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Inclusive Design in IS: Why Diversity Matters

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Abstract:

After decades of research and ambitious political programs, we still observe imbalances in the treatment of people on the basis of gender, age, race, ethnicity, sexual orientation, religion, disability, and social background. Such an issue raises questions about the degree to which information systems can help to overcome such imbalance; for instance, if design principles can be formalized to reshape information systems' design into a different, more-inclusive direction. We contend that IS falls short in tackling this issue. We took the theme of ICIS 2013 ("reshaping society through information systems") as an opportunity to reflect on the multiple aspects of social inclusion in the design and the resulting shape of information systems via a panel discussion. The fruitful discussion during the panel delivered more in-depth results than merely advocating a stance for more diversity in the IS workforce. Building on the principles of design science, we believe that our field can help reshape the digital economy. As a key takeaway, the panel and additional points added in this paper in the light of discussion at ICIS 2013 provide guidance on the impact of gender in IS theorizing as a demonstration example and reflect on the trend towards social design in the IS research community.

Keywords: Design Theory, Social Design, Diversity, Social Inclusion, Gender, Disability, Underrepresented Groups.

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1 Introduction: The Value of Diversity in Information Systems Design

Arguments about the benefits of diversity have been made in social science (Kochan et al., 2002; Yu, 2002; van Knippenberg & Schippers, 2007) and management science (Salomon & Schork, 2003; Foldy, 2004; Trauth & Niederman, 2006; Levina & Vaast, 2008; Daniel, Agarwal, & Stewart, 2013). Trauth and colleagues have articulated four arguments for diversity in the IS field: the innovation argument, the consumer argument, the equity argument and the policy argument (Trauth & Howcroft, 2006; Trauth, Huang, Quesenberry & Morgan, 2007; Trauth 2011). The innovation argument argues that, as economies become knowledge intensive, the highest value is placed on creativity and continuous innovation, which places increased emphasis on talent regardless of individuals' identity characteristics. The consumer argument argues that greater diversity in design teams leads to products that better respond to a diverse consumer base because designers will have a better understanding of customers' needs and wants. The equity argument argues that, because fairness to all is an underlying principle of democratic societies, it stands to reason that all members of a society should have equal opportunity to share in the economic benefits of working in a high-wage field such as information systems. Finally, the policy argument is that, as governments become proactive about increasing the participation of underrepresented groups (in particular in the science, technology, engineering, and mathematics (STEM) fields), companies and other organizations are being encouraged, and sometimes required, to show evidence of initiatives geared toward increasing diversity.

If we accept these arguments, then, as IS professionals, we should endeavor to have inclusive IS design. As such, in this paper, we to consider ways in which we can leverage diversity's positive impacts and consider what, if any, additional set of skills, tools, and so on we require. This paper builds on a panel that the authors presented at the 2013 International Conference on Information Systems (ICIS) in Milan. The panel was conducted to connect the two streams of "design science" and "social inclusion" by following the principle question: if design science is a normative approach that creates artifacts towards an intended outcome, how can design principles be derived that result in more inclusive software artifacts. This paper includes the various points of view on the topic that the authors presented at the conference and adds the results of discussion during the panel and subsequent discussions. In Section 2.1, Sebastian Olbrich begins by discussing the overall issue of inclusiveness in design. In Section 2.2., Eileen Trauth discusses research on inclusion in information systems by focusing on research on gender. In Section 2.3, Shirley Gregor discusses women in online communities. Finally, in Section 2.4, Fred Niederman suggests a basic design model relative to issues of diversity. Given this model, he discusses the design assumptions and implications towards more open and inclusive design artifacts¹. In Section 3, we summarize additional remarks from the panel discussion at ICIS. Finally, in Section 4, we conclude the paper with final remarks.

2 Perspectives on Diversity

2.1 The State of Design and Inclusion: Introducing Examples

In many ways, our world is moving toward even-handedness in providing opportunities for individuals regardless of social diversity (e.g., in gender, race, class, sexual orientation, religion, age, and so on). Because design science is a normative field (Simon, 1996), we shape artifacts so that they fulfill their direct purposes (e.g., providing encyclopedia type information). Consequently, we can also shape design in ways that reinforce opportunities to extend—rather than constrict—participation. It is about time to reflect on the current design practice through the lens of inclusion. First, we should consider the context in which such divergent participation is likely to be observed; second, we must discuss design patterns and how initiators of new artifacts can incorporate designs that promote inclusiveness. Existing approaches such as the Special Interest Group on Accessible Computing (<http://www.sigaccess.org/>) or regulators (such as the U.S. Disabilities Act or E.U. Equality Framework Directive) mostly focus on physical disabilities. In the case, for instance, of a website, such additional design requirements to, for example, make the website readable for a clientele with visual impairment disability (i.e., do not use red and green, make the website accessible for those who use Braille, etc.). However, as of today, there is little research evidence for including social diversity in design. Hence, few guidelines, recommendations, and so on exist to inform design about the degree of social inclusion, which is understandable because social diversity does not lead to homogenous groups that can be addressed by single design artefacts (e.g., color blind people, Braille readers).

