

# The Evolution and Application of Digital Divide Research

Building a digital community in Illinois

# The Evolution and Application of Digital Divide Research: Building a Digital Community in Illinois

By Thomas Prudhomme, Allison Clark & Damian Duffy

Even after more than a decade of research, the digital divide remains an enigma. The definition, cause, and measurement of the digital divide are all open to debate among changing social conditions, political imperatives, and technology. Shifting priorities have prevented development of a national framework for addressing the digital divide, but many states have developed their own programs to increase socio-economic equity through information and communication technology (ICT). For example, more than 100 community technology centers established in Illinois since 2000 continue to serve communities across the state.

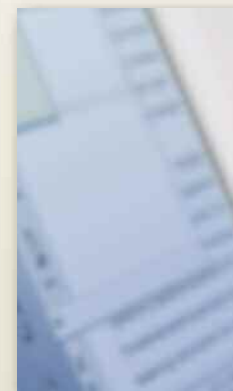
In this chapter, we look into the national debate about the meaning of digital divide and the research and policy goals concerning it. We also examine what the research literature says about using a community-oriented approach to address digital divide objectives, with a particular focus on the role of community technology centers (CTCs). Finally, we discuss the effort to eliminate the digital divide in Illinois, including an overview of the current pro-

gram managed by the Illinois Department of Commerce and Economic Opportunity (DCEO).

## Negotiating the Digital Divide

The U.S. Department of Commerce reported in 2005 that 56 percent of working adults used a computer at work and 42 percent used the Internet. The transformative effects of information and communication technology on work force demographics are everywhere, including Illinois, which ranks seventh nationally in the number of high-tech workers, and where 42 out of every 1,000 private sector workers are employed by high-tech firms.<sup>1</sup>

ICT provides multifaceted tools that can improve the capacity and effectiveness of local, state, national, and international social and economic networks. It has the potential to improve both education and employment.<sup>2</sup> On the other hand, ICT can reproduce or reinforce pre-existing social inequalities.<sup>3</sup> These conflicting issues relating to the digital divide have characterized ICT research and policy since the mid-1990s.



<sup>1</sup> Children's Partnership. *Illinois Youth and Technology Factsheet* (2008). Retrieved October 1, 2008, from [http://www.techpolicybank.org/AM/Template.cfm?Section=State\\_Fact\\_Sheets&Template=/CM/ContentDisplay.cfm&ContentID=11765](http://www.techpolicybank.org/AM/Template.cfm?Section=State_Fact_Sheets&Template=/CM/ContentDisplay.cfm&ContentID=11765).

<sup>2</sup> P. DiMaggio and E. Hargittai. *From the 'Digital Divide' to 'Digital Inequality': Studying Internet Use As Penetration Increases*. (CACPS working paper 15) (Princeton, NJ: Center for Arts and Cultural Policy Studies, 2001). Retrieved September 20, 2008, from <http://www.princeton.edu/~artspol/workpap15.html>; Community Technology Centers' Network (CTCNet) of the Washington Metropolitan Area. *From Policy to Action: Profiles of Washington Area Programs Making Progress on the Digital Divide* (2002) [Electronic version]. Retrieved September 12, 2008, from [http://web.archive.org/web/20030321141621/http://ctcnet.org/frompolicytoaction\\_v1.pdf](http://web.archive.org/web/20030321141621/http://ctcnet.org/frompolicytoaction_v1.pdf).

<sup>3</sup> E. Green and L. Keeble. "The Technological Story of a Women's Centre," in L. Keeble and B. D. Loader (eds.), *Community Informatics: Shaping Computer-Mediated Social Relations* (London: Routledge, 2001): 53-70; K. Williams and A. Alkalimat. "A Census of Public Computing in Toledo, Ohio," in Douglas Schuler and Peter Day (eds.), *Shaping the Network Society: The New Role of Civic Society in CyberSpace* [Electronic version] (Cambridge, MA: MIT Press, 2002): 85-110. Retrieved September 19, 2008, from <http://www.communitytechnology.org/toledo/toledo.pdf>; M. Warschauer. "Reconceptualizing the Digital Divide," *First Monday*, 7(7) (2002). Retrieved September 21, 2008, from [http://firstmonday.org/issues/issue7\\_7/warschauer/index.html](http://firstmonday.org/issues/issue7_7/warschauer/index.html); L. Kvasny and M. Keil. "The Challenges of Redressing the Digital Divide: A Tale of Two US Cities," *Information Systems Journal* 16(1) (2006): 23-53; and P. Gamage and E.F. Halpin. "E-Sri Lanka: Bridging the Digital Divide," *The Electronic Library*, 25(6) (2007): 698-710.



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In general, research and practice dedicated to understanding and implementing programs to address the digital divide have evolved over the past two decades in an organic manner characteristic of social issues. Unfortunately, each study is an independent view into a particular set of circumstances, so there is no coordinated theme to the research or even agreement on a framework within which to evaluate the results. Therefore, it is not surprising that the perspectives of researchers and policymakers have continued to evolve.

### Defining and Re-Defining the Digital Divide

The exact origin of the term “digital divide” has been attributed to both government and the media.<sup>4</sup> It is widely acknowledged that the term was popularized in the U.S. by the Clinton administration and the “Falling Through the Net” series of reports released between 1995 and 2000 by the National Telecommunications and Information Administration (NTIA), an agency of the Department of Commerce.<sup>5</sup> The third “Falling Through the Net” report, released in 1999, defines the digital divide as a gap in access to ICT between information “haves” and “have-

nots.” This concept has resulted in less effective policy and there are two interconnected reasons for this. First, the sole focus on access limits discussion to a single dimension of a multifaceted issue. Second, focusing solely on access incorrectly implies that technological solutions alone can fully address what is, in fact, part of a larger social problem.<sup>6</sup>

This misunderstanding of the digital divide as a binary issue of access is based in the historical traditions of telecommunications policy.<sup>7</sup> The first “Falling Through the Net” report, released in 1995, describes the goal of universal service in American telecommunications policy in terms originally used in the 1934 Communications Act regarding use of the telephone. The idea that the telephone and ICT are analogous technologies is an artifact of the traditional view of the digital divide as a question of access. However, research suggests that the have/don’t have view of access makes sense for the telephone, but not for ICT. The quality and quantity of ICT access can vary greatly depending on the location and capability of the technology. Moreover, technological access exists on a continuum of digital inequalities that also

<sup>4</sup> D. J. Gunkel. (2003). “Second Thoughts: Toward a Critique of the Digital Divide,” *New Media & Society*, 5(4) (2003): 499-522.

