

The Capability Approach Community Informatics

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This article integrates key theories and concepts associated with the Capability Approach to community informatics (CI), a domain of sociotechnical theory and practice concerned to improve the lives of people in need. While the social value propositions for community informatics are useful for orienting pragmatic research and practice, they are currently not well considered theoretically. Sociological theory is therefore explored to provide a stronger anchor to community informatics as compared to the narrower theoretical agenda of information systems. Within this framework, the Capability Approach is identified as one example of a strong social theory with potential for adaptation into community informatics. This would have several effects, including strengthening internal theory, and building capacity to engage in stronger dialogue with other disciplines, including sociology and information systems. This new approach to CI theory via sociological theory also allows for the adaptation and testing of other bodies of theory.

Keywords capability approach, community informatics, ICT4D, development informatics, sociotechnical theory, social theory, theories of the middle-range, effective use

This article integrates normative theories about human well-being associated with the Capability Approach (CA), into the program of community informatics (CI). The CA is particularly associated with the work of Amartya Sen and Martha Nussbaum (Sen 2001; Nussbaum 2003). While some of the concepts behind the CA appear to be common sense or intuitive (e.g., literacy or well-being), in fact, theorizing social concepts is no easy task. This is particularly the case for people who do not have a background in sociology or related disciplines.

In order to provide some orientation to sociological thinking, two relevant ideas in sociology or social theory are considered: first, what is known as “Grand Theory,” particularly identified with the work of the American Talcott Parsons (Parsons 1951), though familiar in the European tradition (Skinner 1985), and second, “theories of the middle-range,” associated with the work of Robert Merton (Merton 1968). These provide a context for considering the CA as a robust form of sociological theory with considerable relevance to CI.

Grand Theory as developed by Parsons is identified with the search for systematic and very-large-scale analytical and explanatory theories of human order (Parsons 1951). However, other Grand Theorists (Derrida, Foucault, Gadamer, Habermas) always had a pronounced moral and ethical edge to their work (Skinner 1985). From that standpoint, the Parsonian approach was famously attacked by C. Wright Mills for abandoning what he believed to be the task for sociology—the promotion of social betterment and human freedom. Instead, “the systematic theory of the nature of man [*sic*] all too ready becomes an elaborate and arid formalism in which the splitting of Concepts [*sic*] and their endless rearrangement becomes the central endeavour” (Mills 1959, 30). In the same vein, Anthony Giddens (1976), a Grand Theorist of a more critical bent, warned against the idealization of an ahistorical and allegedly neutral “arid formalism” in academic sociology and the application of the positivist and neutralizing methodology of the natural sciences to the social sciences.

Somewhat in contrast to Grand Theorizing, another American, Robert Merton, suggested the concept of “theories of the middle-range” as the orientation of most sociological theorizing and practice. “Theories of the middle-range” are “contextual explanations unrelated to universal law” (Mjøset 2001, 16642) but related to here-and-now problem solving, rather than “all inclusive speculations comprising a master conceptual scheme from which it is hoped to derive a very large number of empirically-observed uniformities of social behaviour” that solve grand sociological problems (Merton 1968, 6). Most

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sociological research goes on at this level. We argue that there should also be a consciousness of grander sociological concerns that inform middle-range theory or practice, thus preventing a dry instrumentalism that brackets a concern for social or ethical concerns. These days, such engaged research is known by such names as “public sociology” (Nyden, Hossfeld, and Nyden 2011) or “community-based research” (Stoecker 2005).

Given the pragmatic and instrumentalist orientation of CI, the adequacy of current CI theory as a problem-solving “theory of the middle-range” in the context of the technical orientation of information systems (IS) is reconsidered here. It is proposed that the CA be adopted and adapted as a theoretical tool because although it has aspects of the ethical and moral concerns of Grand Theory, it can be fruitfully adapted for middle-range theorizing with an overarching concern with universals such as human rights and personal well-being. Through the work of Amartya Sen, as detailed in the following, the CA provides a robust theoretical basis and a vibrant social canvas on which to work with socio-technical problems.

Thus, by integrating the social richness of the CA into CI, an improved theoretical and normative baseline for CI here-and-now problem solving and more advanced purposes is provided for research and development. Given similar middle-range approaches in other disciplines such as management and library sciences and their dependency on information and communication technologies (ICTs), the article’s implications may also have relevance for those fields in looking at other bodies of theory.

The structure of rest of the article is as follows. First, the article explores the concept of theory. Second, it discusses the CA and relevant examples of the adaptation of the CA theorization in ICT for development (ICT4D) as relevant to better theorization and practice in CI. Third, the article looks at propositions developed by the CI community and analyzes them in terms of CA adaptations, and finally, this is used to make observations about future CI theory development. Some remarks are also made about future prospects for further integration of the CI and CA research programs.

WHAT IS MEANT BY THEORY?

Information systems (IS) theory is particularly relevant to CI because CI depends upon the assumptions and products of IS system design to develop its social agenda (Stillman and Linger 2009). However, the meaning of “theory” in this context needs to be defined. From a sociological perspective, there is a great deal of dispute and confusion as to what “theory” actually means. Abend provides an extended discussion, suggesting that the problem is in part semantic—that the problem is that people are talking about very different things when they mean “theory,” due to the

polysemic (multiple) meanings of the word (Abend 2008). There are, of course, other valuable discussions on how to categorize types of theory (Mjøset 2001), but Abend’s discussion has the strength of being comprehensive, lucid, and self-contained.