¹ Cathy Urquhart also participated in the panel, but has not been able to contribute to this paper.

I start the argument with equality of the sexes as an introducing example, which has long been a goal of modern, liberal, and enlightened societies. Because it is one of the most recent publically discussed aspects of diversity, many have attempted to fairly effect shared power between the sexes (e.g., on the job market). However, the disparity between men and women is still significant in multiple dimensions, particularly in the design arena. For instance, women file only about 7.5 percent of all patents in the United States of America. In social science, we must examine the ways in which subtle barriers hinder women from taking their fair share in society and whether simple design principles that might help to alleviate such barriers have been neglected. Considering the impact of information systems research, the obvious starting point is to reflect on the numbers of women engaged in our own field.

An illustrative example for an IS that depends on participations is Wikipedia, by far the largest encyclopedia in history. It contains more than 24 million articles in 275 languages. Launched in 2001, it's run by volunteers who call themselves Wikipedians. A 2011 *New York Times*' article by Noam Cohen points out that only one in six Wikipedia editors were women (Cohen, 2011). This number is rather surprising given Wikipedia's open platform concept and the 50 percent share of women among Internet users. The proportions were even more skewed in terms of the number of female contributions to Wikipedia edits, which comprised approximately 9 percent of the total edits performed (Lam et al., 2011). The game industry is another prominent example of a field in which male engagement is disproportionately higher than female engagement—at least when it comes to expenditures for gaming and involvement in game development (Smith, 2013). So far, we can observe particular communities addressing female users of online games (<http://www.frauen-spiele.com/>) and discussing the role of women working in the game industry (<http://www.womeningamesjobs.com>). As a next step, it would be interesting to see if we can derive tacit design principles that can make the gaming industry more attractive for women, which of these principles address users, which ones address developers, and whether or not we can apply these principles to other aspects of diversity. During the development of this article, however, we rather learned about developments in the game industry that rather go the opposite direction as documented in the Gamergate controversy (http://en.wikipedia.org/wiki/Gamergate_controversy).

To leverage diversity's positive impacts, additional management skills are required to avoid conflicts and steer groups toward common goals (Bazile-Jones, 1996; Reichenberg, 2001; Broome, DeTurk, & Habermann, 2002). It is naïve to assume that the same management techniques are applicable to all regardless of how diverse its membership may be. Yet, sophisticated management skills are costly and hard to implement effectively in, for instance, geographically separated projects (e.g., open source software (OSS)) or in a distributed group of end users (e.g., Wikipedia). This issue raises questions about the degree to which inclusive information system design can support strategic workforce management (SWM) initiatives and managing techniques that steer diverse and distributed teams. In my experience, the level of social in-/exclusion of an information system that one can observe does not result from good or poor choices or the lack of will but is simply the result of unawareness of inclusive social aspects.

The resulting unawareness might lead to unintended consequences because artifacts might be built on a small group's requirements. As opposed to adding additional particular requirements (e.g., do not use red and green in charts or on a website), social inclusion is harder to address. Questions are raised about whether or not a design team's composition affects the design outcome; for example, a blind designer is likely to raise the issue that a resulting website should be accessible with a braille reader. But would a bigger share of women in the Wikipedia design team lead to an artefact that attracts more female participation in the encyclopedia? If so, what would the corresponding design theory look like and what can we learn for other means of inclusion; for example, how should one compose the ideal design team? In my opinion, the information systems (IS) field seems to be the ideal community to address and soundly answer such questions.

2.2 Social Inclusion Research in IS: The Case of Gender

Any discussion about IS practice and the state of the IS profession needs to describe the research landscape on the topic. An overview of the current state of social inclusion research in the IS field can best be seen using the example of gender because gender is, at present, the most developed area of research on social inclusion. Hence, other aspects of inclusion (e.g., minority ethnicities, disability, sexuality, etc.) can build on the theoretical understanding that has developed with respect to gender.