<sup>5</sup> K. Williams. “What Is the Digital Divide?” in K. Williams (ed.), *d3: Proceedings of the Digital Divide Doctoral Students Workshop* (Ann Arbor, MI: Alliance for Community Technology, 2001); CTCnet of the Washington Metropolitan Area, 2002; L.J. Servon. *Bridging the Digital Divide: Technology, Community and Public Policy* (Malden, MA: Blackwell Publishing, 2002); D.J. Gunkel. “Second Thoughts: Toward a Critique of the Digital Divide,” *New Media & Society*, 5(4) (2003): 499-522.

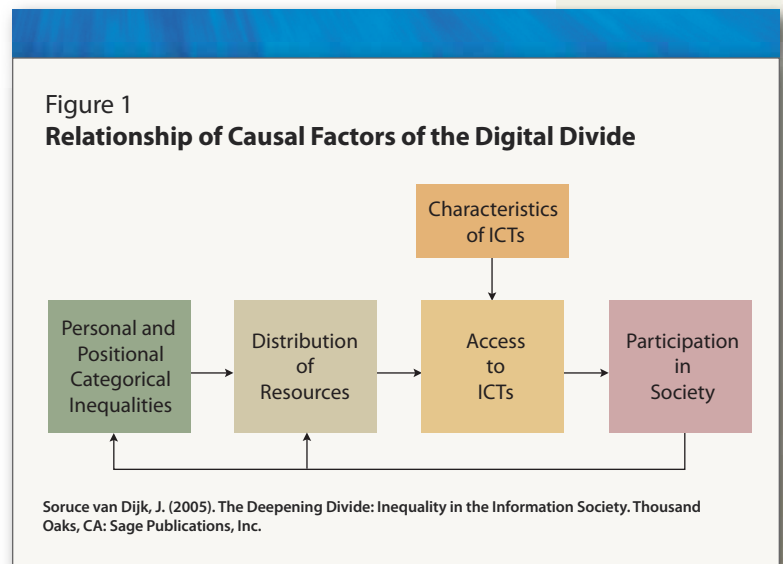
<sup>6</sup> A. Alkalimat and K. Williams. (2001). “Social Capital and Cyberpower in the African-American Community,” in L. Keeble and B. D. Loader (eds.), *Community Informatics: Shaping Computer-Mediated Social Relations* (London: Sage, 2001): 177-204; L. J. Servon. *Bridging the Digital Divide: Technology, Community and Public Policy* (Malden, MA: Blackwell Publishing, 2002); M. Gurstein. “Effective Use: A Community Informatics Strategy beyond the Digital Divide,” [Electronic version] *First Monday*, 8(12) (2003). Retrieved October 1, 2008, from [http://firstmonday.org/issues/issue8\\_12/gurstein/index.html](http://firstmonday.org/issues/issue8_12/gurstein/index.html); M. Warschauer. *Technology and Social Inclusion* (Cambridge, MA: MIT Press, 2003); S. Strover, G. Chapman, and J. Waters. “Beyond Community Networking and CTCs: Access, Development, and Public Policy,” *Telecommunications Policy* 28 (2004): 465-485; J. van Dijk. *The Deepening Divide: Inequality in the Information Society* (Thousand Oaks, CA: Sage Publications, Inc., 2005); K. Barzilai-Nahon. “Gaps and Bits: Conceptualizing Measurements for Digital Divide/s,” *The Information Society*, 22(5) (2006): 269-278.

<sup>7</sup> P. DiMaggio and E. Hargittai. *From the ‘Digital Divide’ to ‘Digital Inequality’: Studying Internet Use as Penetration Increases* (CACPS working paper 15) (Princeton, NJ: Center for Arts and Cultural Policy Studies, 2001). Retrieved September 20, 2008, from <http://www.princeton.edu/~artspol/workpap15.html>; K. Barzilai-Nahon. “Gaps and Bits: Conceptualizing Measurements for Digital Divide/s,” *The Information Society*, 22(5) (2006): 269-278.

include access to ICT literacy, social support, and autonomy of ICT use. All of these issues must be addressed for a person to make effective use of ICT.<sup>8</sup>

Although recent digital divide research has begun to frame the issue as more multifaceted than the binary notion of physical access, research methods continue to be focused on single factors. A 2005 study by Jan A.G.M. van Dijk contends that most digital divide research focuses on “individualistic notions of inequality.” These individualistic notions result in research that generalizes the digital divide based on investigating a single topic. Such studies fail to address the nuances of the issue. Studies focused on the relationship between ICT use and individual demographic characteristics (e.g., income, education, race, age and gender) typically treat all these demographics as independent variables, yielding results that are more descriptive than explanatory. It is more useful, in terms of understanding the digital divide, to study the interrelationships among causal factors, as shown in Figure 1. Studying the relationships among factors has the advantage of allowing distinctions between independent and dependent variables when evaluating how interactions among interconnected societal factors contribute to inequalities in ICT access and use.<sup>9</sup>

As the role of ICT in the economy increases, technological literacy becomes a necessity in the labor market. In addition to reinvent-



ing how business is conducted, the Internet has changed education, government, communication and even the concept of “community.”<sup>10</sup> The diffusion of ICT throughout society presents more opportunities for a person to improve socio-economic standing and overcome social inequality.<sup>11</sup> In effect, the Internet has the potential to level the playing field in an environment where inherent inequalities exist. The digital divide can be viewed as the space between the reality of persistent social, political and economic inequality at one end, and the ideal of full participation in a networked democratic society at the other. Between these two points exists a spectrum of inequalities formed by complex interactions between longstanding socio-economic disparities that widen the gap and the emergent technologies that close it.

