, universal service programs cease to be an aberration within a deregulatory initiative, but a vital component of deregulation that ensures overall political viability. By including the provisions for universal service programs in Section 254 of the Telecommunications Act, legislators succeeded in winning approval for a “regulatory product” (namely deregulation) for which there was much demand from industry. Industry willingly accepted the new financial obligations because it secured for them a relaxation of “line-of-business” restrictions and other deregulatory benefits. In this sense as well, the E-Rate program functioned as a bridge between the seemingly irreconcilable concepts of consumer benefits and industry deregulation.

The above discussion shows that the expectation of policy neutrality in the universal service discourse is not just impractical, but counter-productive as well because it encourages the pursuit of exceedingly convoluted policy solutions. The ideal of “competitive neutrality” enshrined in the 1996 Telecommunications Act cannot be reconciled with the redistributive goals of universal service policy. Universal service scholars and policy-makers need to recognize that universal service policy-making is not an exercise in preserving competitive neutrality, but in achieving coalitions of interest.
through the distribution of costs and benefits. The enormous literature on coalition building and interest group politics in political science has been insufficiently utilized in universal service policy studies—there is ample scope to do so, in the light of the preceding paragraphs.

In Summary

Originally aimed at ensuring access to postal and telephone services, education and broadcasting, universal service policies continue to influence diverse new domains of discourse including rural broadband, Internet access in schools, digital libraries, and community networks. The apparent ability of the universal service concept to continually regenerate itself in new domains of discourse is testimony to the strength of the egalitarian and universalist principles underlying the concept. We are repeatedly drawn to the concept because it taps deeply into our sense of equality and fairness. However, we also saw that there are specific discursive practices that have been used by universal service scholars to promote and project demands for universal access to new socio-technical systems as they emerge. These discursive practices such as precedent, analogy, appeals to values, economic rationalizations, “anatomization” and “stretching” give the demand for universal access urgency in the various debates.

The review of the precedent setting systems and the new discursive domains in this essay also identified certain unexamined assumptions and expectations about the nature of universal service: the unquestioned value attached to informatization; the call for systemic solutions; the expectation that services will be provided uniformly; the conflict between the local and the metropole; and the ideal of policy neutrality. Critically
evaluating these assumptions allowed us to assess the current status of the field and point out some directions for future research.

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Endnotes

1 For example, Leonard Bacon, a Congregational minister, questioned the right of the government to shower resources on the newspapers and give them a decided advantage over proponents of non-secular points of view, such as Methodist circuit riders (John 1995, p. 40).

2 In 1801 the postal system was moved out of the Treasury department to the State department (John 1995).

3 Interestingly, at a time of considerable euphoria about the potential of education, Samuel Miller warned against the tendency to “assign ‘intellectual and moral omnipotence’ to education. Never before was there an age, he noted, when knowledge of various kinds had been so popular and widely diffused: the public mind had been awakened, the masks of ignorance and corruption had been lifted, and the love of freedom had been advanced. But in the wake of these improvements had come superficiality, infidelity, materialism, and worst of all, hubris. God would show little mercy, he warned, to a society that ignored human limitation” (Cremin 1980, p. 5-6).

4 The U.S. Constitution itself makes no mention of education. However, education was debated in the Constitutional Convention. For instance, Madison and others proposed that the Congress should be empowered to establish a national university in Washington, DC. But it was voted down because it was felt that cluttering the constitution with specific proposals like this might generate controversy and make ratification difficult—the framers wanted to stay at the level of general principles. Also, with jurisdiction over the District of Columbia, Congress could create a national university at any later time, if it so desired, without any additional constitutional authorization. Later, when the Bill of Rights was passed, the Tenth Amendment pronounced that all powers not delegated “to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.” While even the Tenth Amendment makes no specific reference to education, it is generally seen as leaving education to the States since no mention was made to it in the Constitution (Madsen 1974).

However, the federal government was not entirely removed from education. When the Continental Congress passed the Northwest Ordinance in 1787, it declared that “religion, morality, and knowledge, being necessary to good government and the happiness of mankind, schools and the means of education shall forever be encouraged” (quoted in Madsen 1974). It also reserved land in every township in the new territories for supporting a public school. On a more general level, the American Revolution “lent new urgency to the discussion of educational affairs, there being widespread agreement that in republics the nurturance of morality and intellect in the citizenry at large is a matter of the highest public responsibility” (Cremin 1980, p. 11).

5 As the name indicates, dame schools were run by women in their homes where very young children were taught their letters. Old field schools, parochial schools, and district schools were all elementary schools under different forms of management. Old field schools, run on the basis of a contract between teacher and parents, got their name from
being located on waste or exhausted land belonging to the town. Parochial schools and school districts were run by the church and an elected board respectively (Good, 1956).

Interestingly, in 1786, Benjamin Rush had written: “Our schools of learning, by producing one general and uniform system of education, will render the mass of the people more homogeneous and thereby fit them more easily for uniform and peaceable government” (p. 10).

The materials in this section have been extracted from Jayakar & Sawhney (2004).

As Mueller (1997) points out, long distance services were much more lightly regulated than local service in the 1920s and 1930s. When a firm uses common facilities to produce goods or services for both regulated and unregulated markets, it has an economic incentive to allocate as much of the common costs to the regulated market (in order to substantiate demands for higher rates).

“[T]he tastes, needs, and desires of all substantial groups among the listening public should be met, in some fair proportion, by a well-rounded program, in which entertainment, consisting of music both classical and lighter grades, religion, education, and instruction, important public events, discussion of public questions, weather, market reports, and news, and matters of interest to all members of the family find a place” Great Lakes Broadcasting Co. (37 F. 2nd 993, D.C. Cir.), quoted in Messere (2003).