At the highest level, we can divide the research on gender in the IS field into two categories: IT use (the design of systems) and the IS workforce (those who design the systems)². The research on gender and IT use tends to focus on positivist studies of technology adoption that assume a gender binary and a gender essentialist perspective³. That is, the research typically studies gender differences in the adoption of some new technology (e.g., e-commerce, tablet computers, etc.). This type of research on gender considers the term “gender” to be a synonym for “sex” and equates “gender research” with “gender differences research”. Hence, the research is nearly always the quest for significant differences that are assumed to exist between the universe of people who are categorized into male or female. When significant differences are found, the interpretation tends to be gender essentialist. That is, the authors would assert that “(all) women use technology” in a certain way. Authors do not typically consider the intersectionality of biological sex with gender identity, sexuality, race, ethnicity, or other identity characteristics. The theories the research uses are theories about technology adoption and use; explicit gender theories are the rare exception.

The other type of research is on gender and the IS profession. While the earliest research in this category is limited to quantitative studies of gender differences in the IS profession, it has shifted over time to focus on only women. This more recent research typically examines issues that help to explain the under representation of women in the IS field. The main differences between this research and research on gender and IT use is that it is methodologically broader. It includes not only quantitative research but also a significant amount of qualitative research. It is epistemologically varied as well and includes not just positivist and interpretive work but also critical studies. Finally, it employs gender theories. This research employs gender theories imported from sociology (e.g., Joshi & Schmidt, 2006) and women's studies (e.g. Adam, 2001); some indigenous theories have also emerged (Ahuja, 2002; Trauth, 2002; Adya & Kaiser, 2005). In addition, while gender and IT use research is dominated by the assumption of a gender binary, gender and IS workforce research has begun to incorporate more recent understandings of a gender continuum that rejects a gender binary. It also acknowledges a difference between biological sex and sociological gender by recognizing the social construction of gender. Consequently, the corpus of gender and IS workforce research is, in general, richer and more nuanced than that of gender and IT use research.

One may wonder why all this matters to the topic of gender and inclusive design. It matters because, when considering the topic of inclusive design, IS professionals and researchers need to be aware of contestable assumptions about gender and IT use and about gender and the IS profession that could hinder efforts towards inclusive IS design, such as:

- The assumption that women constitute a homogeneous group and that all women everywhere possess the same thoughts, feelings, and expectations about technology use and technological professions
- The assumption that the barriers to women in the IS profession are the same for all women, and
- The assumption that something such as a “woman-friendly” design could possibly exist.

I conclude with some suggestions about what we can do to further gender equality in IS design—both practice and research—that we can expand to other areas of social inclusion. These comments come from my research on the underrepresentation of women in the IS workforce, on my own theorizing of the issues, barriers, and facilitators affecting gender and IS, and on the graduate and undergraduate courses on gender and IT that I have taught (Trauth & Howcroft 2006; Trauth, Kvasny, & Greenhill, 2007; Howcroft & Trauth, 2008; Trauth, Quesenberry, & Huang, 2008; Trauth, Quesenberry, & Yeo, 2008; Kvasny, Trauth, & Morgan, 2009; Trauth, Quesenberry, & Huang, 2009; Trauth, 2011; Quesenberry & Trauth, 2012; Von Hellens, Trauth, & Fisher, 2012, Trauth 2013). First, we should address the atheoretical nature and implicit gender essentialism that pervades much gender and IS research so that it does not infect inclusive design practice. Second, in both research and practice, we should build on cumulative knowledge about gender and IT use and gender and the IS profession that has developed over the past 20 years. Finally, we should address the gender imbalance in the IS workforce so that an “I-design” mentality that results from a homogeneous design team does not impair the IS products that result.

² See (Trauth 2013) for a review of gender research that has appeared in IS journals over the past 20 years.

³ There are few exceptions such as (Greenhill & Wilson 2006; Kvasny, 2006; Light, 2007).

2.3 Inclusive Design: Women in Online Communities

In this section, I consider the question of design principles for diversity using women's participation in online communities as an example. The argument in brief is that, although it is possible to develop research-based design principles that address diversity, the information systems (IS) field has considerable room to improve in this respect. For instance, although issues with women's participation in online communities are well known, mainstream IS research to a large extent ignores these problems and there is a dearth of effective design knowledge for redressing the problems.

