SIG: Gender-Inclusive Software: What We Know About Building It

Margaret M. Burnett
Oregon State University
Corvallis, OR 97331 USA
burnett@eecs.oregonstate.edu

Elizabeth F. Churchill
Google
1600 Amphitheatre Parkway
Mountain View, CA 94043 USA
churchill@acm.org

Michael J. Lee
University of Washington
Seattle, WA 98195 USA
mjslee@uw.edu

CHI'15 Extended Abstracts, Apr 18-23, 2015, Seoul, Republic of Korea.
ACM 978-1-4503-3146-3/15/04.
http://dx.doi.org/10.1145/2702613.2727689

Abstract
Recent research has shown that some software that is intended to be gender-neutral is not, in fact, equally inclusive to males and females. But little is known about how to design software in a gender-aware fashion, and existing research on gender differences relevant to software design is scattered across at least five different academic fields (e.g., psychology, computer science, education, communications, and women's studies). This research SIG will bring together female and male academics, industry researchers, and practitioners with three goals in mind: (1) to build community across research/practice boundaries; (2) to pool our knowledge on promising practices for design and evaluation of software from a gender perspective; and (3) to begin to build a shared, on-line research and literature base to support solid, well-informed progress on this important issue.

Author Keywords
Women; feminism; gender; Gender HCI; system design

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

	IT support users	Hobby-ists	Prof. Devel-opers
Features	√	√	√
Tinker	√	√	√
Confi-dence	√	√	√

Table 1. Three gender differences with software usage. These were first reported for spreadsheet users [3, 4] (not shown in the table) and later confirmed across multiple populations and platforms. This table summarizes empirical gender differences for three populations [6].

Introduction

Last year, CHI'14 hosted a workshop entitled "Perspectives on Gender and Product Design" [12]. The workshop focused on the design of interactive systems, and how gender neutrality or gendered use can be constructed and mobilized within the design process. This SIG continues the discussion of this topic in a forum that can accommodate many more participants.

Discussion of this topic matters because, to date, gender has rarely been considered to be a factor in software design; instead, many products are implicitly considered to be "gender-neutral". However, over the past decade, HCI research has shown that such products are often not gender-inclusive [3, 4, 5, 6, 7, 10, 13, 14, 16, 21, 22, 23].

This SIG will provide a forum for people interested in the production of gender-inclusive software. At the meeting, we will discuss questions of interest to the attendees such as:

- Foundational topics, e.g.: What does gender neutrality in software mean? Is gender neutrality possible? What foundations underlie the observed gender differences in software usage? When interactive systems *are* intentionally gendered (such as a game for girls), what are appropriate models of genders for such products? Especially if we follow philosophies like Butler's, in which gender identity and expression are cultural and social constructs that can be complex and performative [9]?
- Design questions, e.g.: From a practical perspective, what kinds of software features can increase gender inclusiveness? What are theoretical underpinnings that can help point to answers to design questions?
- Evaluation questions, e.g.: What methods are available for being able to evaluate the gender inclusiveness of an interactive system?
- Process questions, e.g.: What process changes would help in designing gender-inclusive systems?

Examples of related work in HCI venues

Over the past decade, gender-in-HCI research has gained momentum in the HCI literature. This section provides a few examples to give a flavor of this work.

Some of the past work has been foundational, focusing on how gender differences reported in other fields, such as psychology or commerce, apply to HCI and software. For example, Bardzell reviewed feminist theories and their implications for HCI research and practice [1]. Following up on this, Bardzell and Churchill guest-edited a special issue on feminism and HCI, with contributions from HCI scholars addressing many aspects where gender affects device, application and service design and uptake [2]. As another example, Beckwith et al. reported significant differences in male and female use of advanced features and tinkering during spreadsheet debugging [3, 4]. Results like these were then confirmed across several other platforms and populations (e.g., [6, 15]). See Table 1.

There is also significant work on ways to create gender-inclusive software. For example, Storytelling Alice (Figure 1) takes into account the difference in males' and females' motivations toward using technologies, by devising a variant of Alice as a way to create stories [16]. (Background: females' motivations tend toward technology with useful *outcomes*, whereas males are often interested in technology in its own right [6, 11, 15, 19].)

