Introduction: Community Informatics and Community Development

Kenneth E. Pigg, Guest Editor

Community informatics, a comparatively new discipline, is the study of information and communication technology (ICT) in community development work. Michael Gurstein (2000, p. 1) defines community informatics as "a technology strategy or discipline which links economic and social development at the community level with emerging opportunities" in a wide variety of information and communication technology applications. At the same time, Loader, Hague, and Eagle (2000) from the United Kingdom were describing community informatics as an approach that enables the connection of cyberspace to community places, a field of investigation regarding the ways in which ICT can be geographically embedded and developed by community groups to support new and existing networks. Earlier, Schuler (1996) had described the social movement termed community networking, tracing the history of freenets, computer-supported community work, and community networks tying the community-based social networks of physical relationships to a computer-based technology that permitted enhancement of these networks.

This issue of *COMMUNITY DEVELOPMENT: Journal of the Community Development Society* furthers the exploration of community informatics and community development by providing a number of illustrative and challenging articles about both application and critical thinking. This field is one in which the application of technology has provided leadership to thinking about the ways and means of application and the implications for community and technology theory. Through efforts to promote local initiatives and state and federal programs, the number and scope of applications have proliferated. At the same time, efforts to document these applications have been difficult to mobilize—much less organize—for intensive and critical study. Consequently, we know a lot more about "how" than "why" and "with what effects." Even with so many applications documented, the analysis of what worked and why is limited. In this issue, a very modest attempt to "catch up" has been assembled although it should be noted that our efforts are still more documentary than analytical. Nevertheless, it is extremely important to community development that this documentation is done as the rhetoric surrounding ICT developments has been very direct in its implications for improving community well-being. Since ICT represents what numerous observers and policy makers have called a "transformational technology," the slowness of our efforts to think critically about what we are doing seems strange. Nevertheless, with new journals recently emerging and many new books on a multitude of related topics, the analytical field is gaining traction in a field where technology and its applications changes very rapidly.

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ICT APPLICATIONS FOR COMMUNITY DEVELOPMENT

Since the emergence of the Information Superhighway programs of the Clinton Administration, the United States has witnessed an explosion of ICT applications in many fields. Not to be outdone, the European Union created its own supporting programs as did other English-speaking nations like Australia and Canada. In addition, many states, recognizing some limitations in federal programs, created their own initiatives. As multi-lingual capabilities became available in ICT applications, African and Latin American nations joined the movement. All were justified as helping citizens take advantage of ICT's powerful functions and speeding up the deployment of the technology, which had been left primarily to the private sector. In less advantaged countries, the argument was supplemented by the perception that ICT capacity was necessary to support development and participation in the global economy.

Although the specific applications are too numerous to discuss here, the areas in which applications have been made cover the spectrum of community development interests. Central, of course, are applications that emphasize community building. Scott and Johnson provide readers of this issue a thoughtful and analytical discussion of on-line applications in existence that, for the most part, are not civic in purpose but nevertheless emphasize a number of community dimensions in their concrete manifestations. Their discussion demonstrates the strengths and weaknesses of on-line community as an idea—as well as a reality—and provides useful insight to a number of design elements that would support more civic applications in physical communities. At the same time, they acknowledge that their efforts are extremely superficial and preliminary since these examples are not necessarily intended to address issues of physical community development.

The discussion by Mehra extends the applications into social development areas for diverse groups and extends the discussion to alert community developers to the resource represented by local libraries and librarians, many of whom are becoming active in civic affairs extending the information resources of public libraries for broader application. The applications he discusses are unique to the inventiveness of the sponsors of PrairieNet and the projects' participants, some of whom are African-American females deemed to be part of those who have "fallen through the Net." Nevertheless, many things can be learned from the experience reported by Mehra that can provide useful ideas for community developers.