I start by noting that it is possible to develop design knowledge (constructs, models, guidelines, principles, and theory) (Gregor, 2006; Gregor & Jones, 2007; Gregor & Hevner, 2013) that aids system developers and managers in meeting the needs of diverse users. For example, interface designers use guidelines provided in texts on human-computer interaction (e.g., Schneiderman, Plaisant, Cohen, & Jacobs, 2009) and publicly available standards, such as those available from the World Wide Web Consortium (e.g., W3C, 2014). The W3C gives guidelines for diversity in terms that include how to make webpages accessible to people with disabilities and how to make webpages effective across cultures and languages.

Ideally, design knowledge should be founded on, or supported by, research that provides evidence for the validity of the design knowledge. Reinecke and Bernstein (2013) provide an exemplar in their work on user interfaces that automatically adapt to culture, where experiments in different cultures indicated the value of their approach.

Research carried out in the mainstream behavioral research mode can provide foundations for work in the design science mode and subsequent application of knowledge in design practice (Gregor & Baskerville, 2012). However, if we look at the example of women participating in online communities, we find serious shortcomings in our research directions.

There is considerable evidence for differences in women's participation in discussion forums in the world at large and also more specifically in online communities where there is public discussion and knowledge sharing. The gender breakdown of contributors to "public thought-leadership forums" outside the virtual world is roughly 85-15 percent men to women (Cohen, 2011). Early research on computer-mediated communication has found that participation was much lower for women than men (Ferris, 1996). Some would assert that women are more likely to avoid aggression and to be subject to more overt and covert censorship as explained via the socialization of men and women, different communication styles (Herring, 1993; Truong, Williams, Clark, & Couey, 1993), different motivations (Ferris 1996), and gender stereotyping (Matheson, 1991).

The very low proportion of female contributors to Wikipedia illustrates the size of the problem (Glott, Schmidt, & Ghosh, 2010; Cohen, 2011). Even the topics where we might expect female interest to be higher, such as friendship bracelets for teenage girls and the fashion designers Manolo Blahnik and Jimmy Choo, have shorter entries compared to comparable topics for males.

Negative treatment of women is unfortunately still apparent. One striking instance is that of Anita Sarkessian, who began a Kickstarter project to obtain funding to investigate the ways in which computer games portray women (Sarkeesian, 2012a). Sarkessian reports the misogyny and abuse to which she was subjected as a result:

As some of you may know a harassment campaign is being waged against me because of my Tropes vs Women in Video Games project on Kickstarter. This coordinated attack was launched by various online video game forums and has included attempts to get my accounts banned, a torrent of hate on YouTube, plus countless threats of violence, death, sexual assault and rape. As part of that intimidation effort the Wikipedia page about me was vandalized with misogynist language, pornography and racial slurs.

I went back and forth about whether or not to share this publicly because I don't want to inadvertently encourage this kind of behavior or scare other women into staying silent out of fear something similar may happen to them. But ultimately I've decided I'm going to document and strategically share what is happening to me because these types of online harassment tactics are used against women, feminists and people from oppressed and marginalized groups every day. (Sarkeesian 2012b)

Her detailed account of her experiences and the sophistication of the attacks on her make very uncomfortable reading.

What is the situation when we examine recent research studies of contributions to online communities? I reviewed several studies and give a few illustrative examples. Surprisingly, many studies completely ignore any potential relationship between gender and contributions or differential treatment and behavior of women. Table 1 gives examples of studies that do not consider gender even as a control factor. Chiu, Hsu, and Wang (2006) is one of several studies that had a sample that was primarily male but still did not think to include gender as a control. Ardichili, Page, and Wentling (2003) do not provide any demographics. For reasons of space, I include only these three studies, but one can easily find many more.

Table 2 provides examples of studies that include gender. These studies suggest that women may have different reasons from men to contribute to online communities (Gefen & Ridings, 2005) and may be influenced in different ways by feedback (Harper, Li, Chen, & Konstan, 2007). Kankanhalli, Tan, and Wei's (2005) study does include gender but only as a control variable. It does not theorize about gender as it could in light of prior work. A more nuanced treatment of gender may have led to different findings.

Table 1. Studies of Online Communities without a Gender Perspective

Study	Context	Sample	Findings (in part)
McLureWasko & Faraj (2005)	Legal professional association in USA (electronic network of practice).	n = 173 57% men	Significant factors for contributing: reputation enhancement, enjoy helping others, structural embeddedness, have experience to share.
Chiu et al. (2006)	BlueShop: IT-oriented virtual community in Taiwan.	n = 336 78% men	Significant factors for contributing included community-related outcome expectations. Social interaction ties, reciprocity, and identification increased individual's quantity of knowledge sharing but not knowledge quality.
Ardichuili et al. (2003)	Large, multinational corporation (Caterpillar, Inc.).	n = 30 Gender breakdown not specified.	Reasons for contributing: respondents viewed knowledge as public good; self-based considerations (need to establish oneself as expert, start giving back). Barriers to contributing: concern that information not important or not relevant, fear of losing face.

