

TOWARDS VALUES-INSPIRED DESIGN: THE CASE OF CITIZEN-CENTRIC SERVICES

Research-in-Progress

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Abstract

We argue for and propose a design-way for Values-inspired Design. The context in which we develop our argument is Citizen-centric services in mega-cities. The work draws on and extends prior efforts related to values, value-conscious design and value-sensitive design. Our efforts are motivated by the significant trends towards mega-cities, and an acknowledgment of the need to translate policy-level decisions to citizen-centric services. The efforts we describe, therefore, demonstrate how values can inspire design principles and in turn, dictate specific design features. We use scenario-based design and rely on commonly accepted UML diagrams to operationalize our argument. The outcome, which we call a design-way provides a mapping across artifacts-principles-values that can act as a sensitizing device to facilitate Values-inspired Design.

Keywords: Values, design science, design practice, values-inspired design, mega-cities, citizen services, i-city

Motivation

The design of information systems has been fraught with uncertainty largely because of their constitutive nature. In contrast, research that affords primacy to design (e.g. Hevner et al. 2004; Gregor and Jones 2007) appears to be analogous to an engineering view. It posits activities such as build-and-evaluate to achieve utilitarian outcomes, and generate products such as prescriptive theories and principles. The emphasis in these efforts, then, appears to be that of an engineer, whose principal concern is to make a technology, which has the required functionality. The design of information systems is, thus, seen as enabler of action. Although recent work is beginning to challenge this emphasis (e.g. Sein et al. 2011) suggesting a focus on the 'ensemble' with user participation, the problem remains because the driving factors from users are not explicitly articulated or acknowledged. We argue from the position that technology is not merely enabling, but constitutive. It shapes our life, work practice and institutions in important ways. Elsewhere (see, e.g. Van den Hoven 2005, 2008) design of new technology is seen not only as a creation of new possibilities but also the taking away of possibilities. The design of information systems should then be seen as not just the meeting of requirements but as the promoting of some values (supported via design) and undermining of other values (that reflect the possibilities taken away).

Following this argument, we see Design as a choice to inscribe in the information system *values we value* to eventually shape life, work and society accordingly, and take away choices that we do not value. We hasten to add that this position does not suggest determinism (Winner 1977) with pre-ordained outcomes. Neither does it subscribe to a constructionist position (Bijker et al. 1987) where potential users appropriate technologies in service of their desires. We believe that the design of contemporary technologies is too complex to provide infinite degrees of freedom. Instead, we argue for an interactionist perspective, i.e., a middle ground. We argue for adding the potential for certain kinds of interactions, and constraining other kinds of interactions will promote the values we value. We propose the term values-inspired design, extending prior work on value-sensitive design (Friedman et al. 2002) and value-conscious design (Maders-Huits 2011), extending ideas about frontloading ethics (Van den Hoven 2008).

Values-inspired design defines a design-way that consciously and systematically aims to design information systems that can facilitate the shaping of work, life or society towards the values we value. Following Friedman et al. (2002), we adapt an interactionist perspective in that the designed artifacts give primary importance to conceptualizing prototypical interactions between the artifact and users as a way to bring to life the *values we value*. We attempt to clarify how values can inspire design efforts (not merely make the designers more aware) so that the designers can create interactions that can serve as guideposts. The objective of this paper is to demonstrate how we can use of existing mechanisms such as UML interaction diagrams (UML 2012) as the bridge between the abstract values and concrete design decisions.

The paper uses the case of designing citizen-centric services as part of a larger project aimed at building information systems to support and shape life in mega-cities. The remaining sections of the paper include a brief review of prior work, exploration of a case for designing citizen-centric services, and finally an elaboration of values-inspired design as a design-way that takes us beyond the idea of design principles and theories to a moral epistemology. We conclude with a brief outline of ongoing work.

Prior Work

Incorporating Values into Design

Values are not the same as *Value*. The latter former refers to ethical, moral or ideological principles that can form the basis of action. In contrast, the latter refers to relative economic worth building on ideas of utility, and is the basis of human endeavors aimed at efficient use of resources, for example, based on concerns such as optimization (see, e.g. Collopy 2006, Puroo et al. 1999). In contrast, the move from *Value* to *Values we value* requires acknowledging higher-order human principles. The emphasis is no longer on efficiency and utility. Instead, the *Values* perspective draws on domains such as moral philosophy and business ethics to bring forth a sense of right and wrong, and what ought to be (Rokeach 1973, 2000). Although a complete review of these ideas is beyond the scope of this paper, a few key ideas

