
The GenderMag-Teach Project*

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SubgoalQ: Will <Abi/Tim> have formed this subgoal as a step to their overall goal? (Yes/no/maybe, why, *what facets are involved in your answer*).

ActionQ1: Will <Abi/Tim> know what to do at this step? (Yes/no/maybe, why, *what facets ...*).

ActionQ2: If <Abi/Tim> does the right thing, will s/he know s/he did the right thing and is making progress toward their goal? (Yes/no/maybe, why, *what facets...*).

Figure 1: The GenderMag specialized cognitive walkthrough (CW) questions about each subgoal and about each action a user would need to perform to accomplish those subgoals. *Italics show main differences from standard CWs.*

ABSTRACT

The GenderMag-Teach project is a new and developing online community of practice for educators who are teaching the GenderMag method. GenderMag is an HCI method for gender-inclusive software design. In this paper, we share our community-of-practice approach and its core attributes.

KEYWORDS

HCI design and evaluation methods; Inclusive design; HCI education; GenderMag

INTRODUCTION

In the summer of 2017, a group of us GenderMag researchers decided to look into how to support university faculty members interested in teaching GenderMag [3]. We call the resulting work we are doing to support a community of practice for such faculty the GenderMag-Teach Project.

Our goals had some similarities to the goals behind the 2019 EduCHI Symposium, but are more modest—we aimed only to help faculty teach concepts and practices relating to GenderMag, not all of HCI. Even so, we hope our work in this direction can help to inform and contribute to the design of more ambitious projects to support HCI education.

WHAT IS GENDERMAG?

GenderMag (gendermag.org), short for “Gender Inclusiveness Magnifier”, is an inclusive design and evaluation method [3, 9]. It integrates a specialized cognitive walkthrough (Figure 1) with research-based personas (Figure 2) that capture individual differences in how people problem-solve and use software features—differences that statistically cluster by gender. GenderMag has been used to find gender biases in several commercial and open source software products (e.g., [1, 2, 4, 5, 7, 9]).

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Figure 2: Part of one of GenderMag's personas.

GUIDING INFLUENCES

Our approach to supporting educators interested in teaching GenderMag was inspired by three main influences: (1) some things we've learned from practices of *pre-college* teachers; (2) the National Center for Women & IT's (NCWIT) approach to "resources in a box"; and (3) work on Pedagogical Content Knowledge (PCK).

First, in past collaborations and conversations with people knowledgeable about *pre-college* teaching, we realized how constrained *pre-college* educators' time can be: *pre-college* educators are in the classroom almost all day, with very few hours left for preparation, so enabling them to bring new content into their classes tends to require highly practical supports. For example, some school systems purchase or develop entire curricula to support their teachers; see <https://bit.ly/2l03gdR> for one example. Such curricula can include syllabi, modular presentation materials, exercises, test questions, and so on. Without supports like these, many *pre-college* educators would not be able to afford the time to incorporate content they had not previously taught.

College educators, too, have many constraints on class development time. Thus, we decided that they too might benefit from modular presentation materials, exercises, test questions, etc., like those used in supporting their *pre-college* counterparts.

In deciding where such materials should come from and how to package them, we drew ideas from our second inspiration source, NCWIT (the National Center for Women & IT; <http://ncwit.org>). NCWIT's resources have attributes that we adopted as core attributes for our approach. First, the NCWIT resources are highly modular, and are in types of packaging that are usually reusable and customizable; second, they are all together in one place; and third, they are mostly co-created by members of the NCWIT community. The NCWIT approach guided us to provide the resources we already had for educators all together in one place too, in customizable form, and to encourage our community members to share back to the community any materials they developed.

However, teaching new content requires more than materials, more than knowledge of the content, and more than knowledge of how to teach. It also requires knowledge of how to teach *this* content. This knowledge is called Pedagogic Content Knowledge (PCK) [8], which was the third main influence on our work. PCK is a common topic in *pre-college* education communities, but has made only modest inroads into conversations about college-level CS or HCI education. We viewed good support for PCK on how to teach a nuanced topic like gender-inclusive software as critical, so we placed an emphasis on understanding and sharing PCK units on how to teach GenderMag.

THE GENDERMAG-TEACH COMMUNITY Wiki

To facilitate sharing, we created a wiki (Figure 3) and invited nine faculty members across eight universities who had expressed interest in teaching aspects of GenderMag to contribute to it. The wiki consists of three types of resources: (1) community-building mechanisms, (2) modularized, customizable teaching materials, and (3) teaching guidance (PCK and other materials).