*Unfortunately, while descriptive statistics focused only on access are prevalent in the digital divide literature, they tend to give a superficial view of a deeply complex issue.*

<sup>8</sup> Ibid; and M. Gurstein. Effective Use: A Community Informatics Strategy beyond the Digital Divide [Electronic version], *First Monday*, 8(12) (2003). Retrieved October 1, 2008, from [http://firstmonday.org/issues/issue8\\_12/gurstein/index.html](http://firstmonday.org/issues/issue8_12/gurstein/index.html).

<sup>9</sup> J. van Dijk. *The Deepening Divide: Inequality in the Information Society* (Thousand Oaks, CA: Sage Publications, Inc., 2005): 17.

<sup>10</sup> Community Technology Centers' Network (CTCNet) of the Washington Metropolitan Area. *From Policy to Action: Profiles of Washington Area Programs Making Progress on the Digital Divide* [Electronic version] (2002). Retrieved September 12, 2008, from [http://web.archive.org/web/20030321141621/http://ctcnet.org/frompolicytoaction\\_v1.pdf](http://web.archive.org/web/20030321141621/http://ctcnet.org/frompolicytoaction_v1.pdf).

<sup>11</sup> J.J. Rennie. (2007). “ICTs and Educational Benefits in a Regional Development,” in H. Rahman (ed.), *Information and Communication Technologies for Economic and Regional Developments* (Hershey, PA: Idea Group Publishing, 2007): 1-21.

Table 1  
**Persistent Gaps in the Digital Divide**

| Attribute Showing a Persistent Digital Gap | Direction of Inequality  |
|--|--|
| Age  | Younger people use the Internet more and older people use the Internet less                                |
| Educational Attainment                     | Higher levels of education correlate with higher levels of Internet use                                    |
| Disability Status                          | Persons with disabilities use the Internet less  |
| Language Preference                        | Internet usage is largely skewed towards English speakers  |
| Race and Ethnicity                         | White- and Asian-Americans use the Internet more and African-Americans use the Internet less               |
| Income                                     | Higher income levels correlate with higher Internet use  |
| Parental Status                            | households with younger children use the Internet more than households without members under the age of 18 |
| Employment Status                          | Internet use is highest among students, lowest among the retired and widows                                |
| Community Type                             | Urban and suburban communities have higher rates of Internet use and rural communities have lower rates    |

Source: Rainie, L. (2006, July 28). Life online: The growth and impact of the internet (and related technologies). Presented at the 2006 CTCNet Conference in Washington, D.C.

### Persistent Gaps and Shifting Federal Policy

Statistics describing levels of access to technology are widely dismissed by researchers as simplistic and incomplete measures of the digital divide. However, they are a useful starting point as an easily measurable indicator of broad trends in basic technology adoption. In 2003, it was reported that 62 percent of American households had a computer and 55 percent had Internet access. As of May 2008, 73 percent of adults in the U.S. use the Internet. In contrast, during May-June 1995 less than 20 percent of adults were

online.<sup>12</sup> However, despite the rapid growth of ICT adoption and Internet usage over the past decade, gaps highlighted in earlier digital divide research persist.

Recent data from Pew Internet & American Life Project surveys, as reported by Lee Rainie (2006), identify nine persistent digital gaps. These gaps and the direction of inequality for each are shown in Table 1. The most recent statistics collected by the Pew Internet & American Life Project (2008a) show that these gaps still exist. For example, the survey shows that 75 percent of white American adults are online, but only 59 percent of African-American adults report using the Internet. In addition, the 2003 update to the U.S. census reported that an average of 55 percent of American households included a computer. However, there were computers in only 35 percent of households with members aged 65 and older, and computers were in only 45 percent of black or Latino households and 28 percent of households with adults having less than a high school education.<sup>13</sup> These basic measurements of ICT and Internet access indicate increased usage in the U.S., but they also indicate that differences along social and economic lines remain, and that the policy goal of universal and equitable access has not yet been attained.

Unfortunately, while descriptive statistics focused only on access are prevalent in the digital divide literature, they tend to give a superficial view of a deeply complex issue. For example, descriptive statistics clearly identify digital divides along racial and

<sup>12</sup> U.S. Department of Commerce, Economics and Statistics Administration. *Computer Use and Internet Use in the United States: 2003* (Report number 23—208) [Electronic version] (2005). Retrieved October 1, 2008, from <http://www.census.gov/prod/2005pubs/p23-208.pdf>; Pew Internet & American Life Project. *Demographics of Internet users* (2008a). Retrieved October 1, 2008, from [http://www.pewinternet.org/trends/User\\_Demo\\_7.22.08.htm](http://www.pewinternet.org/trends/User_Demo_7.22.08.htm); Pew Internet & American Life Project. *Percentage of U.S. adults online* (2008b). Retrieved October 1, 2008, from [http://www.pewinternet.org/trends/Internet\\_Adoption\\_7.22.08.pdf](http://www.pewinternet.org/trends/Internet_Adoption_7.22.08.pdf).