are important to develop the arguments. For example, an important concept in the Values perspective is the notion of intrinsic values (Zimmerman 2010) - something that represents an “end in itself,” i.e. one that does not rely on other values. It represents a value held by a person, community or society that is non-derivatively good, i.e. good for its own sake. Examples include equality, justice and love. Empirical research about basic human values (see Schwartz 1992, 2006) suggests that we, as human beings, appear to hold a core set of values that are universal across cultures and continents. Incorporating these in a design effort is important because design, by its very nature, is interventionist (Nelson and Stolterman 2012). It is aimed at changing the world. Although the sciences of design are aimed at learning from this intervention beyond simply causing a change in the world, both actions – changing the world, and learning from it – are implicitly a reflection of the Values of the designers/researchers.

While design science in the IS field has yet to explore these ideas, elsewhere, there have been a few notable efforts to incorporate values into design. Significant among these is the set of ideas described as value-sensitive design. Friedman et al. (2002) describe value-sensitive design as a theoretically grounded approach to the design of technology ‘that accounts for human values in a principled and comprehensive manner throughout the design process.’ Others (e.g. Manders-Huits 2011) have since described value-sensitive design as a position that propounds a proactive approach for the incorporation of values in design,, similar to Van den Hoven’s (2008) position to ‘frontload ethics’ in engineering endeavors. Friedman et al (2002) describe value-sensitive design as an interactional theory, where values are viewed neither as endogenously inscribed into technology, nor as simply transmitted by social forces, i.e. exogenous. Instead, value-sensitive design argues for a middle ground between technological determinism (Winner 1977) and social construction (Bijker et al. 1987). Following this position, people and social systems affect the development of new technologies, and new technologies shape but do not rigidly determine individual behavior and social systems. Friedman suggests that value-sensitive design relies on a moral epistemology and a principled approach to design that maintains that certain values such human welfare, rights, and justice have moral standing regardless of context, similar to the notion of intrinsic values outlined above (Zimmerman 2010). More recent expositions by Friedman et al. (2013) demonstrate how values can be integrated in the design of systems with activities such as identifying stakeholders, identifying values and conflicts, and heuristics for technical investigations. A second notable effort is that of Manders-Huit and Van den Hoven (2009) who suggest the phrase value-conscious design. Their effort argues for more conscious use of ethical theories and positions with the help of roles such as a ‘value advocate’ in the design team. The most recent exposition of these positions (Friedman et al 2013; Borning and Muller 2012) suggest that the need for incorporating values into design is urgent but the challenge remains one of ensuring that these concerns but are ingrained within the practice of technical design instead of remaining at the periphery (Maders-Huit and Zimmer 2008). These efforts provide the backdrop for the specific case we consider: design of citizen-centric services in mega-cities.

Context: Mega-Cities and Citizen Services

For the first time in human history, more individuals live in urban, instead of rural areas (Dugger 2007). By 2050, it is expected that urban population centers will house 2 out of every 3 individuals (United Nations 2012). This surge in urban populations and the unprecedented population growth are expected to result in the appearance of many more mega-cities (10 million+ population). The change will be particularly extraordinary in Asia where “the accumulated urban growth ... during the whole span of history will be duplicated in a single generation” (Dugger 2007). The challenges facing these fast-rising Asian cities are, therefore, qualitatively different from most existing cities (Woetzel et al. 2009). These include infrastructure concerns (World Bank 2013), provision of utilities such as water and energy (Dobbs et al. 2012), and governance mechanisms to ensure services such as health and education (WHO 2008; UNESCO 2012). Research in public-sector governance is beginning to suggest that it is important to consider these problems for each individual citizen, instead of treating them as a collective of millions.

IT-enabled delivery of public services in cities is not a new phenomenon (see Fishenden and Thompson 2012; Gil-Garcia and Martinez-Moyano, 2005). These writings point to at least three generations of efforts. The first generation (similar to advances in the private sector) tried to increase automation and achieve efficiencies (Cordella and Iannacci 2010), with IT applications seen as tools to minimize errors and get things done faster. The second generation witnessed the adoption of market-based mechanisms to drive greater efficiencies (Fang 2002; McNulty and Ferlie 2004) where IT platforms were seen as