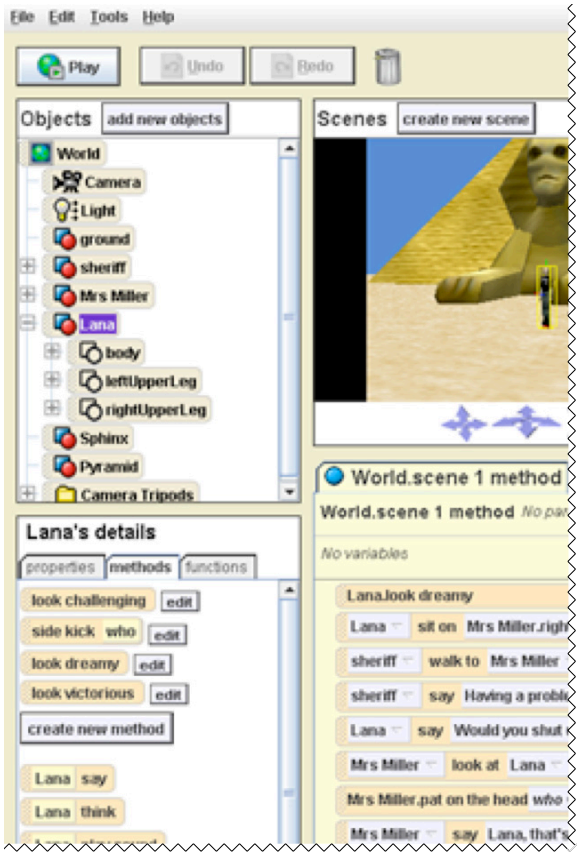

Figure 1: Storytelling Alice motivates both males and females to program by encouraging users to tell their own stories [16]. (Reprinted from http://blogs.msdn.com/b/socaldevgal/archive/2008/09/02/teach-your-kid-to-code-month-in-socal-december-2008.aspx, © 2014 Microsoft Corporation, with permission as per Exhibit B of https://msdn.microsoft.com/en-us/cc300389.)

Another gender-inclusive programming environment is Gidget (Figure 2). Gidget's gender inclusiveness comes from innovating certain programming environment characteristics. For example, it portrays the computer as fallible, personifies error messages, and presents explanatory help in ways that are compatible with both females' tendency toward comprehensive information processing and males' tendencies toward depth-first information processing [17, 18, 20].

Finally, in the process area, processes are beginning to emerge to add a "gender lens" to design and evaluation. For example, Williams provides a number of design process possibilities from low-cost to high-cost [24], and Burnett et al. have an emerging evaluation method called "GenderMaP" [8].

SIG Goals

This SIG has three goals: (1) to build community across research/practice boundaries; (2) to pool our knowledge on promising practices for design and evaluation of software from a gender perspective; and (3) to begin to build a shared, on-line research and literature base.

Because the topic has a blend of foundational and practical aspects, we expect it to bring together interested researchers and product designers who want to come together to form the leading edge of progress on this important topic.

Acknowledgments

This work was supported in part by NSF under CNS-1240957 and IIS-1314384.

References

[1] Bardzell, S. Feminist HCI: Taking stock and outlining an agenda for design, In *Proc. CHI 2010*, ACM Press (2010), 1301-1310.

[2] Bardzell, S. & Churchill, E. (2011). Special Issue Editors' Introduction. Special Issue "Feminism and HCI: New Perspectives." *Interacting with Computers* 23(5), pp. iii-xi.

[3] Beckwith, L., Burnett, M., Wiedenbeck, S., Cook, C., Sorte, S., Hastings, M. Effectiveness of end-user debugging software features: Are there gender issues? In *Proc. CHI 2010*, ACM Press (2005), 869-878.

[4] Beckwith, L., Kissinger, C., Burnett, M., Wiedenbeck, S., Lawrance, J., Blackwell, A., & Cook, C. Tinkering and gender in end-user programmers' debugging. In *Proc. CHI 2006*, ACM Press (2006), 231-240.

[5] Borkin, M., Yeh, C., Boyd, M., Macko, P., Gajos, K., Seltzer, M. & Pfister, H. Evaluation of filesystem provenance visualization tools, *IEEE Trans. Vis. Comput. Graphics* 19, 12 (2013), 2476-2485.

[6] Burnett, M., Fleming, S.D., Iqbal, S., Venolia, G., Rajaram, V., Farooq, U., Grigoreanu, V., & Czerwinski, M. Gender differences and programming environments: Across programming populations, ACM-IEEE ESEM (2010), Article 28, 10pg.

[7] Burnett, M., Beckwith, L., Wiedenbeck, S., Fleming, S., Cao, J., Park, T., Grigoreanu, V., & Rector, K. Gender pluralism in problem-solving software. *Interact. Comput.* 23 (2011), 450–460.