Abend concludes that it is best to not try to define the term “theory” uniquely, but to live with at least seven definitions of theories and apply them to different tasks. These types of theories are summarized using Abend’s terminology in Table 1. Similarly, from a specifically IS perspective, Gregor has developed a discussion about the nature of theory in IS. Gregor also concludes that “theory” can encompass a wide range of concepts, models, frameworks, or bodies of knowledge, depending on the purpose and level of theorization needed (Gregor 2006). As we see from Table 1, the body of IS theory does not include correspondences to Abend’s Theories_{A3-7}, while Gregor’s problem-solving Theory_{G5} for IS, which is arguably a significant part of the field’s work program, is not paralleled by any of Abend’s sociological categories.

As is made clear in subsequent sections of this essay, the CA has richer pickings for CI than the theoretical agenda outlined by Gregor. This is because it moves beyond analytical or prescriptive theories with a technical problem-solving dimension that is capable of providing the core of IS with a theoretical framework embedded in significant theory dimensions of sociology (Abend’s Theories_{A5-7}).

In addition, as we can see from the table, “theories of the middle-range” can be more appropriately contextualized as specific theory types because we can now see their relatively narrow overall focus, notwithstanding their practical significance. Consequently, as Merton suggested, “theories of the middle-range” are not concerned with grand questions about the meaning of existence. If one wishes to explore them more deeply, other sociological theory research is necessary, and CI workers need to undertake a trek into classical sociology (Alexander 1987) or newer works.

COMMUNITY INFORMATICS

Community informatics (CI) is primarily concerned with improving the well-being of people and their communities through more effective use of ICTs. As already established, CI foregrounds social change and transformative action in emergent sociotechnical relationships, rather than prediction and control. It takes the view that ICTs are “radically incomplete” and that “the success of a technology is not fully explained by its technical achievements” (Feenberg and Friesen 2012, 9). The social dimension is critical, yet complex.

The construct of “community,” so central to CI, is difficult and sociologically well problematized (Harvey 2000).

TABLE 1
Types of theory compared

Abend theory types	Gregor information systems theory type	
		<ul style="list-style-type: none"> • Merton: theories of the middle-range • Sen: Capability Approach
Theory _{A1} : Propositional: Posits logical relationships between variables.	Theory _{G3} : Predictive and explanatory; has testable propositions and but not well-developed causal explanations.	
	Theory _{G4} : Predictive—but does not aim to predict with precision.	<ul style="list-style-type: none"> • Capability Approach
Theory _{A2} : Explanations that offer factors and conditions.	Theory _{G1} : Analysis. Says what is. The theory does not extend beyond analysis and prediction. No causal phenomena are specified and no predictions made.	<ul style="list-style-type: none"> • Theories of the middle-range • Capability Approach
	Theory _{G2} : Predictive—but does not aim to predict with precision.	
Theory _{A3} : Interpretations: Hermeneutics, readings, ways of making sense		<ul style="list-style-type: none"> • Theories of the middle-range
Theory _{A4} : Grand Theory, with complex polymathic bodies of work.		
Theory _{A5} : Weltanschauung: Overall perspectives of seeing the world, theoretical “schools” feminist theory, critical theory.		<ul style="list-style-type: none"> • Capability Approach
Theory _{A6} : Normative theories, often with contemporary, politically aligned projects: feminism, Marxism, post-colonial theory, “social theory.”		<ul style="list-style-type: none"> • Capability Approach
Theory _{A7} : Sociological problems: problem of social order, problem of agency, theory of sociology.		<ul style="list-style-type: none"> • Capability Approach
	Theory _{G5} : Theory for design and action. Says how to do something. Explicit prescriptions for constructing an artifact.	<ul style="list-style-type: none"> • Theories of the middle-range. • Capability Approach

However, for the purposes of this article, it is taken to refer to local, geographic collectivities or communities of interest, often in a situation of social, cultural, economic, or other disadvantage. Gurstein suggests that the perspective of CI is unique, because the focus is upon *community* informatics rather than generic informatics as applied to communities (Gurstein 2012). They are the subjects and often partners in community-based CI initiatives (Stillman and Stoecker 2008).

“Effective use,” as proposed by Gurstein, is also a summary concept that has become widespread in CI literature (reflected in papers in the *Journal of Community Informatics*) to express a practical theory for achieving community empowerment. Because of its popularity, Gurstein’s point of view is taken here as indicative of CI’s practical, problem-solving orientation. Gurstein states that “effective use” is “the capacity and opportunity to successfully integrate ICT into the accomplishment of self or

collaboratively identified goals” (Gurstein 2007, 43). The phrase is intended to distinguish between the opportunities offered by ICTs and the actual realization in practice, and he says that

theory is needed to provide insight into the particular areas where the community ontology presents design or application challenges which diverge from those which underlie other areas of applied technology. Thus for example, how can one understand, conceptualize and model dispersed and consensus based decision-making as a basis for collaborative action and as a design criterion for technology systems to enable such processes? (Gurstein 2007, 39)

However, his discussion is by and large concerned with setting up the technical conditions to ensure access to ICTs, taking into account factors such as carriage, devices, tools and supports, content, service access, and what he calls “social facilitation” or the provision of community and government support (Gurstein 2007). Most recently, he has identified CI as a form of “resistance,” also recently addressed by Feenberg (2012, 9). This perspective takes into account an ontology of community-oriented and particularly nonprofit activity for well-being, in contrast to technologies that promote “networked individualism” in a market setting. Thus, while networked individualism can appear to be “neutral” and “empowering,” it is embedded in the rules and protocols of a commercial system—Facebook being a case in point (Gurstein 2012, 41–42).