Messere (2003) argues that there was a political reason why the FRC/FCC made localism one of its policy objectives. The FCC’s authority under the original terms of the Communications Act did not extend to the national radio networks. The network-affiliate relationship too was also arguably outside the FCC’s purview. However, by asserting an interest over the relationship of local stations to their communities, the FCC could have any say in the network-affiliate relationship. “Policy evaluation based on serving the interests of the city of license provided the FCC with sufficient leverage over the whole of the broadcast industry through station regulation” (p. 7). Thus the localism and trusteeship framework was not a neutral decision-making protocol, but part of an active policy vocabulary that could be used by key participants to extend their authority or secure their objectives.

More detail is provided in an article by Louis Caldwell, Chairman of the Committee on Communications of the American Bar Association and the General Counsel to the Federal Radio Commission (Caldwell, 1930). The first law with the phrase was enacted in 1892 in New York, requiring railroads to obtain a certificate of “public convenience or necessity.” Another New York statute of 1895 extended the requirement to street railways. Soon other states made the standard mandatory for all public utilities (the article does not say if this list included telephones as well). The Transportation Act of 1920, that amended the Interstate Commerce Act required railroads participating in interstate commerce to obtain a certificate of public interest or convenience before extending old lines, constructing new lines, or acquiring a railroad. The “public interest” phrase originated in a series of Supreme court decisions, *Munn v Illinois* (1876), *Budd v. New York* (1892); and *Brass v. North Dakota* (1894).

The “public interest, convenience and necessity” standard was used for transportation systems and public utilities on the rationale that they had exclusive right to serve a given area and used public rights of ways. Neither of them were an issue in the case of radio. The basis for using the standard for broadcasting was different—the broadcasters were
given access to a scarce publicly owned media and there was need to ensure diversity of viewpoints (Krasnow & Goodman, 1998; McChesney, 1993).

13 Normal goods are those with a positive income elasticity of demand, i.e. goods for which people tend to increase consumption when their incomes rise and vice versa.

14 Goggin and Newell (2000) characterize the medical paradigm as one that looks at disability as a medical problem where the doctor, the expert, knows what is the best for the patient, the passive recipient of medical care. They view the lay and charity paradigms as going together, as lay people perceive the disabled as objects of pity while charities work to ameliorate the suffering of the disabled. On the other hand, the corporations seek to “manage” the disability communities just as they manage labor, environmentalists, and other demanding constituencies. They talk in terms of “special needs” and “special programs,” which are essentially patchwork solutions.

15 Encryption scrambles digitized content so that only computers/playback devices with access to a decoding key will be able unscramble it and play it back. “Marking” involves placing identifiable information in the digital content that can be used to identify infringement after the use. A simple and easily circumvented example is the “broadcast flag,” that places the logo of the originating station in the broadcast content. A more sophisticated example is the “digital watermark” a pattern of digitized information that is intermingled with the content itself. “Fingerprinting” works by extracting unique patterns in digital content, that would identify its source (Godwin, n.d.).

16 His critique of technology orientation goes deeper. According to Stroecker (2005), “information is often confused with technology, in the sense that once you have the technology it is assumed you will get the information” (p. 17). This confusion becomes especially evident when organizations send enormous amounts of effort assessing the technology needs of a community but do not even bother to understand the information needs. He therefore feels that Community Informatics has the best chance of flowering in library and information science environments where traditionally information has been privileged over technology.

17 See Sawhney (2003) for a discussion on how systems in general benefit from universal access.

18 The text and legislative history of the bill can be accessed in the U.S. Library of Congress’s THOMAS Legislative Information System at http://thomas.loc.gov

19 For a full list of eligible and ineligible services, see the Eligible Services List maintained by the Universal Service Administration Company [USAC] at http://www.sl.universalservice.org/reference/eligible.asp (USAC, 2002).

20 In 1907 there were more than 18,000 rural telephone companies and cooperatives servicing about 1.5 million rural telephones, about a quarter of all telephones in the U.S. By 1920, as a result of networks built by the independents and the networks their competitive pressure induced Bell to build, 39% of farms had telephone service as compared to 35% of all U.S. households. However, after the 1913 Kingsbury commitment, the independents started fading as a competitive force (Fischer, 1987).
According to the International Telegraph and Telephone Consultative Committee, an Integrated Services Digital Network (ISDN) is defined as a network “that provides end-to-end digital connectivity to support a wide range of services, including voice and nonvoice services” (quoted in Gabe & Abel, 2002, p. 1246). What generated considerable enthusiasm for ISDN was that it transmits voice, data, and video over the same line. Depending on the specific technology deployed, the transmission rates of ISDN networks range from 128 kilobits per second to over 150 megabits per second (Gabe & Abel, 2002).

See Sandvig and Sawhney (2004) for an analysis of why ICT research tends to follow the same pattern with each new technology.

“The term ‘broadband’ itself has multiple meanings. Some suggest that ‘broadband’ is a multitier concept and its definition should evolve as user expectations change” (Rowe, 2003, p. 86). Venkatachalam & McDowell (2002) document the differing definitions offered by different participants in a 2001 NTIA proceeding.

Allen, Johnson, Leistritz, Olsen, and Sell, (1998) talk about advanced telecommunications services in general and not broadband per se.

Parker (2000) hastens to add that “The main difference between the railroad and Interstate highway networks on the one hand and the telephone and broadband digital information superhighway on the other is that the costs of the information technologies are so low that our society can easily afford to make the digital information highway available to all rural communities” (p. 282).

Bertot (2003), while not skeptical of rural broadband investments, argues that “in a telecommunications/networked environment, one needs to reconsider this location-based definition and consider the concept of “rurality”—that being “rural’ has more to do with access to and availability of advanced, reliable, and high speed telecommunications services than geography” (p. 187).