facilitators for competition. Described as new public management (NPM), this generation advocated the adoption of private sector style, market-oriented approaches to public services, where dis-aggregation was used to identify packages on which the public sector agencies competed against players from the private sector (Ferlie et al. 1996; McNulty and Ferlie 2004). Many of the promised benefits, however, failed to materialize. Instead, governments saw increased administrative complexity and siloing of government agencies that further diminished lines of communication. Other dysfunctional outcomes included service provider fraud, ineffectiveness of private finance and poor service quality, spiraling costs, and cost-cutting by contractors (Dunleavy et al. 2005). IT then wrought further fossilization of these fragmented silos making progress difficult and delivery of citizen-centric service an impossibly difficult outcome to achieve. In contrast, the third and current generation sees IT platforms as facilitators of individual outcomes emphasizing a conceptualization based on open standards and architectures allowing separation of service logic from the supporting applications (see Fishenden and Thompson 2012). Described as Digital Era Governance (DEG), this generation aims for a “re-aggregation of public services under direct government control around the citizen” (Dunleavy et al. 2006). The emphasis is no longer private-public competition; instead, it places the citizen front and center, and values the translation of government policies to services for citizens. The DEG perspective does not rely on specific technologies such as, say, the social web or cloud computing. Instead, it suggests a move away from vertical agency silos to a service-based conceptualization aimed at dis-aggregation of previously grouped functionalities in agency silos, and extraction of services, which then might be personalized and re-aggregated around specific citizen needs for certain population segments or even individual citizens. This evolution in the role of information technologies and systems in public-sector agencies, and in particular, for the design of citizen-centric services provides the context that we explore for the design-way that we call Values-inspired design.

Values-Inspired Design of Citizen-centric Services

The spirit of the specific work we report here is remaining ‘citizen-centric.’ We, therefore, use a technique called scenario-based design (Carroll 1995) that we extend to include smaller ‘episodes’ that become the drivers of our efforts. The use of scenarios also allows recognition of ‘representative’ individual citizens from different segments of the population. The simple act of designating the users in these scenarios as specific individuals provides the first step towards remaining citizen-centric.

Motivating Scenarios and Episodes

Of the several scenarios considered, two are described in this paper, both about citizens who live in megacities. The first describes Sam, a middle-aged citizen who must cope with a chronic disease as he lives alone. The second describes Mary, a homemaker, who becomes part of what is likely to be lifelong learning. Each table describes the scenario briefly, and multiple episodes within the larger scenario.

Table 1. Sam’s Scenario and Episodes – Managing Chronic Disease	
Sam’s Scenario: Sam, a 45-year old cab driver has been living alone. He has been diagnosed with type-2 diabetes. Following the diagnosis, he has been enrolled in a home care system to manage the chronic disease. A nurse-educator has taught him how to administer the three insulin injections a day and watch for onset of other problems. Sam has worked with a dietician for a personalized diet plan, and a physiotherapist for an exercise regimen. Sam’s smart phone accesses his medical history, prescriptions and these plans. His calendar alerts him to administer medication and tracks his exercise and diet. A social worker has been helping Sam to connect with support groups and social activities. After a year, when Sam’s condition deteriorates, he cannot perform his job as a cab driver. He is admitted to the hospital. The social worker helps Sam apply for financial assistance, respecting his privacy. Doctors at the hospital are able to access, with Sam’s consent, not only his medical history but also details of his case.	
Episode	Description
Diagnosis	Sam’s initial diagnosis after the onset of symptoms
Home Care	Sam’s enrollment into Home Care system with instructions
Self-care	Personalized services direct Sam towards diet and exercise

Management	Sam’s efforts to manage the chronic disease
Escalation	Escalation of the disease and Sam’s loss of job
Case Analysis	Analyzing Sam’s case for ongoing help
Analytics	Analysis of multiple cases, including Sam’s

Table 2. Mary’s Scenario and Episodes – Lifelong Learning	
Mary’s Scenario: Mary, 35 years old, is considering a return to the workforce as her kids are growing up. She finds that becoming an accredited social worker is likely to be suited to her temperament and will provide her an income stream. Her search for programs that will give her the requisite skills is facilitated by the agency resources. She applies for a few programs, and is accepted into her top choices. As she enrolls into the program, she realizes that returning to school will require some re-learning of habits and learning how to manage course work and assignments. The tools on the agency website help along with her mobile device. As she finishes her course, the agency websites help Mary to find the right opportunities for a job.	
Episode	Description
Considering Return	Mary considers a return to the workforce
Choice	Mary decides to pursue studies to become an accredited social worker
Search	Searches for courses and programs to get accredited
Application	Applying for courses and programs
Enrollment	Enrolling in a program with courses of interest
Management	Managing course work and assignments
Job search	Helping Mary to find the right opportunities

The scenarios and episodes hide the complexities for the purpose of this paper. Each episode in the tables has been elaborated as a narrative, and provides the basis for designing the interactions.