Thus, the establishment of theoretical clarity for CI values through “rights,” “freedoms,” “happiness,” “well-being,” or “empowerment” in the context of achieving “effective use” or even “resistance” is important if CI is to be able to move beyond middle-range theorizing, propositions, and problem solving. CI will then be able to contribute to a more critically-oriented approach that can better interact with other disciplines. At the moment, CI work (anecdotally at least) is housed in academic locales such as IS, management systems, or library sciences, where social theory is tangential.

In order to do move beyond the middle-range, rather than reinvent the theoretical wheel, CI can adapt sociological theory. This will provide guidance, to quote Chen’s work on evaluation theory, “on what goals or outcomes should be pursued or examined, and how the treatment should be designed and implemented” (Chen 1990, 7). Richer sociological understandings, particularly those found through exploration of Abend’s Theories_{A5-7}, in turn provide a more solid basis for evaluating the outcomes of the CI “treatments” or social interventions than Gregor’s lower level Theory_{G5}. This move to active consciousness of the different purposes of theory and the intellectual tasks contained within them moves CI away from its somewhat ad hoc approach to theorizing its work. These theories

also help to promote what Gurstein calls “those areas of small victory . . . and on the basis of this research, identify strategies that have achieved success and suggest means for replicating, reproducing, and extending them” (Gurstein 2012, 49), but also, as suggested, enable more advanced theoretical conversations and partnerships beyond the middle-range. The Capability Approach is used as an example of this.

THE CAPABILITY APPROACH

The Capability Approach has been developed via the work of the highly influential Nobel laureate Amartya Sen, as well as other thinkers such as Martha Nussbaum (Nussbaum 2003). The discussion presented here first draws on two monographs directed at nonspecialists—*Development as Freedom* (Sen 2001) and *The Idea of Justice* (Sen 2009)—and selected papers, but it should be noted that Sen has had a huge publication output, with a vast secondary literature. Sen’s work spans economics (for which he received the Nobel prize), philosophy, and social theory. The discussion here also looks at adaptations of the CA used for researching ICTs.

Sen’s work is of such importance that it has influenced the UN Millennium Goals and Human Development Index (Robeyns 2005). Unusually, it draws upon both Western and Indian traditions. However, Sen has stated that the “capability perspective . . . does not, on its own, propose any specific formula for policy decisions” (Sen 2009, 232). Consequently, as Robeyns suggests, “many aspects of his work, including theory and measurement are radically underspecified and [because] every application [of the theory] requires additional specifications, there are always a number of different ways in which a particular question can be answered using the Capability Approach” (Robeyns 2006, 371).

In Sen’s view, it is impossible to have a neutral concept of who and what is a “person” (the IS “user”), devoid of a normative or moral dimension that relates to key values such as the nature of freedom, happiness, or social well-being (Sen 2009). However, utilitarian theory, which has strongly influenced economics, has by and large removed the moral dimension from consideration. To exclude noneconomic, normative values and judgments about the quality of human life from any discussion of the theory of well-being is a serious conceptual mistake (Johnstone 2007). Sen is consequently critical of an overemphasis on the “economic criteria of advancement, reflected in the mass of readily produced statistics” as the primary or sole means of measuring human well-being (Sen 2009, 225).

In contrast, a theory of human capability that takes into account key determinants of well-being such as

education, health, social participation, freedom from oppression, violence, and absence of gender-based discrimination is critical in developing a balanced approach to the problem of well-being. Nussbaum developed her own more detailed list of normative capabilities focusing on women but, like Sen, defined human capabilities as “what people are actually able to do and to be—in a way informed by an intuitive idea of a life that is worthy of the dignity of the human being” (Nussbaum 2000, 5).

Actions that result in positive changes for such people result in what Sen calls substantive freedoms, and are the result of a person’s use of her capabilities, “the alternative combinations of functionings that are feasible for her to achieve” (Sen 2001, 75). The groups of “functionings” that a person chooses can be regarded as a “capability set” that can result in substantive freedom across a range of identifiable areas such as education, health, social participation, and freedom from oppression. “Functionings” is also Sen’s rather clumsy term for the things that people may “value doing or being” in order to obtain these freedoms. They range from basic things—such as the ability to put food on the table—to more complex activities such as being electronically literate and capable (Sen 2001, 75).

Furthermore, Sen argues that the “relationship between resources and poverty is both variable and deeply contingent on the characteristics of the respective people and the environment in which they live—both natural and social” (Sen 2009, 254). These factors include gender, physical differences, and disabilities; differences in the physical environment; variations in social climate (thus, the state of personal and public health); and relational perspectives, that is, the normative dimension associated with perceptions of dignity, poverty, or disability.

The gender element has to be particularly emphasized in how this relationship is played out: From Sen’s (or Nussbaum’s) perspective, the concept of a gender-neutral person is erroneous. The typical person at disadvantage in the developing world is a single, poor woman with dependents, and theories of well-being must take this into account. This again moves the evaluative, planning, and even theoretical focus away from purely materially-oriented attempts to alleviate poverty (such as income support, freedom from hunger, or, in the case of ICTs, the crude roll-out of computers), to one that puts gender constraints and opportunities into the picture.