GENDERMAG-TEACH HOME	
1. WHY TEACH/WHAT SKILLS?	There is a list (incomplete) of places GenderMag is taught
1(A). WHERE IS GENDERMAG TAUGHT?	<ul style="list-style-type: none"> • Beijing Normal University, China • City University of London, UK • Cornell University, USA • Creighton University, USA • Harvard University, USA • Kean University, USA • Namibia University of Science and Technology • New Jersey Institute of Technology • Oregon State University, USA • University of Edinburgh, UK • University of Iowa, USA • University of Maryland, USA • University of Michigan, USA • University of Nebraska, USA • University of Salerno (UNISA), Italy • University of Tulsa, USA • University of Washington, USA • University of Zurich, Switzerland • Victoria University of Wellington, NZ • Waikato University, New Zealand
2. HOW TO TEACH	
2(A). PCK FOR TEACHING INCLUSIVE DESIGN	
3. LECTURE SLIDES	
4. IN-CLASS ACTIVITIES & HANDOUTS	
5. HOMEWORKS	
6. READINGS	
7. EXAMPLE QUESTIONS FOR TESTS, READINGS...	
8. FILE CABINET	
9. GOOGLE GROUP	
10. FREQUENTLY ASKED QUESTIONS	

Figure 3 (left): The community wiki materials. Figure 4 (right): Letting educators know other universities who are using the materials aims to build a sense of community.

The community-building mechanisms are the wiki structure itself, a discussion group (via Google Groups), and a page listing universities who have told us they are using the materials (Figure 4) to help educators realize that they are part of a community.

The modularized teaching materials are small modules, with the idea that a faculty member might want to teach the full method, or only the GenderMag personas, only its specialized cognitive walkthrough, or other bits and pieces of GenderMag. Among the teaching materials are slide decks with lecture modules on various portions of the GenderMag method, sample homework assignments that scaffold practicing GenderMag walkthroughs on example websites, suggested readings, in-class activities such as an interactive GenderMag walkthrough activity to be done in class, the current version of the GenderMag kit (<http://gendermag.org>), and test questions. We built some of the materials ourselves; the rest were contributed over time by faculty members in the PCK study we undertook [6] and by other teachers who have taught GenderMag.

The teaching guidance is of two types. The first is guidance on where GenderMag concepts can fit in a curriculum, and how it might further particular types of course goals. (These are in the “Why Teach/What Skills” section and the “How to Teach” section of the wiki; see Figure 3.) The second is a set of Pedagogical Content Knowledge (PCK) units—teaching tips and pitfalls contributed by the nine faculty who worked with the materials in their classes as part of an Action Research investigation we conducted in Fall 2017 through Spring of 2018 [6]. The community wiki shares the PCK units derived from that investigation, listing each unit and an example for the classroom. Table 1 summarizes the PCK.

Table 1: A summary of the PCK units [6] (tips and pitfalls for educators) from the GenderMag-Teach community wiki. (Table continued next page.)

PCK	Example for the classroom
<i>PCK1-Framing:</i> Providing foundations first can give students the capacity to ...engage.	Educator: “When I finally do present GenderMag, which is probably about a month from now, the students will be so used to Abi and her facets, ... they’re just going to be really bought into it at that point.”
<i>PCK2-Credibility:</i> Providing students credible resources can convince them inclusive design methods are ... useful.	Educator: “It was really helpful to assign the ... paper... because students ... really understood why I am using this.”
<i>PCK3-ContentKnowledge:</i> ... knowledge of the facets can help teachers explain ... how a user might interact with software.	Educator: “I thought those five facets were orthogonal ... but as I explained to students, they are very related ...”
<i>PCK4-Concretization:</i> Reframing facets in concrete ways to explain persona behavior ...	<Educator> began describing the Motivations facet by naming it and then reframing it as “Why is the persona sitting in this chair [in front of the computer with this software]?”
<i>PCK5-Modeling:</i> <Guiding> process for students ... during hands-on practice...	Student: “Can we use subgoal or the scenario when ...” Educator: “Yes you can reference both if ...” Student: “So is the ‘right thing’ the action? ...” Educator: “Yes, it is what <student> defined to us as the action.”

Table 1 (cont.): GenderMag-Teach PCK units.