Table 2. Studies of Online Communities including a Gender Perspective

Study	Context	Sample	Findings (in part)
Harper et al. (2007)	MovieLens, online movie recommendation website (http://movielens.org).	n = 211 72% men	"There were differences between men and women in how much they agreed that they wanted to do something to increase their score. Women were most motivated to agree when they were told they were the same as others (71.4%), while men were most motivated to agree when they were told they had rated fewer movies than others."(p. 156)
Kankanhalli et al. (2005)	Knowledge repositories in 17 organizations in Singapore.	n = 150 57% men	"Knowledge self-efficacy and enjoyment in helping others significantly impact EKR usage" (p. 113). Gender included as control but not significant.
Gefen & Ridings (2005)	40 bulletin boards.	n = 579 63% men	"Women go to virtual communities to give and to get social support and have a more favorable assessment of the capability of others" (p. 78).

This short review on how gender is treated in studies of online communities shows that several studies, oblivious to the fact that their samples are predominately male and to the considerable literature that shows that gender is an important facet of online community behavior, ignore gender completely. Indeed, Gefen and Ridings (2005, p. 89) conclude that "Gender socialization is so ingrained that it manifests itself also into what could have been a gender neutral medium (i.e., virtual communities)". Hopefully, this disregard of gender is mere lack of attention rather than a milder form of the misogyny and hostility towards women that is evidenced in some of the forums themselves.

Given the scant attention in the literature to gender in online communities, suggestions on how designs can be enhanced to encourage more female participation is sparse to non-existent. In fact, the amount of research that can be mined to provide design guidelines for online participation is limited in general. One exception is Harper et al. (2007), who show the effect of email newsletters that compare a member's contribution rates with those of others on subsequent contributions. Women were more motivated to increase their contribution score when told they were rated the same as others, while men were more motivated when they were told they had rated fewer movies than others.

Obviously, room exists for more inclusiveness in theorizing about online behavior and in design guidelines with respect to gender. In particular, it would be wise to consider the latent or overt hostility and aggression that may be directed towards women both in research and in practice if managing online forums.

My examination of the treatment of gender highlights just one example of diversity that can be considered in designing IS. The discussion shows limitations in the treatment of gender and indicates avenues for further research. Examining other areas of diversity, such as culture and language, may indicate parallel avenues for further work. The lesson to take away is that we should always remain alert to individual differences among the people who interact with information systems and how the designs of these systems accommodate differences.

2.4 Implications of a Simple Design Model

Bullying and intimidation are reprehensible actions and should and must be denounced at every turn. This is particularly the case when such disgraceful behaviors are violent, sexualized, or aimed at vulnerable populations. Examples of such behaviors abound on the Internet, which is profoundly sad considering some of the inspiring opportunities that the Internet makes available. The entire range of potential participants should be able to enjoy such opportunities rather than only those belonging to privileged groups.

The central topic of this panel pertains to whether we can identify particular design principles and implement them to prevent discriminatory hurdles being placed in the way of participation in all aspects of computing by all individuals.

To help organize my thinking on this topic, I use a simple model (see Figure 1). This model is not necessarily intended to suggest a testable causal set of statements but rather to stimulate questions potentially salient in understanding design practice and research. The elements of the model are: (1) design intentions: is there a will to create and share products and services that are open and available to all?, (2) design team demographics: how do the demographic characteristics of the design team influence the ultimate accessibility and usability of the products and services created?, (3) design principles: are there particular approaches and techniques of design lead to greater accessibility and usability of the products and services created?, and (4) usability across diverse user groups: how do we evaluate the accessibility and usability of products and services so that we know clearly when positive goals are achieved?