<sup>13</sup> U.S. Department of Commerce, Economics and Statistics Administration. *Computer Use and Internet Use in the United States: 2003* (Report number 23—208) [Electronic version] (2005): 3. Retrieved October 1, 2008, from <http://www.census.gov/prod/2005pubs/p23-208.pdf>.

ethnic lines. On the other hand, survey data also indicates that African-Americans and Latinos without ICT access at home are more likely to have a positive view of technology, and are more likely to access technology in a public setting compared to whites from similar socio-economic situations. Further, there are less well understood impacts of economics and ethnic or cultural dimensions that can affect access to and use of ICT by underserved populations. For example, concentrated poverty limits social network development, which has a greater correlation than race to persistent technological gaps highlighted in descriptive statistical data.<sup>14</sup> Therefore, socio-economic demographics may be indicators of unequal social networking opportunities, rather than measures of the digital divide. These results support the notion that the emerging field of community informatics may offer some benefits as an approach to studying the digital divide, and may lead to more effective policy approaches, precisely because it studies the role of social networking in the adoption and use of ICT.

### Community Technology Centers and the Digital Divide

Public computing, broadly defined, refers to ICT access and use outside of home and/or work. Public computing access centers are highly heterogeneous across several dimensions, including *name* (e.g. cyber café, telecenter, community technology center), *administration* (e.g. govern-

ment, commercial, not-for-profit), *location* (e.g. dedicated buildings, cafés, schools, churches), *function* (e.g. individual computer access, computer skills training, social services, community building), *relation to other centers* (e.g. individually operated, part of a network, multiple locations under one administration), *programming*, and *target populations*.<sup>15</sup>

The terms “public computing” and “community technology” are used relatively interchangeably, and usually refer to both virtual community computing networks (CCNs) and geographically located community technology centers (CTCs). However, the literature on community technology tends to focus more on the contributions of community-based organizations. In recent years, the efforts of community-based organizations have been concentrated on creating and operating physical CTCs that provide public access to computers and the Internet, as well as technical instruction and support.<sup>16</sup>

### Defining Community Technology Centers

In large part, the focus among researchers of community technology centers is on CTCs founded through the grassroots actions of community-based non-profit organizations (NPOs). One such organization is Playing to Win. It was founded in New York City by Antonia Stone in 1980 and is widely cited as the first CTC. With the aid of the National Science Foundation, Stone’s organization



<sup>17</sup> D. Schuler. *New Community Networks: Wired for Change* (New York: ACM Press, 1996); Community Technology Centers’ Network (CTCNet) of the Washington Metropolitan Area. “From Policy to Action: Profiles of Washington Area Programs Making Progress on the Digital Divide” [Electronic version] (2002). Retrieved September 12, 2008, from [http://web.archive.org/web/20030321141621/http://ctcnet.org/frompolicytoaction\\_v1.pdf](http://web.archive.org/web/20030321141621/http://ctcnet.org/frompolicytoaction_v1.pdf); L.J. Servon. *Bridging the Digital Divide: Technology, Community and Public Policy* (Malden, MA: Blackwell Publishing, 2002); M. Warschauer. *Technology and Social Inclusion* (Cambridge, MA: MIT Press, 2003); CTCnet. *About the Network* (2007a). Retrieved October 6, 2008, from <http://ctcnet.org/who/network.htm>; CTCnet. *Members* (2007b). Retrieved October 6, 2008, from <http://ctcnet.org/who/members.htm>.

<sup>14</sup> K. Mossberger, C.J. Tolbert, and M.A. Gilbert. (2006) “Race, Place, and Information Technology,” *Urban Affairs Review*, 41 (2006): 583-620; K. Mossberger, D. Kaplan, and M.A. Gilbert. “How Concentrated Poverty Matters for the “Digital Divide”: Motivation, Social Networks, and Institutions,” in K. Williams (ed.), *eChicago 2007, Dominican University* (River Forest, IL: Dominican University Graduate School of Library and Information Science and University of Illinois Graduate School of Library and Information Science, 2007): 158-192.

<sup>15</sup> S. Davies et al. *Community Technology Centers As Catalysts for Community Change* (2003). Retrieved September 30, 2008, from [http://www.bctpartners.com/resources/CTCs\\_as\\_Catalysts.pdf](http://www.bctpartners.com/resources/CTCs_as_Catalysts.pdf); M. Warschauer. *Technology and Social Inclusion* (Cambridge, MA: MIT Press, 2003); S. Kaiser. “Community Technology Centers and Bridging the Digital Divide,” *Knowledge, Technology, & Policy* 18(2) (2005): 83-100.

<sup>16</sup> D. Schuler. *New Community Networks: Wired for Change* (New York: ACM Press, 1996); Alkalimat & Williams, 2001; Servon, 2002; Davies, Wiley-Schwartz, Pinkett and Servon, 2003; Warschauer, 2003; Pinkett, 2002.



grew into a national coordinating body for CTCs, and was renamed the Community Technology Centers Network (CTCnet) in the early-1990s.<sup>17</sup>

CTCnet serves a membership that includes community technology centers and capacity-building organizations representing all 50 states, as well as countries in the Americas, Africa, Asia, and Europe. The network provides online resources including best practices, evaluation materials, a CTC start-up guide, a searchable membership directory, and a list of regional networks. CTCnet also sponsors a semiannual conference for CTC organizers. CTCnet defines its members as centers or programs that provide community access to ICT along with the training necessary to meet the social, economic, educational, and cultural needs of community residents. Unfortunately, that definition is broad and can be applied to a wide variety of organizations and service models. This presents a major challenge when trying to count public computing resources and quantify their use.<sup>18</sup>

Despite this high degree of heterogeneity, there are some general data applicable to

institutions that fall under the broad definition of CTCs. First, the majority of CTCs serve urban areas. In a 1999 survey, 65 percent of CTCs in the U.S. were in urban areas, while 14 percent were in rural areas and 7 percent were in suburban areas.<sup>19</sup> These trends appear to be holding, based on data from a 2007 survey of 127 CTCnet members that indicated 72 percent of CTCs were located in urban areas, 15 percent in rural areas, and 12 percent in suburban areas.<sup>20</sup>

A second trend is that most CTCs target low-income populations, particularly families. In the 1999 survey, 76 percent of respondents said their CTCs targeted low-income populations and parents/adults. However, there was a general trend to focus on all age groups in a family. In the same survey, 74 percent of the CTCs reported targeting children ages 5 to 17, and 73 percent listed young adults ages 18 to 24 as their target population. When asked what populations they expect to serve in the next two years, the top answers from the 2007 survey respondents were “at-risk youth, immigrants, and unemployed or underemployed adults.”

