Personas, Participatory Design and Product Development: An Infrastructure for Engagement

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ABSTRACT
The design of commercial products that are intended to serve millions of people has been a challenge for collaborative approaches. The creation and use of fictional users, concrete representations commonly referred to as 'personas', is a relatively new interaction design technique. It is not without problems and can be used inappropriately, but based on experience and analysis it has extraordinary potential. Not only can it be a powerful tool for true participation in design, it also forces designers to consider social and political aspects of design that otherwise often go unexamined.

Keywords
Persona, design method, scenario, user-centered design

INTRODUCTION
Cooperative design techniques that can be effective in in-house or custom development contexts are less effective in commercial product or package software development. Traditional "user-centered" approaches have been improved upon in recent years but current practices tend to fall short in several respects: Designers and users are not truly engaged; social and political aspects are filtered out; and complexity and representativeness are difficult to identify and portray. In this paper we discuss *personas*, a technique that, if used in conjunction with other methods, can draw upon powerful psychological forces to restore these dimensions. The use of this method is rapidly spreading, including in our organization. In this paper we focus on presenting a theoretical case for the method, which may not at first glance appear to be participatory design, and then we discuss our own experience in utilizing this method.

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At the PDC '90 conference one of us presented a paper identifying "obstacles to participatory design in large product development organizations" [15, 16]. Designers of mass-market, commercial software often can't confidently identify specific users of their software. When attracting hundreds of thousands or millions of people is the goal, finding "representative" participants is a challenge. Organizational barriers are substantial: Designers must look outside their organization, but external parties have little incentive to participate over time, and development schedules rarely accommodate such involvement.

Although sustained user involvement seems desirable, its effect on commercial products is not clear. When an in-house or custom project does not include participatory design, the resulting problems can be obvious. But how would Microsoft Word, the Mac OS X or Lotus Notes differ had participatory design been extensively used?

PARTICIPATORY DESIGN IN PRODUCT DEVELOPMENT
Early Scandinavian efforts
Early in the participatory design movement, this was not an issue: Platform-independent software was not significant until the 1980s. Systems were built for one organization. In the mid-80s, recognizing the expense of developing for a single organization, participants in the UTOPIA project worked hard to involve a large segment of the newspaper industry. As the work progressed, the researchers on the team saw the potential for a general desktop publishing application, which did not exist at the time [12, 13].

This revealed the complexity of working closely with users on a possible new product. Ehn [13] describes a 'tradition/transcendence' tradeoff: A new product may be useful to new users, but not to the current users who have developed skills and conventions around existing tools and practices. The researchers saw a product potential, but worker participants desired a less generally useful system that was more closely synchronized with existing practices. The desktop publishing product was not designed.

In the early 1990s Scandinavian and North American researchers undertook efforts to marry collaborative practices to product development. At CHI '94 Morten Kyng's paper "Scandinavian design: Users in product development" described a traditional custom project to support the Great Links bridge construction that *also* included partners interested in using the research to design products [21]. The PDC '94 call for participation sought input from those who "investigate the incorporation of participatory design approaches in new areas such as product development."

Participatory methods from product developers

Product developers' efforts to adapt and extend elements of the participatory design approach include low-fidelity mock-ups and prototyping [14, 20, 24], increased engagement and communication with potential users [19, 25] and an emphasis on site visits and understanding the work context [2]. These methods focused on raising the level of "user participation" above that achieved in traditional laboratory studies.[1]

Although these methods can be useful, elements of the Scandinavian approach were lost in transfers to product development:

- Long-term engagement with particular participants, and the empathy, commitment and deep understanding that such engagement can bring;
- Attention to the sociopolitical and 'quality of life' issues that marked much of the early work, including values, fears, aspirations, and so forth.

We contend that the personas approach described below can help restore these elements. Because it supplements other approaches, nothing is lost beyond a manageable investment of time. First, though, we review two other important approaches from the mid- and late 1990s: ethnography and scenario-based design.

Ethnography and design

Conferences, journals, and books on Participatory Design, CSCW and HCI include numerous reports that focus on applying ethnographic approaches to product development [e.g., 3, 11]. Challenges in bridging ethnographic work and design include fitting the time course of such work to product design cycles and, of equal significance, communicating ethnographic analyses to designers and developers. Addressing this communication challenge is central to the shorter-term contextual design approach [2]. Another challenge is that ethnographies often identify disruptive effects that usually accompany the introduction of a new technology, the tradition/transcendence issue.