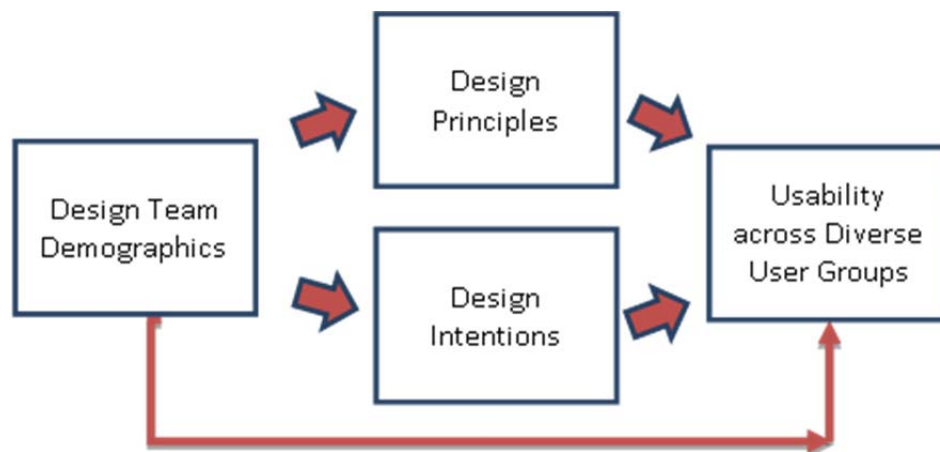


Figure 1. A Model of Design Relative to Issues of Diversity

This model suggests that “design intentions” is the primary mechanism influencing accessibility and usability for diverse groups. Design intention is another way of emphasizing the will to instantiate the objective of creating systems that generate broad and diverse “usership”. Clearly, some systems are designed in such a way that does not stimulate broad and proportional use by various groups. Discussion in the panel emphasized the dominance of male editors and contributors to Wikipedia. We can infer that Wikipedia was not designed in such a way that such dominance would be difficult or impossible to manifest. I don’t know if it was intentionally designed to discourage female editors and contributors to use it, but such was the effect whether intentional or not. Note that the conceptualization of design here can refer to “technical design” in the sense of the constraints and attributes of the technology per se or to the “socio-technical design” in considering the combination of technical affordances and the social norms, policies, and traditions for interacting with the technology. It is likely that much more is written and understood about tactics for technical design aimed at encouraging broad use (and limiting or prohibiting dominance by a particular group) than about embedding such technology in social systems that actively support diverse participation. How would one change the technical design of Wikipedia to make it more accessible to women editors and contributors? How would one change the socio-technical design? Do the principles that would guide both technical and socio-technical design remain constant across workplace systems (e.g., SAP or Microsoft Office) and purely hedonic systems (e.g., games, music, films) and public social media?

We can reasonably expect that those with the intention to develop and market IS products and services that are actively inclusive will be more likely to staff design teams with a more diverse set of designers. Although a gender balanced-design team does not guarantee that the ultimate product or service will be more accessible, it is a good bet that on average that a gender-balanced design team will produce products and services that are more accessible. If this were shown to be the case, then staffing design teams with diverse membership would signal an intention toward producing products more accessible to diverse constituencies, which might necessitate hiring a more diverse set of design tasked employees from whom particular projects can be staffed. It would also lead to a reasonable expectation that resulting products and services would, in fact, be more accessible.

However, while, on average, such benefits should be expected to accrue, we should further explore the mechanics of how such diversity of design team would influence outcomes. As noted elsewhere in the panel, demographically defined groups are not necessarily homogenous. Women, for example, range from among the most conservative to most liberal along the political spectrum. Born deaf people may have quite different needs and interests than those who lose hearing later in life. I would expect that design team members who happen to also be members of vulnerable social groups will be sensitive to issues that affect all members of that group (thus generally bringing sensitivity to at least a subset of design issues) but may not identify all issues that pertain more specifically to subsets of the group. As a result, we would expect improvement with the inclusion of a broader array of design team members but must continue to remain sensitive to the difficulty of addressing every potential combination of demographic states.

We should also be aware of the impact of different roles and power arrangements in teams. Sensitivity to an issue by one team member may not be enough to raise the issue to an important place on the team’s agenda. Where minority group members are assigned for the purpose of “statistical correctness” but excluded from genuine influence, their impact may be reduced. On the other hand, design teams that exclusively comprise a single demographic—typically young white male engineers—can be expected, on average, to be sensitive to a narrower range of issues but may still vary greatly in their own range of sensitivity to issues of diversity.

We can expect key areas of technical design practice to involve both requirements and testing. Disasters such as airbags that protected male drivers to a significantly better degree than female drivers clearly failed to adequately represent the full range of requirements and insufficiently tested the product on the whole range of users. In this case, such testing need not have been gender specific but needed to test the full range of sizes and weights of drivers to realize that the average male and female size and weight differ so that the effects of not testing the full range affects male and female people in different proportions. Techniques for developing thorough testing procedures are well documented in the user-computer interface design literature. Schneiderman et al. (2009), for example, provide many helpful guidelines.