<sup>18</sup> See K. Williams and A. Alkalimat. “A Census of Public Computing in Toledo, Ohio,” in Douglas Schuler and Peter Day (eds.), *Shaping the Network Society: The New Role of Civic Society in Cyberspace* [Electronic version] (Cambridge, MA: MIT Press, 2002): 85-110. Retrieved September 19, 2008, from <http://www.communitytechnology.org/toledo/toledo.pdf>; K. Williams. “Research Note: Across the United States, 85,000 to 144,000 Public Computing Sites,” *First Monday* 8(4) (2003). Retrieved September 19, 2008, from <http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/article/viewArticle/1046/967>.

<sup>19</sup> L.J. Servon. *Bridging the Digital Divide: Technology, Community and Public Policy* (Malden, MA: Blackwell Publishing, 2002): 60.

<sup>20</sup> CTCnet. “2007 CTCNet Member Demographics Survey” (2007c). Retrieved October 1, 2008, from [http://ctcnet.org/who/2007%20CTCNet%20Member%20Demographics%20Survey%20Summary\\_082307.pdf](http://ctcnet.org/who/2007%20CTCNet%20Member%20Demographics%20Survey%20Summary_082307.pdf).

<sup>21</sup> S. Davies et al. *Community Technology Centers As Catalysts for Community Change* (2003). Retrieved September 30, 2008, from [http://www.bctpartners.com/resources/CTCs\\_as\\_Catalysts.pdf](http://www.bctpartners.com/resources/CTCs_as_Catalysts.pdf); K. Williams. “Research Note: Across the United States, 85,000 to 144,000 Public Computing Sites,” *First Monday*, 8(4) (2003). Retrieved September 19, 2008, from <http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/article/viewArticle/1046/967>; Illinois Department of Commerce and Economic Opportunity (DCEO). *Bridging the Digital Divide Grant Program Fiscal Year 2008 Request for Applications* (2008); K. Williams and A. Alkalimat. (2002). “A Census of Public Computing in Toledo, Ohio,” in Douglas Schuler and Peter Day (eds.), *Shaping the Network Society: The New Role of Civic Society in Cyberspace* [Electronic version] (Cambridge, MA: MIT Press, 2002): 85-110. Retrieved September 19, 2008, from <http://www.communitytechnology.org/toledo/toledo.pdf>; L. Estabrook, E. Witt, and L. Rainie. *How People Use the Internet, Libraries, and Government Agencies when They Need Help* (Washington, D.C.: Pew Internet & American Life Project/Graduate School of Library and Information Science, 2007). Retrieved September 9, 2008, from [http://www.pewinternet.org/pdfs/Pew\\_ULibrariesReport.pdf](http://www.pewinternet.org/pdfs/Pew_ULibrariesReport.pdf); L.J. Servon. *Bridging the Digital Divide: Technology, Community and Public Policy* (Malden, MA: Blackwell Publishing, 2002).

The third finding is that the majority of CTCs are embedded within other community organizations. In 1999, 61 percent of respondents reported operating ICT programs within a pre-existing community-based organization. In 2007, the figure was 72 percent. This finding underscores that, much like the definition of the digital divide, the identity of CTCs exists within a variety of social and institutional contexts. This is illustrated by the role of public libraries in CTC research. Public libraries are often included under the blanket definition of CTCs. Conversely, research of Internet use in libraries is often presented as an area of inquiry separate from analysis of both standalone CTCs and CTCs embedded in community-based organizations. For example, some studies discuss libraries and CTCs under different headings, while others look at public Internet use only in terms of public libraries. To add to the confusion, public libraries do not always define themselves as CTCs.<sup>21</sup>

### CTC Research and Community Informatics

Community informatics is an emerging, multidisciplinary field of research. It investigates the social and cultural factors shaping the development and diffusion of new ICT, and explores the impact of ICT on community development, regeneration and sustainability. Community informatics

shows promise as an integrative framework for digital-divide research because it focuses explicitly on the interaction between socio-cultural contexts and ICT development initiatives. Informatics research does not attempt to impose rigid conceptual frameworks upon diverse socio-cultural contexts, but instead provides flexible methodologies that value local interests, objectives, and responsibilities.<sup>22</sup>

One widespread finding resulting from informatics research is that community participation in CTC implementation is paramount to its success. In a study of the failure of six South African CTCs, the primary reason was due to an ignorance of local conditions with respect to infrastructure, legal requirements, and access to communication and the Internet. On the other hand, the successful implementation of 14 CTCs in Atlanta, Ga., hinged upon a 'bottom-up' approach that drew on the assets of the community. In this case, direct participation by different stakeholders was both accepted and actively solicited. From these studies, it is clear that both individual and community development can be enhanced by social settings that relate learning to the specific culture of the community.<sup>23</sup>

The most persistent challenge facing CTCs is sustainability. In general, they tend to be lacking in sufficient funding, qualified staff and up-to-date technology. However,



*Community informatics shows promise as an integrative framework for digital-divide research because it focuses explicitly on the interaction between socio-cultural contexts and ICT development initiatives.*

<sup>22</sup> L. Keeble and B.D. Loader. "Community Informatics: Themes and Issues," in L. Keeble and B.D. Loader (eds.), *Community Informatics: Shaping Computer-Mediated Social Relations* (London: Routledge): 1-10; M. Gurstein. (2001). "Community Informatics for Flexible Networking," in L. Keeble and B. D. Loader (eds.), *Community Informatics: Shaping Computer-Mediated Social Relations*. (London: Routledge, 2001): 263-283.