Scenarios without personas

Designers have long used scenarios to organize, justify, and communicate ideas. These often do not involve users [e.g., 5]. Recently, participatory design and human-computer interaction researchers have focused on the use of scenarios to engage users and development team members; see papers in the collections *Scenario-based design* [6] and *Scenario-based system development* [18].

We focus on scenarios because they share attributes with personas and at first glance can be more compelling. However, we will argue that scenarios are less effective when not built on personas.

Every reader is no doubt familiar with scenarios in some form, but as a framework consider Carroll's overview [7]. Scenarios are stories. They have a setting, agents or actors who have goals or objectives, and a plot or sequence of actions and events. His example:

> "An accountant wishes to open a folder on a system desktop in order to access a memo on budgets. However, the folder is covered up by a budget spreadsheet that the accountant wishes to refer to while reading the memo. The spreadsheet is so large that it nearly fills the display. The accountant pauses for several seconds, resizes the spreadsheet, moves it partially out of the display, opens the folder, opens the memo, resizes and repositions the memo and continues working."

Keep this example in mind.

Carroll notes that scenarios can help designers and analysts focus on assumptions about people and tasks, assumptions that are implicit in the software. Scenarios can encourage reflection during design, they are concrete yet flexible – easily revised, extended or fleshed out. They can be viewed from multiple perspectives, abstracted and categorized. Finally, Carroll notes that they promote a work orientation. Citing participatory design, he says "one can increase (their) effectiveness by couching them at an appropriate level and directly involving users in creating and using them."

The extensive literature on scenario-based design has little discussion of the "agents or actors." Little is said about defining an agent or using it appropriately; nothing is said about the values or aspirations of an agent/actor.

The participatory design community has used scenarios heavily to engage "future users." This includes acting out scenes of current or future envisioned work activities as mutual education about work practices, technology constraints, and new possibilities [19].

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[1] Iterative design based on lab studies was itself considered participatory by some, e.g. [10].

Bødker [4] has extended scenario use to include more of a focus on reflection in action, describing three possible roles: to present and situate solutions, to illustrate alternative solutions, and to identify potential problems. Scenarios are clearly better for promoting reflection and discussion among team members and possible users than, say, formal specifications.

But scenarios come with substantial risks and problems. There is often little discussion of the data, if any, on which a scenario is constructed. A scenario constructed by actual workers might be trusted more, but memory is unreliable, people can be guided by a simplified conception of the routine or alternatively by extreme experiences.

Often scenarios are created to justify particular features or technologies. They may include unrealistic assumptions about work practice or technical feasibility. A quarter century of working with scenarios in design has left one of us feeling that scenarios are rarely useful because they are rarely empirically grounded. The most reassuring data would be ethnographic, followed by data drawn from contextual inquiry and analysis, obtained directly from participant-users, derived from demographic or market research, taken from observations of usability studies, or combinations of the above. More often, scenarios are used *in place of* real data on work practice. Scenarios are not a problem, but how they are used usually is.

Bødker [4] describes an innovative use of scenarios. Two detailed scenarios were constructed around the use of the same proposed technology: a cheery utopian vision and a nightmarish, dystopian vision. These succeeded in focusing discussion on how to design to avoid undesirable outcomes and enhance positive uses. This indirectly illustrates the weakness of a single scenario: It is not anchored to reality strongly enough to be more than an argument.

In a further insight, Bødker notes "It gives a better effect to create scenarios that are caricatures... it is much easier for users and whoever else is going to relate to the scenarios to assess things when they see full-blown consequences... Not that they 'believe' in the caricatures, indeed they do not, but it is much easier to use one's common sense judgment when confronted with a number of extremes than when judging based on some kind of 'middle ground.'"

Caricatures are engaging, but may not be necessary.

PERSONAS

Realistic scenarios appear to be a perfect tool for design: They depict the work practices one hopes to support. Their weakness is that they are not engaging. How well do you recall Carroll's accountant scenario, minutes after reading it? Reread it. Dull. Scenarios are often difficult to reconstruct and hard to extend with confidence. Engagement is important. That is why Bødker argued for caricatures, unrealistic extremes that are more engaging, more memorable.