Finally, Sen is sympathetic toward participatory approaches to research and development, though his remarks are generic, rather than prescriptive, reflecting the belief that people’s own agency in achieving their goals is critical. “The people have to be seen . . . as being actively involved—given the opportunity—in shaping their own destiny, and not just as passive recipients of the fruits of cunning development programs” (Sen 2001, 53; also 2001, 80–81).

All these aspects of the CA—either through reference to Sen and Nussbaum’s works or through the secondary literature—can be seen as instantiations of ethical and moral explorations for emancipatory purposes, as found in Abend’s Theory_{A5} and Theory_{A6}. Likewise, Gurstein’s moral and practical concerns for an engaged, participatory, and critical approach can be accounted for through the CA’s conceptual and theoretical depth.

CA, because it works from a position of free human agency, is not concerned with direct predictability (as in Abend’s Theory_{A1} or Gregor’s Theory_{G3} and Theory_{G4}). It could, however, be used to set up situations where certain outcomes could be generally aimed for within the “radically incomplete” (Feenberg 2012) sociotechnical environment of CI.

ADAPTATIONS OF THE CAPABILITY APPROACH APPLIED TO THE STUDY OF ICTS

A number of researchers have already applied the strong normative approach of CA to the design and evaluation of projects in ICT4D (information and communication technology for development). Their work is also relevant to the domain of CI. This approach can certainly be considered as a form of Gregor’s Theory_{G5}, albeit much informed by the higher order concerns of Abend’s Theories_{A5-7}. Each of the eight approaches discussed in the following (in authors’ alphabetical order) is also summarized by a key rubric in Table 2. A number of the theories are drawn from a recent special journal issue of *Ethics and Technology* devoted to the CA, with other theories chosen because they are referenced in academic literature.

TABLE 2
Adaptations of the CA for the study of ICTs

Authors	Conceptual adaptation of the Capability Approach
Gigler (2011)	Informational capabilities and informational capital
Grunfeld, Hak, and Pin (2011)	Capabilities, empowerment, and sustainability
Kleine (2010)	Choice framework
Johnstone (2005); Johnstone (2007)	Theory of justice
Oosterlaken (2008); Oosterlaken (2009)	Capability sensitive design
Toboso (2011)	Functional diversity for disability
Vaughn (2011)	Indigenous communities on the margin
Zheng and Walsham (2008)	Capability exclusion in the e-society

Each of the examples used here is also important because these are located in different domains (information studies, development studies, philosophy, disability, material design, and indigenous studies), demonstrating that around the core of CA normative theories there is a richness that has been applied in ICT4D which could also be applied to CI. While the focus in the reported research is upon evaluation of activity, there is no reason why the frameworks developed could not then be used to design social–technical interventions with the aim of measuring the effects that occur through the CA lens.

Gigler, focussing on *information capabilities and information capital*, suggests that there is no simple social or economic causation effect that can be attributed solely to the introduction of ICTs. Based on research in rural villages in Bolivia, he suggests a method of evaluating subtle and complex sociotechnical effects by testing “an impact chain that attempts to unpack the various indirect effects of ICTs on people’s well-being” (Gigler 2011, 3). He uses these to examine the interaction between personal and community capabilities to take advantage of opportunities to use information in everyday life. His concept of informational capabilities “refers to the combination between a person’s existing livelihood resources in terms of information (informational capital) and his/her agency (ability) to strengthen these assets and to use them in such a way that the use of information can help a person to transform his/her options in life in order to achieve the ‘beings’ and ‘doings’ a person would like to achieve” (Gigler 2011, 7).

Grunfeld, Hak, and Pin have combined a participatory approach with an attempt to longitudinally understand the micro-, meso-, and macro-impacts of an ICT4D project in Cambodia, through what can be called the *capabilities, empowerment and sustainability (CES) model*. As they state, “the conceptual model used in this research assumes a virtuous spiral dynamic between the use of ICT and the building and strengthening of capabilities, empowerment, and sustainability (CES) in the sense that individuals and communities can use ICT to build CES, which in turn can improve their ICT infrastructure and skills” (Grunfeld, Hak, and Pin 2011, 152). In their opinion, many of the insights around the impacts of ICTs upon health, education, community development, and the effects of ICTs on women can only be obtained through a participatory approach that at the same time reflects the choices that individuals and communities make in determining capabilities, drawing on the insights of the CA as benchmarks for investigation.

Kleine has developed another detailed framework for operationalizing the CA, based upon what she calls the *choice framework*, developed from work in Bolivia (Kleine 2010). Kleine is also critical of top-down evaluation methodologies and makes a strong argument for

participatory methods as a means of strengthening project outcomes, particularly those that are overly focused on narrower economic outcomes.

She observes that ICTs are having profound impacts, yet researchers struggle to find the means to demonstrate this in a measurable and meaningful way to funders. Part of the problem is also that ICTs’ contribution to development can be “characterized as one of multiple possible entry points into complex and systemic development processes” (Kleine 2010, 684), and it is not easy to develop evaluations for such complexity. While the CA, drawing upon a number of theory frames, is conceptually rich and has great possibilities as an analytical tool, “the dilemma which emerges is how to apply the capability approach to specific areas or sectors in a meaningful way while retaining open-ended development outcomes that do not presuppose individuals’ choices” (Kleine 2010, 626). Kleine details 10 categories for understanding the interaction between people and technology, including social, personal, material, and informational resources, financial resources, geographical resources, health resources, human resources, psychological resources, information (Gigler’s informational capital), cultural resources, and social capital or social resources.