<sup>23</sup> A. Alkalimat and K. Williams. (2001). Social Capital and Cyberpower in the African-American Community," in L. Keeble and B.D. Loader (eds.), *Community Informatics: Shaping Computer-Mediated Social Relations* (London: Sage, 2001): 177-204; L.S. Clark. (2003). "Challenges of Social Good in the World of Grand Theft Auto and Barbie: A Case Study of a Community Computer Center for Youth," *New Media Society*, 5(2) (2003): 95—116; L. Kvasny and M. Keil. The Challenges of Redressing the Digital Divide: A Tale of Two US Cities," *Information Systems Journal*. Vol. 16, (1) (2006): 23-53. ; D. Hulbert and M. Snyman. "Determining the Reasons Why ICT Centres Fail: Six South African Case Studies," *Mousaion* 25(2) (2007):1-20; D.V. O'Neil and P.M.A. Baker. "The Role of Institutional Motivations in Technological Adoption: Implementation of DeKalb County's Family Technology Resource Centers," *The Information Society*, 19 (2003): 305-314; R. Pinkett and R. O'Bryant. "Building Community, Empowerment and Self-Sufficiency," *Information, Communication & Society*, 6(2) (2003): 187-210; N. Turner-Lee and R. Pinkett. (2004). "Asset-Based Approach to Community Building," in P. Day and D. Schuler (eds.), *Community Practice in the Network Society* (London: Routledge, 2004): 170-185.



*In Illinois, as with the rest of the world, descriptive data on basic access indicates that digital divides continue to persist along socio-economic lines.*

because CTCs exist within different social contexts and programmatic goals, it is difficult to develop a single set of standards for what makes a community-based project sustainable or successful. One component that does seem to work for all is a project champion or coordinator willing to commit significant amounts of time and effort. ICT projects also require a certain level of technological literacy among the management and coordination team.<sup>24</sup>

Evaluation criteria are especially important to potential funding sponsors, which in turn are essential for sustaining CTC programs. There are five key areas covered in community informatics evaluations of community networks and CTCs: *strong democracy* (i.e., increasing democratic participation in politics and advocacy among community members), *social capital* (e.g., thriving social institutions within the community, collaboration among community members), *individual empowerment* (i.e., issues of information literacy and ICT access), *sense of community* (i.e., increasing community involvement and commitment to a geographic community), and *economic development opportunities*.<sup>25</sup> Like all other aspects of CTC implementation and administration, community stakeholders also should be involved in the design and implementation of evaluations in order to ensure success.

### The Importance of Collaboration

The term “digital divide” means different things to different people. CTCs attempt to

address these differences through a variety of organizational structures and programs. Despite the widely diverse set of issues and approaches to the digital divide, one theme seems to stand out in all of the literature: technology exists as a secondary issue to longstanding social and cultural inequalities. While technology can enable successful programs, the best practices for research into and partnerships with CTCs are all centered on the community and not on the technology. Programs that seek to redress socio-technical inequities must first be created in collaboration with the target community so they will be relevant to the context and interests of that community. Informatics-based research methodologies suggest that the best way to achieve these goals is to engage the communities as peers, make sure all projects are community driven, identify pre-existing social assets, and find ways to build on them.

### The Digital Divide in Illinois

In Illinois, as with the rest of the world, descriptive data on basic access indicates that digital divides continue to persist along socio-economic lines. According to a study by the Children’s Partnership,<sup>26</sup> based on U.S. census data, 70 percent of households in Illinois earning less than \$15,000 per year do not own a computer. This is compared to 40 percent of all Illinois’ households and 38 percent of all households nationally that do not own a computer. Further, 79 percent of households in Illinois earning less than \$15,000 per year do

<sup>24</sup> L.J. Servon. *Bridging the Digital Divide: Technology, Community and Public Policy* (Malden, MA: Blackwell Publishing, 2002); Mayor’s Advisory Council on Closing the Digital Divide. *The City that Networks* [Electronic version] (2007). [http://egov.cityofchicago.org/webportal/COCWebPortal/COC\\_EDITORIAL/DigitalDivide.pdf](http://egov.cityofchicago.org/webportal/COCWebPortal/COC_EDITORIAL/DigitalDivide.pdf); M. Wolske. *Issues in Setting up CTCs*. Presented in LIS 490: The Digital Divide: Policy, Research, and Community Empowerment at the University of Illinois at Urbana-Champaign (2008, October 1); L. Hopkins (2005). “Making a Community Network Sustainable: The Future of the Wired High Rise,” *The Information Society*, 21 (2005): 379-384.

<sup>25</sup> D. O’Neil. “Assessing Community Informatics: A Review of Methodological Approaches for Evaluating Community Networks and Community Technology Centers,” *Internet Research*, 12(1) (2002): 76-102.

<sup>26</sup> Children’s Partnership. *Illinois Youth and Technology Factsheet* (2008). Retrieved October 1, 2008, from [http://www.techpolicybank.org/AM/Template.cfm?Section=State\\_Fact\\_Sheets&Template=/CM/ContentDisplay.cfm&ContentID=11765](http://www.techpolicybank.org/AM/Template.cfm?Section=State_Fact_Sheets&Template=/CM/ContentDisplay.cfm&ContentID=11765).

not use the Internet at home, compared to 49 percent of all Illinois households and 45 percent of all households nationally. Based on these statistics, Illinois is ranked 33<sup>rd</sup> in the U.S. for household computer access and 38<sup>th</sup> in terms of Internet access. The data would support the notion that there is a great deal of room for improvement in serving lower socio-economic communities in Illinois.