Other areas of application that receive lots of attention are economic development and "e-commerce." In this issue, Walzer and Colavito describe an analysis of survey data from Illinois that included questions about buying habits on-line. Today, it is hard to imagine consumer items that cannot be purchased from on-line sources, and consumers who may not have the time or ability to seek out desired products from physical stores find considerable convenience from on-line storefronts. As the data used by Walzer and Colavito suggest, even in areas with limited physical access to ICT services, purchasing habits are changing in ways that threaten the existence of many local shop owners. Pigg and Crank address the deployment of ICT in rural communities to support efforts for economic development with their early study results. Many local communities, unable to secure adequate infrastructure support from commercial providers have deployed their own ICT infrastructure using municipal utilities or specialized service organizations dedicated to ICT deployment. The types of technology deployed can be very different, but the purpose is always to support an enhanced local economic situation with more and better jobs and more income for residents. Unfortunately, most small communities treat ICT as just another piece of the necessary infrastructure and not much different from water and sewage systems, utility services, and transportation with an unspoken strategy of "build it and they will come" to locate in "our community." These communities have not yet begun to take full advantage of the functional capabilities provided by ICT, nor have the local merchants and manufacturers.

Many areas of application are represented by Borgstrom and her colleagues in their review of the efforts supported by the U.S. Commerce Department's Technology Opportunity Program (TOP) described in this issue. Healthcare delivery systems, educational programs delivered via TV and

audio capabilities, electronic delivery of government services (e-government), workforce training delivered, and citizen participation enhancements (e-democracy) were all the focus of TOP projects across the United States. The TOP program operated from 1995-2004 and supported several hundred "demonstration projects." What these diverse projects demonstrated is the focus of the discussion by Borgstrom, Druker, and Sparrow, and the specifics of each application are described in project documents available on-line in the TOP database.

One of the kinds of e-government applications available in many forms is discussed by Zimmerman and Meyer. This application takes the form of on-line databases that may be used for planning and evaluation of local projects and conditions. While these authors concentrate on data that is organized by the USDA's Cooperative Extension system, their analysis extends their findings to community efforts to do similar things acknowledging that many local communities are locating and providing access to data in various forms for citizens to use, something that has been fairly difficult in the past. If these sources of information can be organized by local communities and used to improve community development efforts, many benefits may accrue to local residents. Involving residents and other users in the design of the ICT services can be instrumental in their successful application (Gurstein, 2003), but involving residents in the evaluation of the effects of the project and in deciding to make needed improvements also benefits from a participatory approach—and Stillman outlines this methodology in some detail in this volume.

FRAMING OUR UNDERSTANDING OF COMMUNITY INFORMATICS

As noted above, theory and the development of normative frameworks that can guide critical analysis of ICT deployment in community development has severely lagged behind application development. Nevertheless, this issue of JCDS provides a number of examples that begin to move in this direction in productive ways. Laudeman proposes a novel framework with a dual focus on community development theory and information theory. His analysis indicates that ICT "…adoption, use, and impacts are complex and *contingent*[1] socioeconomic phenomena that involve a melding of individual and collective learning. Such learning is enabled by information-intensity" (p. 45). Laudeman's argument extends beyond the expected boundaries of technology diffusion noting how ICT is a different kind of technology. His discussion places his analysis within the boundaries of the more general perspective known as "social construction of technology." Further, his perspective is further informed by the introduction of the notion of "information intensity" that relates to both human and social capital assets in the community. His argument is cogently summarized in his use of the "cone of development" and the related discussion.

Social capital is frequently mentioned in many of the papers in this issue in the form of networks, norms, and social infrastructure elements. Despite some critical views of the relationship between ICT use and social capital formation (Pigg & Crank, 2004), this relationship is likely to be central to future development of normative frameworks for ICT and community development. The network connection is more than just an analogy; it is a valid feature of ICT use and provides a direct link to the social capital discussion. Further, as Scott and Johnson note in their discussion of on-line communities, features of computer-based ICTs can be used in normative ways to support collective action and community building. These features extend beyond communication itself and represent one of the functional dimensions of ICT (more about this below).