Socio-technical design would, of course, continue testing beyond the point where a technology actually works to make sure that the mechanisms for interacting with it and the social systems in which it is embedded also produce positive effects on accessibility and usability of the final products. Although it is

often straightforward to know the demographic breakdown of the use of products and services, when such use is imbalanced by gender or other demographics, it is not always so simple to know if differences in use are due to differences in average interest level or intended or unintended systematic exclusion. Clearly, the voices of those in the less-frequent user camp expressing experiences of exclusion would strongly indicate a need for remediation, whatever the motivations of the source.

Even considering the final element in the model—outcomes—raises some questions. What constitutes success? In an ideal world, all people without regard to their demographic categories will have access to the full array of features and opportunities that they would want. Where a particular product or service is targeted to a particular group, individuals outside the group would have easy and effective access. For example, though I am fortunate to have good hearing capabilities, I sometimes am in a situation to profit from the written text accompanying various televised programs (especially when the room is noisy or the broadcast is in a different language). In the US, television stations whose programs are targeted to a female audience exist (though one assumes only a subset of female viewers find this to be interesting), but, at times, particular programs capture my interest and I have no difficulty viewing these. The ability to target a particular audience without excluding those not targeted would seem a modest goal.

Where such goals are not met, we all should be vocal about eliminating barriers to participation. It is not only the cause of the particular group affected in a particular case but rather the job of *all* who advocate inclusivity to take action when inappropriate barriers to participation are erected. In some cases, such action might be most effectively done by developing alternative services and products that target the excluded group(s). We see a version of this with the emergence of the social networking site Ello (Ello, 2015), which promises to provide member interaction opportunities while not selling personal data for marketing purposes. In other cases, it might be done by public movements to pressure those responsible for the exclusivity to engage in redesigning the technical and socio-technical systems that foster such exclusion. In cases of egregious behaviors such as intimidation, threats, bullying, and unfair exclusion, all legal means should be used to hold the perpetrators of such behaviors accountable.

3 Additional Aspects from the Panel Discussion

The vivid discussion in the panel session addressed mainly three areas: 1) regulations and funding, 2) specific design themes, and 3) what the AIS community can do to support the process towards more inclusive design. We cluster the three areas in the three tables below. The first column addresses the topic discussed as it was raised by the audience members; the second column summarizes the discussion.

Table 3. Area 1: Regulations and Funding

Topic raised	Remarks and positions
Government policies and funding. How they affect having social inclusion as part of the design of IS'	- Eileen: yes, of course it does. Some big funds (e.g., the National Science Foundation), do explicitly fund research on social inclusion. - Fred: the whole realm of academic life in between government institutions and the Association of Information Systems (AIS) is affected/steered by funding. It starts, for instance, with criteria of tenure/promotion and application.
Does crowd funding lead to more diversity?	- Shirley: there is no known evidence, but it might even be the other way round; that is, small, distinct groups target specific problems that address small distinct solutions. - Cathy: we might want to look at the whole process of "kickstarter" projects and involve diversity in the question at the beginning—who to ask, who to get involved, demographics...?
Dependency between legal constraints (e.g., graphical interface design) and inclusive design	- Shirley: this is already applied in terms of interface design. For instance, government agencies tend to offer more ways of accessibility (e.g., Braille readers) and articulate their tender in that way. - Eileen: the American Disabilities Act exists. It is often not followed; yet, organizations can be sued. But there are other groups not covered by design (e.g., sexual harassment). It would be interesting to follow future law cases on these other aspects.