Personas are a method for enhancing engagement *and* reality. We are finding them to be a powerful design tool in practice. Persona use does not require eliminating scenarios or any other method: It is a foundation on which to build scenarios and data collection. It is an infrastructure for engagement. It is a means for communicating data that is collected using other user research methods.

Personas are fictional people. They have names, likenesses, clothes, occupations, families, friends, pets, possessions, and so forth. They have age, gender, ethnicity, educational achievement, and socioeconomic status. They have life stories, goals and tasks. Scenarios can be constructed around personas, but the personas come first. They are not 'agents' or 'actors' in a script, they are people. Photographs of the personas (in our experience, 'amateur' volunteers were better than professional models) and their workplaces and homes are created and displayed in public places.

At first glance this could appear to be a step backward, away from the work context and the specific actions we want to support. (Of course, the specific actions are less important than the users' goals. The accountant did not want to open a folder to access a memo, s/he wanted to get a particular piece of information. Perhaps another solution would have been better.)

But to the extent that personas take a step back, it is to obtain a far more powerful level of identification and engagement that enable design, development, and testing to move forward more effectively.

Cooper [8] presents a case for the use of personas in design. The use of abstract user representations originated in the field of marketing [e.g., 23] but Cooper's use of personas, their goals, and activity scenarios is focused on design. Cooper's claims are based on anecdote and on appeals to reason, not on data. He does not describe in detail how personas are constructed. He exhibits a disdain for empiricism, including feedback on design possibilities. But our experience confirms the power of personas, and we and our colleagues have worked on ways to integrate personas with standard methodologies. Personas can be used badly. Our impression is that Cooper, a designer, has very good intuitions, but for most of us a more solid foundation will prove necessary.

Cooper marvels at the "surprising" power of personas, but does not endeavor to explain their power. Below we argue (with the benefit of hindsight, of course) that perhaps it should not have been so surprising. We then provide an overview of how we are employing personas and some tradeoffs and issues that remain to be resolved.

In parallel with Cooper, a few others have promoted the use of abstract representations of users to guide design: user profiles and scenarios derived from contextual inquiry [17, 29] and user classes fleshed out into "user archetypes" [22]. These practitioners, along with Cooper, are clear in positioning these representations as the starting point, around which scenarios are constructed.

The power of people

Early proponents of participatory design went to such lengths as playing football with workers who would be using (and helping design) software. Can we achieve comparable effects with fictional people, and if so, what is the cost and what are the benefits? What are the risks?

Soap operas, situation comedies, dramatic series. There is no question that fictional people can be extraordinarily engaging. Many viewers fully engage with characters in U.S. television programs such as *As the World Turns* and *ER*.

People in these extremely popular series for the most part resemble normal people. They may look better or be wittier on average, but their appeal is in part that they can be identified with (or against). They are often moderately complex—because we observe them over time, caricature is not essential.

Designers explored the use of shocking, caricatured personas in a short-term study and reported engagement and discussion [9]. But we have found, as did Cooper, that extreme characters and shock are not necessary. One factor is the duration of the exposure. A single film can benefit by having an extreme hero or villain, but this grows dull in a longer series. Characters in a series become more complex, more realistic. Similarly, once established, personas can be an ongoing presence, evolving to reflect data gathered from real people. That said, issues of stereotyping and casting against type in persona construction remain and are discussed in the final section.[2]

Method acting and the value of detail. When an actor prepares for a scene that takes place in, say, the living room of the house the character lives in, one exercise is to create a history for each prop, each piece of furniture. When was this table bought? Which meals are eaten on it? Where did this desk come from? What has the character put in the top drawer? The next drawer? How often is it used? And so on. None of these details are specified in the script. None directly impinge on the scene. But by specifying the detail, an actor may intuitively behave in a more natural, normal way. If one frequently uses a desk one might walk by it or glance at it in a particular way…

Some of this detail may be invented, but many actors spend days or weeks observing and talking with real people who resemble those to be portrayed. A character is fictional but the behavior is based on real data: precisely the goal with personas. If successful, the actor can accurately intuit a character's behavior in a new situation. A designer, developer, or tester can intuit the behavior in novel situations of the people on whom a persona is based.