<i>PCK6-TheoryOfMind</i> : Coaching students ... to see software through the eyes of a persona.	Educator: "Some students seem to have no problem just slipping right into that mindset of ...I'm going to speculate from her perspective'...But there are still students that don't."
<i>PCK7-Averting"I"</i> : Listening for uses of "I" during in-class activities and prompting students to use the personas' names can reduce use of "I" methodology and increase perspective-taking.	Educator: "I'll remind them of the rules, such as they're never allowed to say "I" or "you" or "the user," they have to say Abi ... or Tim [a GenderMag persona]."
<i>PCK8-Engagement</i> : Tasking students to modify non-essential parts of ... materials, such as background information, can increase engagement ...	One team modified one of the personas, turning her into "Jenn." Part of the backstory they devised for her was: Student: "Jenn needs to find housing for her 18 years old son who is deaf and transferring to <University>."
<i>PCK9-RefutingStereotypes</i> : Pointing students to the evidence... can help students connect their work to foundations rather than stereotypes.	Educator: "This [pattern of data] holds strongest for male versus female developers. Why do you think ...?" Student: "Women ... don't like technology." Educator: "Not true, [these data] are software developers."
<i>PCK10-ReducingStereotypes</i> : Having students perform the inclusive design process can reduce tendencies to stereotype members of populations unlike themselves.	A prior study investigating stereotyping in the presence of the GenderMag method, found that groups that performed a GenderMag walkthrough gender-stereotyped personas less than those who did not do a walkthrough and less than people do on average [6].
<i>PCK11-HandlingResistance</i> : Relating inclusive design methods' utility to the broader goal of inclusive appeal and/or to greater market share can... motivate them...	Educator: "They like the idea that we have to design software for everyone... if only half the market wants to buy your software, that's not going to be a very successful product."

CONCLUDING REMARKS

The GenderMag-Teach project is young, but our results so far are encouraging. In the 1.5 years since we began, about 20 universities have begun to teach aspects of GenderMag using the materials on our community wiki, and some community members have also contributed materials, data, or PCK insights to the effort. We are continuing to improve and expand upon the project. We also hope that our experiences and our community can contribute to other efforts to build communities of practice to support Global HCI Education.

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REFERENCES

- [1] Margaret Burnett, Robin Counts, Ronette Lawrence, and Hannah Hanson. 2017. Gender HCI and Microsoft: Highlights from a longitudinal study. *IEEE VLHCC*, 139-143.
- [2] Margaret Burnett, Anicia Peters, Charles Hill, and Noha Elarief. 2016. Finding gender inclusiveness software issues with GenderMag: A field investigation. *ACM CHI Conf. Human Factors in Computing Systems*. 2586-2598. Doi10.1145/2858036.2858274.
- [3] Margaret Burnett, Simone Stumpf, Jamie Macbeth, Stephann Makri, Laura Beckwith, Irwin Kwan, Anicia Peters, and William Jernigan. 2016. GenderMag: A method for evaluating software's gender inclusiveness. *Interacting with Computers*, 28(6), 760-787. DOI 10.1093/iwc/iwv046
- [4] Sally J. Cunningham, Annika Hinze, and David Nicols. 2016. Supporting gender-neutral digital library creation A case study using the GenderMag Toolkit. *Knowledge, Information, and Data in An Open Access Society*, vol. 10075, pp. 45-50, 2016.
- [5] Christopher Mendez, Hema Susmita Padala, Zoe Steine-Hanson, Claudia Hilderbrand, Amber Horvath, Charles Hill, Logan Simpson, Nupoor Patil, Anita Sarma, and Margaret Burnett. 2018. Open Source barriers to entry, revisited: A sociotechnical perspective. *ACM/IEEE ICSE 2018*, 1004-1015.
- [6] Alannah Oleson, Christopher Mendez, Zoe Steine-Hanson, Claudia Hilderbrand, Christopher Perdriau, Margaret Burnett and Andrew J. Ko. 2018. Pedagogical Content Knowledge for teaching inclusive design. *ACM ICER '18: 2018 International Computing Education Research Conf.*, Espoo, Finland. 9 pages. <https://doi.org/10.1145/3230977.3230998>
- [7] Arun Shekhar and Nicola Marsden. 2018. Cognitive Walkthrough of a learning management system with gendered personas. *4th Gender & IT Conference (GenderIT'18)*, 191-198. doi:10.1145/3196839.3196869.
- [8] Lee Shulman. 1987. Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review* 57, 1 (1987) 1-23. <https://doi.org/10.17763/haer.57.1.j463w79r56455411>
- [9] Mihaela Vorvoreanu, Lingyi Zhang, Yun-Han Huang, Claudia Hilderbrand, Zoe Steine-Hanson, Margaret Burnett. 2019. From gender biases to gender-inclusive design: An empirical investigation. *ACM CHI Conference on Human Factors in Computing Systems Proceedings (CHI 2019)*, May 4-9, 2019, Glasgow, Scotland, UK. Paper 53, 14 pages. <https://doi.org/10.1145/3290605.3300283>