Although not addressed explicitly, there is an implicit recognition of the importance of an information ecology perspective. The nature and form of information available, its accessibility and the context in which it is applied, will likely be an important analytical tool for community informatics in the future. The discussion by Borgstrom, Druker, and Sparrow illustrates this set of linkages in their observation of the importance of planning and participation in Technology Opportunity Program (TOP) projects. After all, community developers are already well aware

of the necessity to link information and context to create action agendas. Further, there is a question underlying all these papers regarding the relationship between the information infrastructure (networks) that exist in communities without an ICT infrastructure and how the deployment of this technology may change this infrastructure. Will this new technology-based infrastructure lead to more openness in decision-making by providing more access to information from diverse sources or will technology reinforce the power of elites who have access and stand on the "advantaged" side of the digital divide? Understanding how the pre-ICT networks are organized can guide development of community networks in community development projects.

Wilkinson's "field theory" (1993) may be a useful perspective regarding the connection to information infrastructure. By focusing on those social fields represented by networks of individuals and organizations and the information they share, one may be better able to intervene and broaden access to this infrastructure by those in other social fields. How this information can be leveraged for improving the community field is a major challenge for analysis in the many application examples available today.

GUIDELINES FOR COMMUNITY DEVELOPMENT

In concluding this introductory discussion, I want to summarize my personal interpretations of what the authors in this issue have tried to say in the broadest context. In some cases, I want to emphasize common observations that can serve as guidelines for practice. In others, I want to try to provide a more concrete set of guidelines to what may be less obvious to the reader. By using the content of the papers to illustrate these points, I hope to provide a solid basis for action for community developers to build upon and, perhaps sometime in the future, share with others in the pages of JCDS as these authors have done.

A. It's Still about the People, not the Technology!

Borgstrom, Druker, and Sparrow make this point explicitly, but nearly all the authors address it to some extent. While initial focus may be on the nature, use, and potential benefits of ICT, sooner or later discussion turns to how to get things done. This phase of the discussion hinges success on the human and social assets of the community. To decide what form of technology to deploy, how it can best be used, what goals are important to the community to focus resources upon, and how these decisions are to be made—demands that people work together. Such collaboration is a political and social process, and it involves balancing risk and trust in applications about which little may be predictable. Further, once the deployment is complete, the quality of the social infrastructure—as well as the information organized and made available—will likely determine how successfully the long-term goals of community development will be achieved as illustrated by the examples provided by Pigg and Crank. Community leadership will play an important role as will ordinary citizens and the mediating structures that help organize and manage information. Finally, how these efforts are evaluated is a very political process and the recommendation by Stillman in this issue for using participatory approaches as the basic form of evaluation further illustrates the importance of the human dimension. In the end, the uses and successes of ICT for community development will be socially constructed. The specific forms may be unpredictable and very different from those initially envisioned, but they will be dependent on the quality of community participation and leadership.

B. Physical Access and Usefulness are Different.

As many of the discussions related to the documentation of a digital divide that exists among users by gender, income level, ethnicity, and geography demonstrate, having physical access to ICT services does not mean someone actually knows how to use them. A similar phenomenon occurs in community informatics. It is useful to understand the functional dimensions of this

technology (or set of technologies depending on your perspective) so that we can more fully realize the potential of ICT. There are four identifiable functional dimensions associated with ICT: interaction, content management, scalability, and appropriation.[2]

a. *Interaction*: It is useful to keep constant attention on the fact that ICT represents a different form of communication than previous forms like the telephone or television represent. The most useful functional difference is that ICT provides for interactivity in far more ways than previously experienced, and this functionality will likely expand in interesting and unpredictable ways. As the size of the communication pipeline has grown with technological advances, our ability to combine audio with video, at the same time or asynchronously, and with increasing numbers of people at the same time has grown. A broadband connection provides quite acceptable VOIP (voice-over-IP) service that rivals a good phone connection and can include video services as well as document sharing services. In short, this functional dimension provides services that make ICT communications very similar to face-to-face communication and support as many different forms of interactivity as we have in the more traditional mode. The services to support this function are now available from multiple sources at relatively little expense (for the software, at least).