Table 4. Area 2: Design Themes

Topic raised	Remarks and positions
To what extent does the designer's gender and background consciously or unconsciously affect how welcome participants of different genders and background feel? Are there any studies?	- Shirley: Gefen and Ridings (2005) is a rare example where gender as an attribute of design and its outcome. In design science and IS in general, we mostly learn too little about the group that evaluates the product. The rare examples point out the groups are typically not very diverse (e.g., more than 70 percent male). - Cathy: on a more general level, several studies have shown that diversity fosters innovation. Rarely that point is picked up—neither in research nor in practice. - Fred: groups of white male design teams can potentially come with equally inclusive design if they knew about and follow appropriate design principles. However, I would expect on average that more diverse design teams will come up with designs that are more inclusive.
Follow up question on the diversity of design teams: what about the other way round—apply design that focuses on differences.	- Eileen: the question implies that design is usually set up for a majority and includes minorities or not. This view is rather challenging since design should be for a continuum along demographic lines and not for a dichotomy. It should be inclusive about “invisible” groups and include people with mixed ethnicities, transgendered people, and so on. - Fred: the usual distinction among public institutions is ethnicity, which is already highly problematic in multiple ways. The same logic applies for using first language as criterion. - Shirley: in the pool of publications, there might be an over-emphasis on female/gender studies. This emphasis neglects other groups. - On a follow-up question from audience on Internet participation and discrimination, implicitly anonymity was suggested as solution for multiple groups: - If no total anonymity is guaranteed, the situation remains problematic: it is interesting to observe that women often choose names that do not disclose their sex when participating in online communities.
Current production/manufacturing paradigm is moving toward mass-individualization (specific design for individual). Is this possible way forward for IS design?	- Cathy: physical products will take physical forms, which is relatively hard to compare to software that includes more social aspects. - Eileen: social change can be stimulated by system design. An example is in the USA where there is now federal recognition of same-sex marriage. So there now have to be changes in information systems for things such as tax systems.
If we had design principles for inclusive design, could they potentially backfire (e.g., in terms of misuse for discrimination...)?	- Fred: I see two answers to that question: - Design principles might simply fail (i.e., the purpose of design initially was inclusiveness, but people go back to what they were doing all along). - Having a (complete) set of design principles could make people stop thinking about the ultimate goal in their design and mechanically follow rules without looking for their human application. I am also not so sure that socio-technical design principles can be as clear-cut as simply technical ones. - Cathy: there is no ultimate set of design principles. More likely, developing them will occur along with technology's development. Also, principles of inclusiveness could compete against each other. - Shirley: might lead to a discussion of limits of inclusion in terms of feasibility/money argument—to what degree is inclusion wanted? - Remark from audience: yes, of course it can backfire and, in some ways, design principles are already used for discrimination. Take the criterion of age, for example. Non-digital natives have a clear disadvantage in using ICT as new features are designed for people who already use technology. Another example is TV marketing, which openly addresses what the marketing industry calls the relevant peer group (i.e., designing the TV spots for groups aged 14-50).

Table 5. Area 3: Position of IS / AIS

Topic raised	Remarks und positions
What about starting at our own doorstep (i.e., in the AIS community and, in particular, its conferences): name tags, noise at social events, accessibility of rooms, presentations, etc.	• Cathy: we are moving in the right direction because AIS conferences offer more options of inclusion than they used to in terms of social events, networking events, first timer meetings, etc. Admittedly, that might be too late for some. Also, this very panel offers a few design innovation (e.g., that questions are asked by (anonymous) cards with consequence that rank, reputation, etc. do not matter during the discussion). • Eileen: imbalance and exclusion does not happen at conscious level. We speak about a more subtle process (e.g., how do we (people with power) recruit staff, reviewers, etc?). • Fred: as a member of the organizing team for ICIS 2010, we considered several diversity issues. We tried to make sure that regions 1, 2, and 3 were equally treated and encouraged to participate. Perhaps there are additional ways to design conference activities that will act to welcome greater diversity in all aspects of the conferences. • Remark from audience: design always stays normative and the preference of the designer. For instance, try to read the last name of ICIS name tag (note: it is written significantly smaller than the first name). Hence, there is the underlying design assumption that people address themselves on a first name basis when visiting ICIS.
Additional remarks during the discussion (by the audience).	• One cannot predict exactly what happens to design outcome or formalize such outcome by rules. We rather observe a design cycle and needs to be constantly monitored and verified (i.e., results must be compared to the intended outcome and consequence of the actual outcome should be surveyed). • There is a general problem that diversity might become a marketing catchphrase in design. The general issue is that everybody asks for diversity in that everybody is different/diverse in a way. Consequently, we can observe a trend towards (supposable) more individual products. A current trend picked up in service delivery and industry 4.0 is mass customization. While this might be a step ahead in some ways, the same logic of feasibility and system boundaries apply.

4 Concluding Remarks

It became obvious during the discussion that we have a long way to go until we have a sound understanding of design implications for fostering diversity. As a way forward, we can derive several starting points and principles:

- **Overall, we must understand design and its effects better:** we can achieve this point by establishing a body of Design Theory and Design knowledge. The corresponding design principles will guide us towards different aims.
- **We can build on existing knowledge:** even though we are at the beginning of the discussion, there is a lot we already know from literature that we can already apply to design. Yet, we need to summarize or transfer existing knowledge from different fields.
- **Start an open discussion about findings:** applying design principles to the practical process of design is a timely and costly effort. In practice, it is often neglected due to budget restrictions, deadlines, and so on. Steering development into a different direction seems to be less a discussion about affordance of design but about will.
- **We must aim for a clear research agenda:** we should make this specific line of research as rigorous as any other.

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