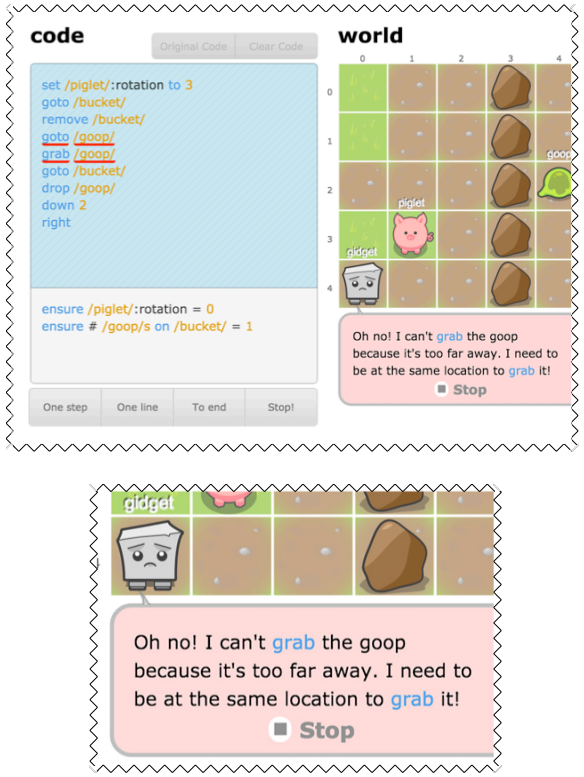

Figure 2: Gidget prototypes a debugging-first discretional game for learning programming. (Top): Part of the Gidget programming/debugging environment. (Bottom): This error message demonstrates the "fallible computer" approach (Gidget made the mistake, not the user) and the personification of the error messages [17, 18].

[8] Burnett, M., Stumpf, S., MacBeth, J., Beckwith, L., Makri, S., Kwan, I., Peters, A. The GenderMaP Kit: How to use the GenderMaP method to find usability issues through a gender lens, 2015. http://eusesconsortium.org/gender/

[9] Butler, J. *Gender Trouble*. Routledge, 1990.

[10] Cao, J., Rector, K., Park, T., Fleming, S., Burnett, M., Wiedenbeck, S. A debugging perspective on end-user mashup programming, In *Proc. VL/HCC* 2010, IEEE (2010) 149-156.

[11] Cassell, J. Genderizing HCI, In Jacko, J. & Sears, A. (eds), *The Handbook of Human-Computer Interaction*, Mahwah, NJ, Lawrence Erlbaum (2002), 402-411.

[12] Dray, S., Busse, D., Brock, A., Peters, A., Bardzell, S., Druin, A., Burnett, M., Churchill, E., Williams, G., Holtzblatt, K., Murray, D. Perspectives on gender and product design, CHI'14 Extended Abstracts (2014), 53-56.

[13] Dunwell, I., de Freitas, S., Petridis, P., Hendrix, M., Arnab, S., Lameras P. & Stewart, C. A game-based learning approach to road safety: The Code of Everand. *Proc. CHI 2014*, ACM Press (2014), 3389-3398.

[14] Grigoreanu, V., Burnett, M., Wiedenbeck, S., Cao, J., Rector, K. & Kwan, I. End-user debugging strategies: A sensemaking perspective. *ACM Trans. Comput. Hum. Interact. 19*, 1 (2012), Article 5, 28pg.

[15] Hou, W., Kaur, M., Komlodi, A., Lutters, W. G., Boot, L., Cotten, S.R., Morrell, C., Ozak, A.A. & Tufekci, Z. "Girls don't waste time": Pre-adolescent attitudes toward ICT, In *CHI Extended Abstracts 2006*, ACM Press (2006), 875-880.

[16] Kelleher, C., Pausch, R., Kiesler, S. Storytelling Alice motivates middle school girls to learn computer programming. In *Proc. CHI 2007*, ACM Press (2007), 1455-1464.

[17] Lee, M.J., Bahmani, F., Kwan, I., Laferte, J., Charters, P., Horvath, A., Luor, F., Cao, J., Law, C., Beswetherick, M., Long, S., Burnett, M., & Ko, A.J. Principles of a debugging-first puzzle game for computing education. IEEE VL/HCC (2014), 57-64.

[18] Lee, M.J. & Ko, A.J. Personifying programming tool feedback improves novice programmers' learning. ACM ICER (2011), 109-116.

[19] Margolis, J. & Fisher, A. *Unlocking the Clubhouse: Women in Computing*, MIT Press, 2003.

[20] Meyers-Levy, J. Gender differences in information processing: A selectivity interpretation, in Cafferata, P. & Tubout, A. (eds.), *Cognitive and Affective Responses to Advertising*, Lexington Books, Lexington, MA, 1989.

[21] Rode, J. An ethnographic examination of the relationship of gender & end-user programming, Ph.D. Thesis, Univ. California Irvine, 2008.

[22] Subrahmaniyan, N., Beckwith, L., Grigoreanu, V., Burnett, M., Wiedenbeck, S., Narayanan, V., Bucht, K., Drummond, R., Fern, X. Testing vs. code inspection vs. what else?: Male and female end users' debugging strategies. In *Proc. CHI*, ACM Press (2008), 617-626.

[23] Tan, D.S., Czerwinski, M., & Robertson, G. Women go with the (optical) flow. In *Proc. CHI 2003*, ACM Press (2003), 209-215.

[24] Williams, G. Are you sure your software is gender-neutral? *Interactions 21,* 1 (2014), 36–39.