Social reasoning and Theory of Mind.[3] Beyond engaging the attention of team members, a detailed persona enables them to draw on experience to fill in more aspects of behavior than are included in a scenario or specification. This utilizes a powerful human characteristic. From birth or soon thereafter, every day of our lives, we use partial knowledge to draw inferences, make predictions, and form expectations about the people around us. We are not always right, but we learn from experience. We continue to extrapolate. Personas evoke this universal capability and bring it into the design process. Faceless accountants lying inert on the page do not.

Thus, well crafted personas are generative. In the case of scenario creation, individuals across a product team can independently generate appropriate and complementary scenarios for seemingly disparate areas of a large, multifaceted product. As Cooper indicates, once a set of personas is constructed and provided with sets of goals, once team members have accepted and assimilated them, then meaningful scenarios can be constructed around them. We differ from Cooper in that we argue that the scenarios, personas, and product designs should evolve in response to ongoing observations of, and feedback from, the real people who inspired them.

Our experience with personas

One of the authors, along with many colleagues, has been actively using personas and refining techniques for using them for several years. We are preparing a paper detailing our method and experience. A few key points:

- Unlike Cooper, we feel strongly that persona use needs to be complemented with a strong, ongoing effort to obtain as much quantitative and qualitative information about users as possible, to improve the selection, enrichment,

[2] Lene Nielsen [26] describes the thinness or flatness of most scenario characters from the perspective of a writer.

[3] 'Theory of mind' was a term first used to describe primates' ability to predict the behavior of others by recognizing their mental state [28]. Subsequently it has become a field of research in child development [1]. 'Social intelligence' is a broader term, often used in describing animal, robot and software agent behavior.

and evolution of sets of personas. In our method, persona creation begins with quantitative market segmentation much like that discussed by Weinstein [30]. The highest priority segments get fleshed out with user research including field studies, focus groups, interviews and further market research.

- In a recent effort, persona creation involved a team of about 22 people over a period of roughly two months. Team members included product planners, usability engineers, interaction designers, market researchers, and technical writers. Other efforts have been less intensive, involving one or two people for shorter periods of time. These lighter efforts typically capitalized on existing user research and generated somewhat less detailed personas.
- We utilize a central "foundation" document for each persona as a storehouse for all information about that persona (data, key attributes, photos, reference materials, etc.). Figure 1 shows the table of contents for a foundation document. Note that the foundation document is not the primary means of communicating information about the persona to general team members (more on that below). Likewise, foundation documents do not contain all or even most of the feature scenarios (i.e., "walk-through" scenarios are located directly in the feature specifications). Instead, the foundation document contains goals, fears, and typical activities that serve to motivate and justify scenarios that appear in feature specifications.

Figure 1. Table of Contents for a Foundation Document

- Links between persona characteristics and the supporting data should be explicit and salient. If personas are not perceived as credible, they are not used. Our foundation documents contain copious footnotes, comments on specific data and links to research reports that support and explain the personas' characteristics. All persona illustrations and discussions link back to these foundation documents so that the team can always access the supporting documentation.
- "Grass roots" persona efforts, when a few people on a team decide to try the method, have typically had less impact than desired. Getting high-level management and key team members to buy into the use of personas is critical. On first encounter, the idea may seem too unscientific, "arty," to engineers and others. It can take a leap of faith for the first teams in an organization to try it. It is a major step to have team leaders say "We're all going to do it," provide people resources for creating and promoting the personas, and a budget for posters, T-shirts, and other materials to keep personas visible.
- Communicating about your personas should be multifaceted, multimodal, on-going, and progressively unfolding. While our foundation documents are available to anyone on the team who wishes to review them, they are not the primary means for delivering information about personas. Instead, we've created many variations of posters, flyers, handouts and giveaways (e.g., squeeze toys with persona images and information). Figure 2 shows the likeness of a poster comparing high level details of four personas. Additionally, we maintain a detailed web site that includes the foundation documents, supporting research, and a host of tools for using the personas (screening material for recruiting usability test participants, spreadsheet tools, comparison charts, posters and photos, etc.). We utilize email to routinely put small bits of persona information in front of the team (e.g., fact of the week, email from the personas – that's right, we've created email addresses for them). Very important are study participants recruited based on personas, with

findings grouped and reported by persona. Generally, we think of the persona effort as an on-going campaign.