Designing Prototypical Interactions and Clarifying Values

Responding to the challenges described by Manders-Huit and Zimmer (2009) about how difficult it is to communicate ethical concerns to technical design communities, we re-purpose UML interaction diagrams (2012) not necessarily as directives for implementation but rather as prototypical interactions between an envisioned information system and a user. We derive our use of the interaction diagrams in this manner from the idea of a prototype (Olivé 2007, p. 40). This allows us to describe a ‘prototypical interaction’ that can be used it as a springboard for variations. We map these diagrams to the interactionist perspective (Friedman et al. 2002), allowing for the possibility that the prototypical interactions sow the seeds for mutual shaping and evolution of the artifact as well as practice.

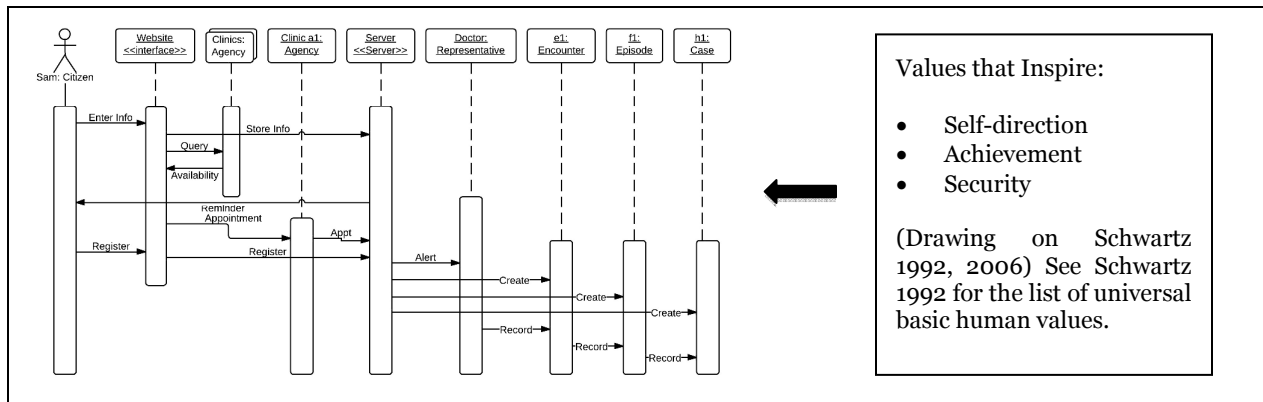
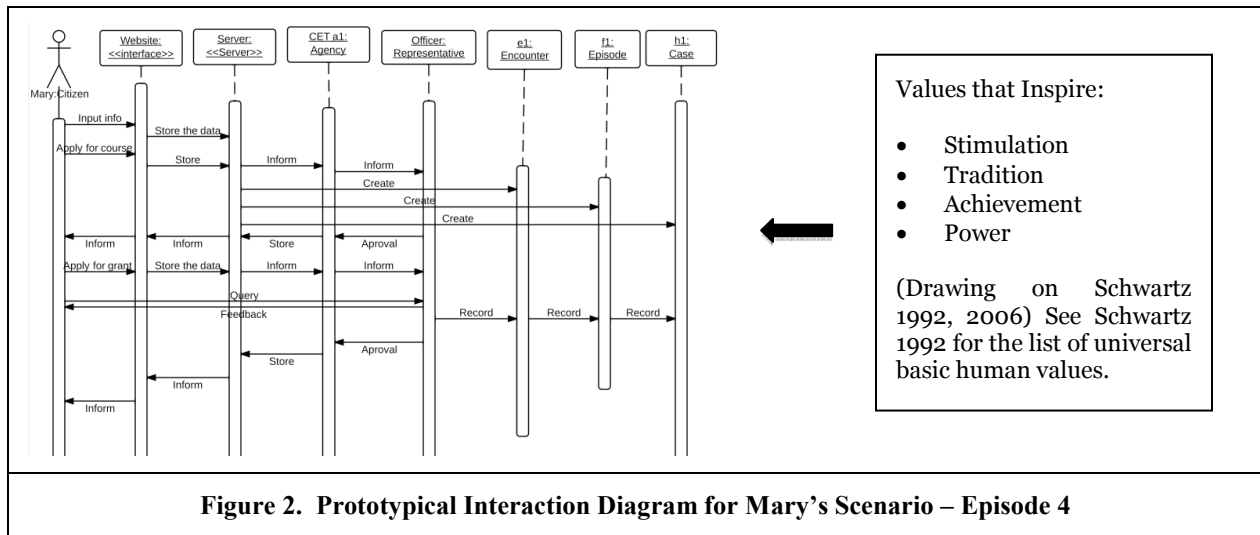