From an approach grounded in ethical and philosophical theory, Johnstone argues that the CA is ultimately concerned with justice, because “capability theory rejects any simplistic utilitarian calculus and . . . is not in the business of adding up costs and benefits. Instead, it maintains the absolute value of fundamental human freedoms” (Johnstone 2007, 81). Consequently, she proposes a *theory of justice* that can be applied to examine ICTs in society, and this theory is then used to judge the value and worth of how ICTs are used in an ethical and moral way to achieve human well-being.

Johnstone also states that the CA provides the opportunity for a broader and more socially responsive agenda to understanding and promoting the possibilities that ICT offers in the context of global development,

encompassing not only value-based analyses and judgements of individual action, but also of situations, systems and forms of distribution . . . of social and technical arrangements in the most general sense. It would take as its starting point human capabilities and functionings, and would seek to make judgements about the deployment of technology in terms of its role in enhancing or diminishing these. (Johnstone 2007, 81)

With this assertion in mind, technologies as artifactual and social resources are drawn upon by people in the expression of their capabilities to achieve freedom and well-being in the context of the achievement of justice for all. Thus, they are a resource to be drawn into developing possibilities for the extension of individual and community and contingent knowledge capacity

through “the building of instrumental freedoms—in terms of capacities, resources and environmental features,” though none of these relationships should be regarded as causal or deterministic in nature (Johnstone 2007, 80).

Johnstone also takes an interest in using the CA to investigate knowledge capabilities, environmental influences, and what she identifies as direct and indirect ICT influences. This framework, sensitized by a justice approach, has been used in her investigation of an AIDS organization in South Africa. As with the work of the other authors in this review, many key investigative variables are delineated that assist in specifying theoretical and practical agendas.

In her work on the CA, Oosterlaken discusses *capability sensitive design* where the details of design are “morally significant” and that “engineering products are far from neutral instruments to be used at will for either good or bad, but rather value-laden or inherently normative” (Oosterlaken 2009, 94). Technology cannot therefore be considered as morally neutral, but reflects particular sociotechnical choices and preferences on the part of designers and others, a point already well established in the literature (Barley 1990). In order to achieve this, an emphasis should be put upon using participatory design methods because some information can only be obtained from people and communities themselves. Effective design methods therefore promote “personal and social/environmental characteristics that influence the conversion from resources into capabilities and functionings” (Oosterlaken 2009, 94, 98). Technology can thus be seen as a tool for “capability expansion” from the bottom up, and she goes on to look at cases of product application in developing countries (Oosterlaken 2008).

As noted, Sen’s view is that inequality is gendered, and that people’s lives are often inhibited by different forms of disability. Toboso reorients the discussion within recent disability literature, arguing for *functional diversity for disability*. From this perspective there is no such thing as a typical “person” (once again, a reflection on problems with technological “neutrality”), when there are various physical and personal conditions that impact upon “effective use.” This point of view takes up the social model of disability, which looks at disability as a personal feature, rather than the medical model, which looks at disability as deficit. “In terms of functioning—physical, mental, and sensory—humans being are diverse, and all societies should view this diversity as a source of enrichment” (Toboso 2011, 108).

This “is a reversal of major importance, for disability is no longer assumed to originate with the individual’s limitations, but rather with society’s limitations in taking the specific, functional requirements of those individuals into consideration” (Toboso 2011, 108). It is therefore the

task of sociotechnical designers to account for “functional requirements” of people with different disabilities and to develop in their approach recognition of the capability set that allows a person to function as fully as he or she wishes. In practical terms, this represents a form of ICT affirmative action, and in fact this is already recognized in the World Wide Web Consortium Accessibility guidelines that are already mandated for government contracts in some countries (for example, in Section 508 of the Rehabilitation Act Amendments in the United States). The measurement of capability becomes a measure of a person’s capacity and freedom of choice to have ability (e.g., someone with limited hand mobility), to take advantage of the “functionings” provided to a person by a technology (e.g., voice commands rather than use of keyboard). This, in turn, becomes part of an evaluation of degrees of freedom and well-being.

Vaughn’s discussion of *indigenous communities on the margin* (Vaughn 2012) stresses the way in which indigenous identity in Australia (and in many other countries) is tied up with what is known as “country”—the physical and spiritual attachment by traditional peoples to the preservation and development of their culture, sometimes in radically new ways (e.g., contemporary Indigenous Australian art). Any development of capability sets or functionings has to take into account this ongoing spiritual connection. Indeed, one of the failures of indigenous policy has been that it has given so little credence to connections to “country.” Ontologically, in indigenous eyes “caring for country” or “caring for culture” can be the most important thing that they can be capable of doing, beyond visible physical achievements (Vaughn 2011, 133, citing Tom Calma, Aboriginal and Torres Strait Islander Social Justice Commissioner). As one sympathetic anthropologist puts it, “Aboriginal people assert endlessly . . . that the interactive, ceremonial, and productive relationship with country is necessary for the continuation of social life” (Cowlshaw 2004, 957). Additional capabilities and functionalities must be embedded in any ICT activity that goes on in conjunction with communities for any productive relationship to occur. As Vaughn and others note, the relationship between individual and collective rights is a challenging one (Stillman and Craig 2006). Working with indigenous partners to assert equal authority with privileged researchers is no easy task to undertake. Such issues are taken up through activity such as that known as “kaupapa research” with Maori, which specifically acknowledges local ontologies and epistemologies (Bishop 2005). Developing an ethical approach to engaged ICT research without fetishizing or privileging ICTs is consequently an enormous and occasionally political challenge (Stillman, Herselman, Marais, et al. 2012).