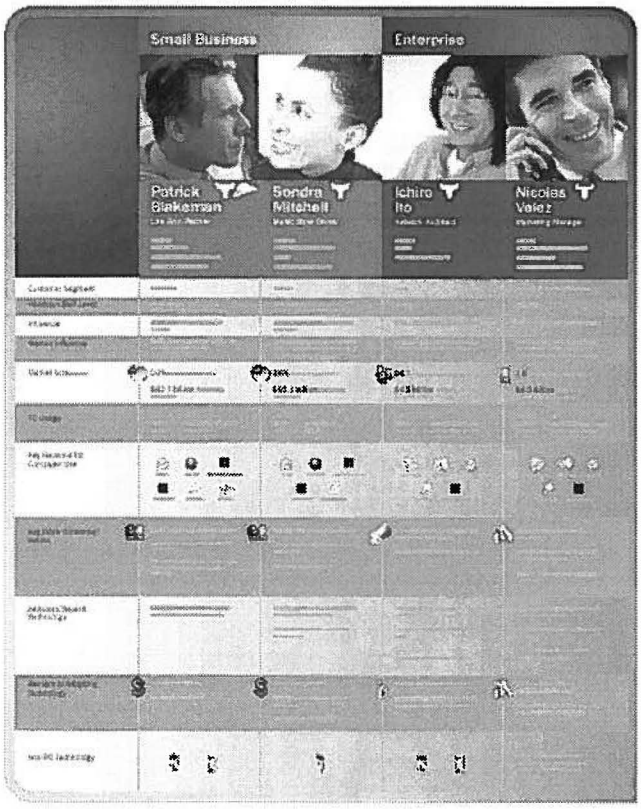

Figure 2. A Persona Comparison Poster

- A successful persona campaign instructs a team in using the personas and provides tools to help. Cooper describes persona use mostly as a discussion tool. "Would Dave use this feature?" This is valuable, but we have generated additional activities and incorporated them into specific development processes, and created spreadsheet tools and document templates for clearer and consistent persona utilization.

  As an example of how personas become concrete in the development process, Figure 3 shows an abstract version of a feature-persona weighted priority matrix that is used to help determine what features are built in the product development cycle. In this example, the scoring in the feature rows is as follows: -1 (the persona is confused, annoyed, or in some way harmed by the feature), 0 (the persona doesn't care about the feature one way or the other), +1 (the feature provides some value to the persona), +2 (the persona loves this feature or the feature does something wonderful for the persona even if they don't realize it). The sums are weighted according to the proportion of the market each represents. Features 2 and 4 should be high priority; 3 should probably be dropped.

	Persona 1	Persona 2	Persona 3	
Weight:	50	35	15	Weighted Sum
Feature 1	0	1	2	65
Feature 2	2	1	1	150
Feature 3	-1	1	0	-15
Feature 4	1	1	1	100
Etc.	-	-	-	-

Figure 3. A Feature-Persona Weighted Priority Matrix

Benefits of personas

- Personas create a strong focus on users and work contexts through the fictionalized setting. We've seen our personas go from scattered use (in early persona projects) to widespread adoption and understanding (in recent product cycles). Our personas are seen everywhere and used broadly (e.g., feature specifications, vision documents, storyboards, demo-ware, design discussions, bug bashes – even used by VP's in product strategy meetings arguing for user concerns). Not only have we seen our development teams engage personas, but correspondingly they have engaged in our other user-centered activities. In other words, our persona campaigns generated a momentum that increased general user focus and awareness. With our most recent persona effort, we've had partner teams, building related but different products, adapt our personas in an effort to enhance cross-team synergy and communication.
- Personas utilize our mind's powerful ability to extrapolate from partial knowledge of people to create coherent wholes and project them into new settings and situations. They encourage an end-to-end approach when considering large sets of features.
- The act of creating personas makes explicit our assumptions about the target audience. Once created, they help to keep the assumptions and decision-making criteria explicit. Why are we building this feature? Why are we building it like this? Without personas, development teams routinely make decisions about features and implementation without recognizing or communicating their underlying assumptions about who will use the product and how it will be used.
- Personas are a medium for communication; a conduit for information about users and work settings derived from ethnographies, market research, usability studies, interviews, observations, and so on. Personas utilize the power of narrative and storytelling to enhance attention, memory, and organization of detailed user data. How many of your team members actually read through market research and usability reports? How much of it do they remember? Once a set of personas is familiar to a team, a

new finding can be instantly communicated: "Patrick cannot use the search tool on your web page" has an immediacy that "a subset of participants in the usability study had problems with the search tool" doesn't, especially for team members who now see Patrick as a person as real as, say, Mark Green on "*ER*."[4]

- Personas focus attention on a specific target audience. The method helps establish who is and consequently who is not being designed for. Personas explicitly do not cover every conceivable user. They also help focus sequentially on different kinds of users. For example, a quality assurance engineer can one day test a product focusing on Sondra scenarios, another day focusing on Ichiro scenarios.