b. *Content Management*: The technological innovation represented by the combination of computers with communication technologies provides for many types of expanded services via ICT. One of the most important in commercial applications is content management (or knowledge management) that permits information to be stored, organized, shared, combined, and otherwise manipulated in individually satisfying ways. Combining data with information storage, and organization and retrieval services, as well as with document sharing, provides for the creation and interpretation of content in ways unavailable before. Whether we are talking about information formerly stored on library shelves or in government files, putting this data on-line and providing the ability to make better use of it is a powerful community development tool. The Zimmerman and Meyer study, as well as the Scott and Johnson paper, both outline the importance of this functional dimension and the related design guidelines that make this function more useful to users. People trying to solve problems may use this function to provide access to a community's assets and find it an invaluable service. Organizing these assets on-line takes resources, but these are mostly information and human resources to organize it physically to fit the content management software being used. This is a challenge, but one that is not unusual for communities except in scope and intensity. Yet, as Laudeman argues, without the intense use of information in the future, development goals will be placed at risk.

c. *Scalability*: Once a person is connected to the Internet, she has immediate access to the whole Net, the entire global network of information and services available to everyone else. In fact, for community development, scalability represents both an asset and a liability. It is an asset because scalability increases the access of individuals to everyone else on the Net, expanding personal networks for various kinds of transactions, some of which were impossible or improbable before. It is a liability because scalability tends to detract attention from local places and draw it to global places. The effects of e-commerce on small retailers described by Walzer and Colavito are good examples. Other examples are the "one-to-many" kinds of communication provided by chat rooms, wikis,[3] and other such tools on the Internet, such as email systems. It takes conscious effort and the building of content and services that are directly connected to the geography of places to overcome the potential negative effects of scalability. Without such attention, local citizens will be involved more with global networks than with local.

d. *Appropriation*: It is hard to predict exactly how ICT might be used by any specific individual, organization, or community. The technology is so flexible that an application employed in one situation can be modified very slightly and used in another quite easily. A knowledge management tool is a good example; created as a tool for commercial use to permit workers to share tacit knowledge and improve the performance of each person as well as the team, knowledge management software can be used in the kinds of community building applications described by Scott and Johnson or can be used to link people with complimentary knowledge and skills for a community project. An application in an educational setting might also be appropriated for use in a community setting such as described in Mehra's paper. Innovation occurs rapidly in cyberspace, and appropriating technology developed for one purpose for another unrelated (except in function) purpose seems to happen frequently as ICT is deployed in more arenas.

C. Democratic Transformation Seems Possible.

Over and over, those involved with ICT use refer to its potential in transforming democratic processes and institutions. Advocates of ICT use make many claims for transforming democracy: making information more widely accessible to support more effective participation, providing tools to support direct communication between citizens and elected or appointed officials, providing means for direct referenda through polling applications, and encouraging citizen dialogue to resolve conflicts. One could imagine Mehra's project with African-American women being appropriated to explore the dimensions of citizen opinions and values regarding environmental assets and their protection or improvements needed in school systems. We have already seen the use of email and other forms of communication on-line (as well as with cellular phones) to support citizen mobilization and to protest proposals at the World Trade Organization meetings in Seattle and Rio de Janeiro. Broadening participation and improving the quality of that participation by including better information on which to base ideas for action can only improve democratic processes. The examples of e-government that make bureaucratic processes more convenient and responsive to citizen (and community) concerns illustrated in many of the TOP projects reviewed by Borgstrom, Druker, and Sparrow provide another avenue for making democratic processes and institutions work better. Of course, such processes and applications of ICT may threaten some decision makers who see a diminution of power resulting from such changes. To the degree that all citizens do not have access and are restricted to the disadvantaged side of the digital divide, these processes are still dominated by elites because the issues of concern to the disadvantaged do not make it to decision making agendas (Stillman, this issue). So, the technology itself does not guarantee that democracy will be improved. The technology only provides tools for creative application that has the potential to do so. It remains to be shaped by the people who use it and want it used for specific purposes to make such improvement realize its potential.