Finally, in a number of papers, Zheng (with Heeks and Walsham) argues that ICT for development tends to take

growth and modernization as axiomatic priorities, without considering other social priorities or the effects of ICTs (Zheng and Heeks 2008; Zheng and Walsham 2008; Zheng 2009). Consequently, there is a danger that narrowly conceived ICT for development projects caught in traditional ideas about development may lead to patchy e-literacy, and result in *capability exclusion in the e-society*. In contrast, the CA helps to reorient perspectives about ICTs so that it takes into account the personal and social variables that affect people's capacity to achieve well-being, via a richer understanding of what constitutes information literacy and the dimensions of inclusion and exclusion. More generally, information literacy, which includes e-literacy, "should move beyond the scope of individual skills to a structural level social phenomenon which entails the diversity of human conditions and social contexts" (Zheng 2007, 2222). In particular, the CA becomes a sensitizing tool operationalizing and analyzing functionings and capabilities that e-literacy offers in the context of social diversity: One size doesn't fit all. This results in a "perspective of ICT [that] emphasizes embedding ICT in the pursuit of human development (i.e., allowing individuals to achieve greater capabilities and to lead a life they value)" (Zheng and Walsham 2008: 79). Zheng and her co-authors also outline many research questions relating to the investigation of the soci-technical effects of ICTs via the CA that could be fruitfully taken up in CI (Zheng and Walsham 2008, 76).

REMARKS

From the discussion of the authors' work just given, it is clear that there is considerable overlap in the different papers in the application of the CA's normative theoretical baseline—located as it is in deeper sociologically related theory. These can then be applied to different ICT4D middle-range problems that resonate with CI (taking up the challenge of Gregor's Theory_{G5}). As Salvador and Sherry put it, from their perspective as ethnographers within Intel, "the vast majority of engineers, marketers and management in multinational corporations simply do not have an intuitive understanding of these [distant and complex] locales. They are far from each other—in physical, social, cultural, symbolic and emotional distance" (Salvador and Sherry 2004, 83). The CA, strongly located in rich theories, provides an opportunity to correct this imbalance through its practical toolbox.

The example of the eight CA adaptations drawn from ICT4D can next be compared to value propositions that are characteristic of views within the CI community. This provides an opportunity to develop a more thorough basis for CI theory and analysis and consequently, a better means of conducting research activity.

KEY PROPOSITIONS FOR COMMUNITY INFORMATICS

The following set of key propositions for CI were developed based on an analysis of data from three workshops associated with the loose international coalition of researchers known as the Community Informatics Research Network (CIRN)¹ during 2005–2007, but they also confirm the anecdotal evidence about the orientation of the CI research and practice community (Day 2010), and the thrust of Gurstein's most recent work (Gurstein 2012).

The history of the workshops and conference brainstorm session (hereafter "workshops") is as follows:

- The first event was a Roundtable Workshop at the Open University, Milton Keynes, United Kingdom, on June 2–3, 2005. The workshop focused on developing a set of key propositions and statements about CI. Nineteen people came together from Australia, Brazil, Ireland, Portugal, Sri Lanka, and the United Kingdom. During the workshop, the wiki was used to document the sessions, and some comments were added shortly after the event.
- The second event was a Brainstorm held at the 2006 Prato (Italy) CI Conference, which was attended by about 45 people from many countries, and a wiki was set up to record the results of the brainstorm. In the morning session of the first conference day, participants were asked to put online what they thought were the "Big Questions" for CI.
- The third event was a workshop called CIBlend held in Porto (Portugal) on November 26–27, 2007 with about a dozen people from different countries. A wiki was also developed for that event.

These workshops brought together ideas in the works of individual scholars and those discussed informally on, for example, the CI researchers list (ciresearchers@vancouvercommunity.net) and allowed for a synthesis in a communal setting. However, such syntheses were not documented. It is therefore difficult to gauge what impact these workshops had on the thinking and work of those who attended them. Despite these limitations, a best effort has been made here to consolidate the propositions developed at these workshops. As a participant-observer in all three events, the first author also attempted to reconstruct the documented discussion and debate. The propositions therefore represent a personal interpretation of years of group activity around CI issues. It is also important to note that these propositions have not yet been formally fed back into the CI community. Each of these propositions and insights from the CA is now discussed.

1. In the CI context, ICTs are primarily a group or community tool for social or local business development.

The workshop participants felt that the focus of CI work is overwhelmingly oriented to a community-oriented conception of technology, based on the assumption that individuals in dire need are often in situations where collectively oriented analyses and process are critical for supporting individual or community engagement and use. This results in a desire for group processes and community-based research, rather than individually oriented tools or more distanced research. Individuals, as part of a greater whole, belong to communities and their component parts (families, workplaces, neighbourhoods, friendships, ethnic or other collectivities). Participation in the design and implementation process is also emphasized, rather than “shrink-wrapped” solutions, in accordance with recognized community development principles (Stoecker 2005). Moreover, in all the research workshops, there was a high degree of concern for ethical activity with indigenous or minority populations that avoided colonizing or distancing effects. Gurstein, in his recent work, speaks of knowledge sharing and collaborative knowledge building, and research as a process, which is further support for this proposition (Gurstein 2012).