  In our experience, this works for testers and other product team members in "bug bashes." An experienced tester reported feeling that he was identifying "the right kind" of problems in drawing on knowledge of a persona in guiding his test scripts and activities.

  Compare this to an observation from a study of interface development:

  > Some people realized that tests conducted by Quality Control to ensure that the product matches specification were not sufficient. One manager noted, 'I would say that testing should be done by a group outside Development. 'Cause Development knows how the code works, and even though you don't want it to, your subconscious makes you test the way you know it works... See, those people in the Quality Control group have nothing to do with customers. They're not users.'
  >
  > In fact, two members of Field Support were reported to have found more bugs than the Quality Control group in the latest release, and they had accomplished this by working with the product as they imagined that users would. Testing by Field Support was an innovative experiment, however, and not part of the accepted development process.
  >
  > 'The Quality Control group has a lot of systematic testing, and you need some of that, but at the same time, you need somebody who is essentially a customer. It is as if you had a customer in house who uses it the way a customer would every day, and is particularly tough on it and shakes all these things out. That's what these two guys did, and it was just invaluable.' (Poltrock and Grudin [27], page 64.)

  The two Field Support engineers were able to "test as a user" because of their extensive experience with customers. That persona use results in similar positive reports is encouraging.

Risks of personas

Getting the right persona or set of personas is a challenge. Cooper argues that designing for *any* one external person is better than trying to design vaguely for everyone or specifically for oneself. This may be true, and it does feel as though settling on a small set of personas provides some insurance, but it also seems clear that personas should be developed for a particular effort. In making choices it becomes clear that the choices have consequences. For example, they will be used to guide participant selection for future studies and could be used to filter out data from sources not matching one of the persona profiles.

Related to this is the temptation toward persona reuse. With an investment in developing personas and acquainting people with them, it may be difficult to avoid over-extending their use when it is time to disband one cast of characters and recruit another one. It can be good or bad when our partner teams adopt or adapt our personas. Different teams and products have different goals, so the personas are stretched a bit. So far, the stretching has been modest and closely tied to data (because our target customers do indeed overlap), but it is a concern.

In addition, marketing and product development have different needs that require different persona attributes, and sometime different target audiences. Marketing is generally interested in buyer behavior and customers; product development is interested in end-users. We've had some success in collaborating here, but there are rough edges.

Finally, we have seen a certain level of 'persona mania' within our organization and others. There can be a temptation to overuse personas. At worst, they could be used to replace other user-centered methods, ongoing data collection, and product evaluation. Personas are not a panacea. They should augment and enhance – augment existing design processes and enhance user focus.

Personas and sociopolitical awareness

We conclude by addressing another key element of the early participatory design movement that has been filtered out of most subsequent efforts and techniques, that of social and political consciousness. Early participatory design efforts were explicitly focused on improving the quality of working life for those workers most at risk of unrewarding consequences of information technology [12].

[4] Or your favorite television or movie character. Team members conversing with other people often refer to personas without realizing that the others don't know who they are. One person remarked "Hillel wants Irene dead." Hillel, a senior manager, was observed tearing down a poster about Irene, a persona he did not want his group focusing on.

The tool of persona use forces one to decide precisely whom one is designing to support. Each persona has a gender, age, race, ethnic, family or cohabitation arrangement, and socio-economic background. This forces existing assumptions about users to the surface and provides an effective avenue for changing or countering them. One could populate an entire persona set with middle-aged white males, but it would be obvious that this is a mistake.

Cooper writes that "all things being equal, I will use people of different races, genders, nationalities, and colors." He quickly adds that "political correctness" is not his goal, but realism. He uses stereotypes if he feels it will provide more credence; he avoids casting strongly against expectations if he feels it will undermine credibility.

Participatory design researchers and practitioners will appreciate the subtleties and the potential of this dance.

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