THE COMMUNITY DEVELOPMENT CHALLENGE

In the "information economy" and the "knowledge society," access to information and the capacity to transform that access into knowledge useful for human purposes are critically important. Community informatics is all about how to develop such access and how ICT can be so transformed. Of course, its action base in community development is what separates community informatics from other uses of ICT in commerce, medicine, education, and so forth. There is, however, an underlying tension that community development must address directly if community informatics is to realize its potential. Phillip Quéau (2002) has eloquently argued for greater recognition for what he calls "epistemic regimes," the specific, local "knowledge societies" that community developers recognize as central to the sense of community that people possess. In

discussing the impact of globalization and ICT deployment in the context of growing commercial influence over the technology, Quéau argues it is absolutely necessary—for good governance to exist—that we recognize and give status to the "…cultural, economic and societal role of information and knowledge in a given society," e.g., *community* [4] (p. 10). Otherwise, the effects of globalization will quickly overpower and usurp the integrity and centrality of what local people "know" and what information they deem useful and important.

However, developing content based on what local people know is a messy affair. Developing an ICT-based system for local use involves more than cataloguing information and a storage and access system. Identifying this knowledge seems straightforward enough, but Schulz (1998) argues that we need a "communicative praxis," a participatory approach to the "…construction of meaning, projects, visions, values, styles, strategies and identities through interaction with and against one another." It matters not whether this interaction is based in physical contact or virtual (Sahin, 2005). As demonstrated by several articles in this issue, the participation of users in the construction and evaluation of ICT-based community network systems is critical to their success. This participation affects both the usability of the system and the motivation to use this technology to do some things that were previously done differently or not done at all.

Recently, the Intelligent Community Forum recognized a French community, Issy-les-Moulineaux, for excellence in its use of ICT (see www.intelligentcommunity.org). This modest size community near Paris launched an effort in the mid-1990s to create a digital city and lure technology companies to the community. Today, its population has grown 35 percent but, more importantly, its employment base of 70,000 workers is larger than its population! In addition, forty-five civic projects have been completed by improved community well-being, from cyber-nurseries that permit parents to check on their children via the Web, to a "CommeVous search engine" that allows citizens to discover other people who share their interests, to a multi-media equipped City Council room that permits citizens to participate directly in Council meetings. Local leaders also claim to have improved government efficiency and saved US $500,000 annually. The city hosts an annual forum on E-Democracy and presides over a large network of municipal mayors in the "Global Cities Dialogue." This story illustrates the dynamic nature of ICT deployment, its multi-functionality, and the benefits of involving citizens in the project's design and how this fosters use. City leaders are putting into place a "communicative praxis" that mobilizes local knowledge in dynamic rather than static ways. Such efforts demonstrate the leverage to be obtained in a knowledge society.

As community informatics becomes more formalized and agrees upon a normative framework from which to develop our understanding further of the transformative power of ICT applications, we will all understand how to increase this leverage and the benefits promised by ICT advocates. However, community developers will also be called upon to help integrate the technology with community development processes (e.g., participation) in order to achieve the dimensions of success illustrated by the Issey-les-Moulineaux example. The projects discussed in this issue and those in other publications only serve to illustrate basic ideas and their limitations and potentialities. Making the Net work is not a technical problem but a human community problem, one that the field of community informatics is prepared to address.

NOTES

1 Italics added for emphasis.

2 I am indebted to Wal Taylor, of South Africa, for suggesting this dimension be added.

3 The term "wiki" is taken from the Hawaiian language and has been used as shorthand for a software system that provides for several types of communication not provided by other systems. See http://wiki.org/wiki.cgi?WhatIsWiki and http://c2.com/cgi/wiki?WikiWikiWeb for more information.

4 Italics mine.