Figure 1. Prototypical Interaction Diagram for Sam’s Scenario – Episode 1

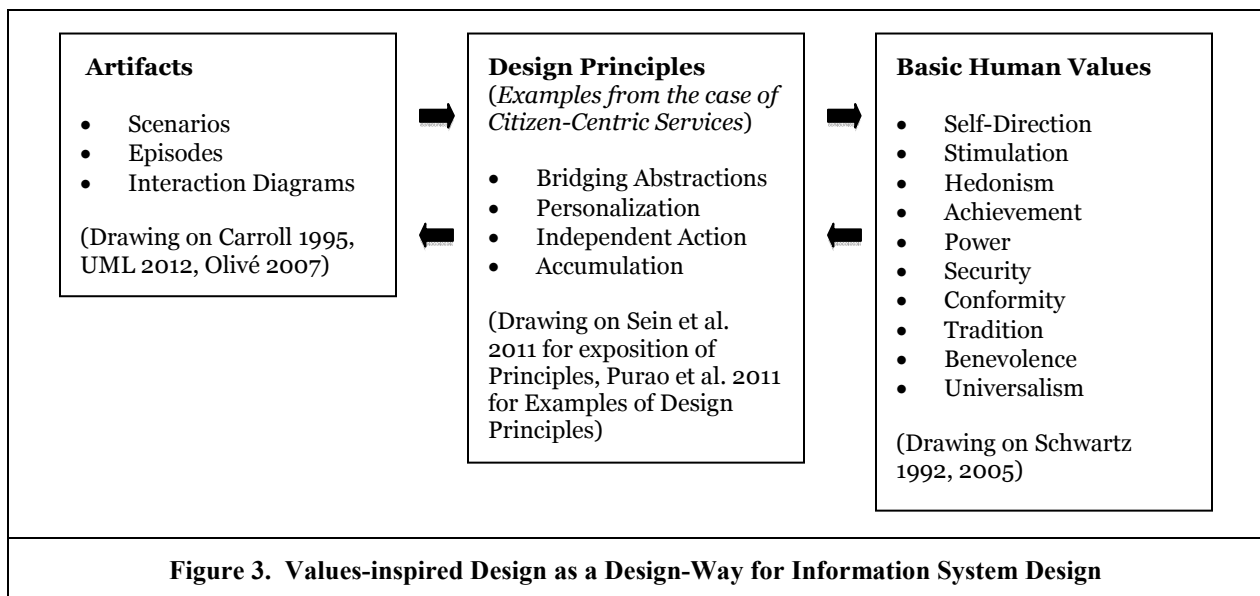


Values-Inspired Design as a Design-Way

We acknowledge that the work we report here lacks some detail about mapping between the artifacts and the Values. We emphasize that it is not a specific interaction or a specific class that operationalizes the values. Instead, it is the aggregate of these features that allows it. This does not mean that the values are pre-ordained as a result of these decisions. Instead, these design choices make it possible to realize the values we value. This section, in part, is intended to overcome the problem of detail by elaborating Values-Inspired Design as a “Design-Way” borrowing the term from Nelson and Stolterman (2012). Our exposition relies on the key idea that it is difficult to bridge directly from “Values” to “Artifact.”

Artifacts – Principles – Values

Our exposition of the Design-Way for Values-Inspired Design, therefore, suggests a continuum that includes (a) the Artifacts, (b) the Principles, and (c) the Values that inspire both (see Figure 3).



The figure is not intended to be used as a Process. At best, it should serve as a sensitizing device. It shows core ideas and prior work we draw upon and extend. The arrows indicate interactions that are likely to occur although we have found that the typical cycles progress from Values to Artifacts and only then, arrive at Principles. Principles, in this sense, appear to provide a meso-level conceptualization that is difficult to arrive at unless both extremes are visited repeatedly.

Concluding Remarks and Ongoing Work

We have argued for and suggested what we call a design-way for Values-inspired Design. The context in which we have developed our arguments is the design of citizen-centric services in mega-cities. We have described how successive conceptualizations of public-sector and city services have culminated in the understanding we have today – where basic human values are considered more important than market competition. Drawing on the notion of universal basic human values, we have outlined what we call a design-way for Values-inspired Design, to provide a sensitizing framework to incorporate the Values we value into our design effort. As we progress, we anticipate that we will be able to clarify roles that participate in such design, and shed light on the interactions across Artifacts, Principles and Values.

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