Insights from the Capability Approach. While the research agenda of the CA has generally been focussed on individuals and specifying and testing the achievement of improved forms of well-being (as a cover term that includes the achievement of various forms of freedom, affluence, health, etc.), the aggregation of results of the CA approach through community-wide studies offers the potential for using rich data that capture many aspects of social activity in conjunction with ICTs. Sen’s theoretical and empirical research into such factors as age, gender, class, resources, disability, the presence or absence of human rights, and sometimes family, clan, tribal, or caste affiliation has been taken up in the papers already reviewed here and is ripe for further development. Furthermore, as has been demonstrated earlier in this article, the CA relates back to strong bodies of social and sociological theory as though comparison with Abend’s typology of theory types in this case where Theory_{A6} would be most relevant.

As an example, the capabilities that result from a person’s utilization of Kleine’s categories of social resources could be specifically mapped and researched to provide both personal and community perspectives. As another example, a new approach that looked at the attainment of well-being and freedom through the double lens of the CA and the literature on children’s rights could result in an innovative approach to understanding the transformative (or non-transformative) effect that ICTs have in their lives. Such an approach could also conceptually use the work of Johnstone on a theory of justice for young people’s ICT capability and capacity whether in developing or developed

countries. To take this one step further, the complexity of indigenous identity (as discussed by Vaughn) could shape the development of capability sets and studies in other indigenous contexts.

Methodologically, the empathy shown by Sen toward participatory means of discovery based on a desire to empower the disempowered (also taken up by authors such as Kleine and Oosterlaken from a moral perspective), or to ensure justice (Johnstone), ties in with one of the value strengths of CI—its concern for participation and community engagement as a means of strengthening sociotechnical design decisions for people and communities in need.

2. In a CI-context, one-shot implementation and incentives to change are problematic.

Many of the issues that were raised in the workshops with respect to the divergence from traditional business or government models are also relevant in this context. CI aims to develop nuanced sociotechnical responses to complex social problems and situations, and this is to be expected as it deals with “real-world” issues. This contrasts with approaches often associated with more conventional ICT solutions, which build a solution for a too-simple model of social reality.

Many CI reports and discussions also raise the problem of “short-termism.” Many change processes—particularly when the initiative is experimental or working with the relatively unknown—require time to take hold and mature in a community, yet funding is too often linked to a very short program or program cycles that hinder the development of effective community-based strategies. One of the problems faced by the CI community is that they are often in dialogue with decision makers who themselves are constrained by political or funding factors or decision makers. They consequently have a limited technical, rather than broader critical social, orientation. They are also reluctant to engage in long-term projects that appear politically or financially risky, particularly when outcomes are viewed in narrow economic terms (e.g., “sustainability” being viewed as sustainable in a market, rather than social, sense). While “radical incompleteness” may be inherent to much sociotechnical activity in CI, this flies in the face of conventional program management.

Insights from the Capability Approach. Using the rich range of research approaches available from CI, the strong foundations of the CA permit the CI researcher to develop a strong case for deep and thorough investment in ICT projects that can demonstrate and map how ICTs affect human well-being rather than being engaged in short-term “single-shot” approaches. The different adaptations discussed in the preceding are adaptations that focus on ICTs, and include rigorous insights that demonstrate to the funding skeptic that CI in conjunction with CA is not engaged in lightweight sociological theorization. Substantial thinking and research have gone into a theoretical

program that has had significant impact in many areas of human development assessment. Incorporation of a CA approach into CI could demonstrate the potential for enhanced outcomes and their documentation on the ground, as that is what funders are primarily looking for.

CI should be able to take intellectual direction from the CA, and be able to point out to decision makers and assessors the policy impact of Sen's approach on significant bodies such as the UN Human Development Index, as a means of steering conversations in a new direction. As Alkire puts it in an important overview article on the CA,

the fundamental insight of the Capability Approach concerns the objective of human development: namely, that it should not be economic growth as an end-in-itself, but rather be the expansion of people's real freedoms to do and be what they value. However, as is overwhelmingly evident by now, such a change in the objective has direct implications for the information that is considered and the conception of rationality that is invoked. (Alkire 2005, 125)

This is a theory that can only be tested in the long term.

3. In a CI context, sociotechnical effects are not direct and immediate and evaluation is complex.

Because CI as a form of sociotechnical practice is so closely linked to community development, its effects or causal sequences, particularly in the long term, cannot be prescribed or predicted. Sociotechnical effects, the outcomes of the relationship between people and artefactual systems, are emergent, enacted, and dependent upon human agency, rather than being simply embodied through intended use (Orlikowski 1992; Orlikowski 2000). Gurstein makes much the same point (Gurstein 2012, 48). What also emerges, through anecdotal evidence, the research literature, and the workshops summarized, is a demand for longitudinal investment in projects in order that sociotechnical effects can be observed and be evaluated through different means.