The legislative strategy for addressing the digital divide in Illinois has been to appropriate funds annually for most of the past decade. The Illinois Eliminate the Digital Divide Law (30 ILCS 780) was put into effect on May 17, 2000. The law's intent was to address certain findings by the General Assembly, including:

- The growth of high technology industry, including computers, the Internet and advanced telecommunications, has created a division in society.
- Those who are able to master the tools of the new digital technology and have access to the technology have benefited in the form of improved employment possibilities and a higher standard of life.
- Those who are unfamiliar with the new technologies, or do not have access to them, are increasingly constrained to marginal employment and a standard of living near the poverty level.
- This "digital divide" parallels existing economic, racial and gender divisions in society, with the more privileged members of society having much greater opportunity to benefit from the new technologies than those who are less favorably situated.

The purpose of the Illinois Eliminate the Digital Divide Law was "to establish educational and economic development initiatives that will bridge the digital divide, making possible a society in which all individuals can benefit from the opportunities provided by the new technologies."

The Illinois Digital Divide program is administered by the Department of Commerce and Economic Opportunity. The program provides public access to technology along with training in the use of specific applications that are important to learning for younger participants and that are essential for employment for older participants. The Illinois CTCs are connected with the Illinois Worknet project, a comprehensive job-finding resource that also is funded and administered by the DCEO. At present, the program issues an annual request for proposals for funding new and existing CTCs. The 2008 solicitation received more than 300 applications, and 104 CTCs were awarded funds.

Three features of the current Illinois program differentiate it from many other state-based initiatives and reflect a keen understanding of the community informatics view of the digital divide and the nature of successful community-based programs. The first is that the DCEO encourages existing CTCs with strong records of funding and success to collaborate directly with newer, less-experienced CTCs. This collaboration could include sharing information about structure and governance, marketing, staffing, and management. In addition, CTCs also can collaborate by pointing clients to existing training programs in nearby CTCs or by sharing training materials and trainers to bring a successful program to a new audience.

The second unique aspect of the Illinois program is that it has defined "underserved" in a broad way to include both urban and rural communities. In the 2008 competition, several awards were given to relatively new, rural CTCs. The focus on collaboration can also help these awardees by putting them in contact with more experienced CTCs elsewhere in the state.

The third aspect is incorporated into how the program is addressing sustainability.



*It is clear that expanding CTC coverage is difficult when state-based programs are the only source of funding.*



<sup>27</sup> T. Prudhomme and R. Rich. *Review of Grant Programs* (2007). A report submitted to the Illinois Department of Commerce and Economic Opportunity on April 15, 2007.

<sup>28</sup> See <http://illinois-digitalcommunity.net>.

<sup>29</sup> International Telecommunications Union (ITU). *ITU's New Broadband Statistics for 1 January 2005* [Electronic version] (2005). Retrieved November 15, 2008, from <http://www.itu.int/osg/spu/newslog/ITUs+New+Broadband+Statistics+For+1+January+2005.aspx>.

The authors of a study conducted by the University of Illinois Institute of Government and Public Affairs (IGPA) concluded that the probability of long-term success for individual CTCs and for the overall program would improve if there was a mechanism supporting statewide coordination and collaboration.<sup>27</sup> It is clear that expanding CTC coverage is difficult when state-based programs are the only source of funding. To support collaboration among CTCs on operations, program development and fund raising, the DCEO asked IGPA, through its Center for Technology and Public Policy (CTPP), to develop a web-based information resource called the Illinois Digital Community Network.<sup>28</sup> This resource will provide information to the public about CTCs and their program offerings across the state. It also will share information among the members of the CTC network, and share searchable information about best practices, funding opportunities and success stories from around the United States and internationally.

Illinois policy has followed the path of other state governments in directing funding toward community technology initia-

tives, through a focus on supporting and developing CTCs. Among its neighboring states, Illinois appears to be at the forefront of CTC implementation. The CTCnet membership directory lists 133 members in Illinois, compared to three in Indiana, four in Iowa, 10 in Wisconsin, four in Kentucky, and seven in Missouri. Minnesota has 22 CTCnet members and Michigan has 16. The question facing policy makers in Illinois is, "What has been accomplished with the funding provided, and how has the state of the digital divide in Illinois improved?" Table 2 represents a subset of national survey data from obtained from self-administered Internet speed tests taken through Speedmatters.org between September 2006 and May 2007. Among its neighbors, Illinois ranks first in download speeds but fourth in upload speeds. At the national level, the U.S. ranks 16<sup>th</sup> among industrialized nations in high speed Internet access.<sup>29</sup> Speed is important when computer use is oriented toward media, especially video or animation, or when a high level of interactivity is needed.

Tables 3-5 represent data taken from calculations made by the Children's Partnership (2008) based on 2003 US Census Data. Illi-

Table 2  
**Internet Speed Test Results for Illinois and Neighboring States**

| State         | Number of Internet Speed Tests | Median Download Speed (kbps) | Median Upload Speed (kbps) | National Download Speed Ranking | National Upload Speed Ranking |
|---------------|--------------------------------|------------------------------|----------------------------|---------------------------------|-------------------------------|
| United States | 79,876                         | 1,973                        | 371                        |                                 |                               |
| Iowa          | 706                            | 1,262                        | 489                        | 47                              | 10                            |
| Illinois      | 2,518                          | 2,184                        | 365                        | 17                              | 33                            |
| Indiana       | 1,739                          | 1,955                        | 434                        | 24                              | 16                            |
| Kentucky      | 1,126                          | 1,607                        | 363                        | 32                              | 37                            |
| Michigan      | 2,677                          | 2,042                        | 364                        | 19                              | 36                            |
| Minnesota     | 1,186                          | 1,771                        | 376                        | 26                              | 22                            |
| Missouri      | 2,075                          | 1,432                        | 327                        | 38                              | 44                            |
| Wisconsin     | 1,652                          | 1,551                        | 326                        | 34                              | 45                            |

Source: CWA. (2007). *Speed matters: A report on internet speeds for all 50 states*. [Electronic version]. Retrieved November 15, 2008 from [http://files.cwa-union.org/speedmatters/CWA\\_APT\\_StateBroadbandInitiatives.pdf](http://files.cwa-union.org/speedmatters/CWA_APT_StateBroadbandInitiatives.pdf), p. 57.