This makes CI similar to many other socially-oriented and community development approaches that do not fit into traditional, rational, planning and evaluation models, and in which the ability to take in multiple perspectives (Rothman 1972) and community-based research methods are a significant part of any solution (Stoecker 2005). However, how to actually implement such a research method is still a looming question in CI.

Insights from the Capability Approach. The CA can provide a social-justice-oriented theoretical basis and a structure for conducting complex longitudinal evaluations of well-being from many different points of entry (Kleine) into socio-technical projects. The authors' work reviewed in the preceding represents different points of entry, across the time frame (and, as well, a geographic conception) of a project continuum, though others could of course be identified. To take a specific example, Gigler's work, fo-

cus on informational transactions as a means of understanding ICT impacts, can be empirically evaluated in the field, and though it is not intended to demonstrate simple cause and effects, it does demonstrate strong interlinked dependencies and can be used to develop a "theory of change" (Kubisch 1997). Gigler has also emphasized the importance of community-based research and particularly community-based engagement for the insight it provides.

Sen also speaks of the dangers of informational exclusion—the "silo effect"—the result of which is the exclusion of otherwise valuable information, particularly of a noncountable nature (Sen 2001, 56ff). A concern for full knowledge discovery is also foundational to program evaluation thinking (Shadish, Cook, and Leviton 1991). Given that there is considerable interest in CI in "formative" evaluation—that is, the discovery of what happens during the course of a project or larger program—particularly through participatory and qualitative or mixed method methodologies, program evaluation could add much to the integration of the CA and CI (Patton 1990; Greene 2006). Yet projects and programs do not only exist for their participants. They are also bound to be accountable, and this is where "summative" or final evaluations are important, in which hard-to-define questions of value and worth are explored through the CA and answered for the community, researchers, funders, and other stakeholders (Guba and Lincoln 1981).

CONCLUSIONS

This article has explored the potential of applying middle-range CA theories to CI, so as to move CI beyond purely instrumental concerns, by providing it with the theoretical tools to take on more substantial and challenging problems, such as those related to social inequality and the achievement of well-being.

Middle-range CA, which has connections to stronger, higher level theory, as found through correspondences with Abend's Theories_{A1-2} and Theories_{A5-7}, offers a theory framework that can be incorporated into a middle-range CI program. It can provide CI with instruments that are based in human, rather than technical or sociotechnical, problem solving in the IS community, and thus can enable a stronger dialogue with different aspects of IS theory and practice. Furthermore, examples of the adaptation of the CA to particular circumstances as outlined for projects in development informatics demonstrate the practical aspect of the CA, and relate to Gregor's Theory_{G5}, which refers to explicit prescriptions for constructing an artifact. This artifact can be an information or knowledge system based on certain concepts or middle-range theories for design, implementation, and evaluation of projects and programs.

We conclude that the robustness of CI work is improved through a stronger theory chain. The CA approach can ultimately, to use Gregor's term drawing on Habermas, have "emancipatory" effects on CI. Likewise, the intellectual value chain can be reversed through such a connection. The activity of CI, through its increased intellectual rigor, will permit a stronger dialogue with the sociological community interested in new fields for exploration.

In fact, other combinations of theories and theoreticians could be utilized, but the point is the same, that thinking and working with strong bodies of theory will improve the capacity of CI to do its work as a defensible discipline engaged in different theory and practical tasks. In that sense, the delineation of a richer theory frame is akin to Hirschheim, Klein, and Lyytinen's work on delimiting the theory tasks of IS (Hirschheim and Klein 1989; Hirschheim, Klein, and Lyytinen 1996).

As we have seen, a number of researchers have already begun to successfully adapt the CA to ICT for development, and their approach can be successfully moved across to CI. It is also desirable that other researchers take on problem-solving challenges using the CA for their own particular research programs. Given the interest in the human development field in the measurement of decades-long longitudinal social changes, is it possible to propose a transnational long-term research program around social effects of ICTs on human well-being responsive to particular cultural differences? Is it indeed possible to develop human rights ICT "universals," truly responsive to the well-being approach of the CA? Such propositions were the subject of considerable debate as part of the World Summit for the Information Society in the early part of the past decade (Civil Society Organisations 2003).

The beginnings of a new research program of relevance to a new generation of researchers and activists can be seen in research such as that conducted by Tsatsou for Greece, the United Kingdom, or Portugal (Tsatsou 2011), or the Scandinavian studies of Bradley (2006), that relate to issues theories of social order, ethnicity, and so on, and that have correspondences to Abend's Theories_{A5-7}. Such middle-range research could in fact be an important contribution to grand problem solving for public purposes, for example, reformulating the issue of Internet governance. This activity would require close work between networks of researchers in CA and CI, and further, into different sociological theoretical specialities. It is also hoped that this article offers to researchers working on specific middle-range problems in CI a new perspective on how to connect their activity to grander analytical and theoretical challenges, whether they relate to IS or to other disciplines that interact with technical artifacts.

This activity could, to quote Johnstone again, enable CI to become a research and practice domain

encompassing not only value-based analyses and judgements of individual action, but also of situations, systems and forms of distribution . . . of social and technical arrangements in the most general sense. It would take as its starting point human capabilities and functionings, and would seek to make judgements about the deployment of technology in terms of its role in enhancing or diminishing these. (Johnstone 2007, 81)

Given the profound impact that the ICTs have had on all forms of communication around the world, there may well be rich pickings from the rhizome.

NOTE

1. See also <http://cirn.wikispaces.com>.

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