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Illinois ranks second among its neighbors behind Minnesota in percentage of total households with a computer, but sixth in total households with Internet access. However, Illinois ranks fourth among its neighbors in computer ownership and Internet access in households earning less than \$15,000 per year. Compared to surrounding states, Illinois ranks fifth in the percentage of households with broadband Internet access. Illinois is similar to other Midwest states in its performance on various measures of the digital divide and, along with neighboring states, still lags behind the national average by most measures. However, the informatics-based approach to supporting the CTC network in Illinois just began in 2007-

**Table 3**  
**Households with a Computer in Illinois and Neighboring States**

| State         | Households Earning Less than \$15,000 Per Year (by Percent) | Total Households (by Percent) | National Ranking by Percent of Total Households |
|---------------|---|-------------------------------|---|
| United States | --  | 62%                           | --  |
| Iowa          | 32%   | 65%                           | 18%   |
| Illinois      | 30%   | 60%                           | 17%   |
| Indiana       | 27%   | 60%                           | 36%   |
| Kentucky      | 28%   | 58%                           | 41%   |
| Michigan      | 29%   | 60%                           | 35%   |
| Minnesota     | 36%   | 28%                           | 8%  |
| Missouri      | 31%   | 61%                           | 30%   |
| Wisconsin     | 25%   | 64%                           | 23%   |

Source: The Children's Partnership (2008). Illinois youth and technology factsheet. Retrieved October 1, 2008, from [http://www.techpolicybank.org/AM/Template.cfm?Section=State\\_Fact\\_Sheets&Template=/CM/ContentDisplay.cfm&ContentID=11765](http://www.techpolicybank.org/AM/Template.cfm?Section=State_Fact_Sheets&Template=/CM/ContentDisplay.cfm&ContentID=11765).

**Table 4**  
**Household Internet Access in Illinois and Neighboring States**

| State         | Households Earning Less than \$15,000 Per Year % that Use the Internet | Percent of Total Households that Use the Internet | National Ranking by Percent of Total Households |
|---------------|--|---|---|
| United States | -  | 55  | -   |
| Iowa          | 24   | 57  | 18  |
| Illinois      | 21   | 51  | 38  |
| Indiana       | 17   | 51  | 40  |
| Kentucky      | 19   | 50  | 42  |
| Michigan      | 19   | 52  | 36  |
| Minnesota     | 28   | 62  | 8   |
| Missouri      | 23   | 53  | 34  |
| Wisconsin     | 17   | 57  | 17  |

Source: The Children's Partnership (2008). Illinois youth and technology factsheet. Retrieved October 1, 2008, from [http://www.techpolicybank.org/AM/Template.cfm?Section=State\\_Fact\\_Sheets&Template=/CM/ContentDisplay.cfm&ContentID=11765](http://www.techpolicybank.org/AM/Template.cfm?Section=State_Fact_Sheets&Template=/CM/ContentDisplay.cfm&ContentID=11765).



*Perhaps the most daunting barrier to bridging the digital divide in Illinois is in the disparity of network service availability to citizens in rural and urban parts of the state.*

**Table 5  
Percentage of Households with Broadband Internet in Illinois and Neighboring States**

| State         | Percent of Households with Broadband Internet | National Ranking by Percent of Total Households |
|---------------|---|---|
| United States | 20  | -   |
| Iowa          | 17  | 33  |
| Illinois      | 17  | 36  |
| Indiana       | 10  | 47  |
| Kentucky      | 12  | 45  |
| Michigan      | 20  | 18  |
| Minnesota     | 20  | 20  |
| Missouri      | 15  | 40  |
| Wisconsin     | 20  | 22  |

Source: The Children's Partnership, 2008

2008, so it is too soon to see definitive results. The longer-term strategy for the current program is to define a workable community-based sustainability model that uses modern informatics approaches to support a social network of CTCs. The model should be responsive to the needs of communities by being aware of how they operate and share information. It needs to be collaborative to support effective leveraging of social, technical and programmatic assets shared by the entire network of CTCs and their partners in state government and the university research community. Finally, it needs to develop into a scalable approach that can still focus on local needs. In this way, it can be applied nationally, expanding the collaborative network of participants, their information and other assets, while still supporting quality program delivery to the



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local community. The belief underlying this strategy is that families will invest in computer and Internet technology only if they see a direct benefit in their daily lives.

It will be interesting to monitor the outcomes from this program over the coming years. The challenge to the Illinois Department of Commerce and Economic Opportunity is to maintain the program's focus long enough to realize the benefits of the approach. It is vital to the program moving forward that the focus on informatics, not just access, is maintained. The challenge for the Illinois General Assembly is to continue funding the new effort until it can be sustained or augmented with additional funding sources. Despite its longevity, state government's commitment to the



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program is still determined on a year-by-year basis. Perhaps the most daunting barrier to bridging the digital divide in Illinois is in the disparity of network service availability to citizens in rural and urban parts of the state. Although attempts have been made over the years to create equity in network and Internet services throughout the state, for example the Illinois Century Network, the inequity remains. As long as service availability and quality is based upon the willingness of commercial carriers to provide broadband services, it will be market driven. The market is not likely to incentivize the provision of broadband to areas of low-income population and

*Illinois is similar to other Midwest states in its performance on various measures of the digital divide and, along with neighboring states, still lags behind the national average by most measures.*

growth. Opening broadband access and client-oriented services in these areas would bring the possibility of participating in the “Internet economy” to the people who live there. Illinois has the CTC program and social network to provide the expertise and training to enable these communities to participate in 21<sup>st</sup> century society and commerce. Yet it remains to be seen if improvements to the digital infrastructure and investment of the needed political capital are possible.

