Supporting Women in Computing through Regional Conferences

Prof. Alka R Harriger, Purdue University, West Lafayette

Alka Harriger joined the faculty of the Computer and Information Technology Department (CIT) in 1982 and is currently a Professor of CIT. For the majority of that time, she has been actively involved in teaching software development courses. From 2008-2014, she led the NSF-ITEST funded SPIRIT (Surprising Possibilities Imagined and Realized through Information Technology) project. Since October 2013, she has been co-leading with Prof. Brad Harriger the NSF-ITEST funded TECHFIT (Teaching Engineering Concepts to Harness Future Innovators and Technologists) project. Professor Harriger's current interests include application development, outreach to K-12 to interest more students to pursue computing careers, applying IT skills to innovating fitness tools, and wearable computing.

Dr. Gloria Childress Townsend, DePauw University

Gloria Townsend, Professor of Computer Science, has taught at DePauw University for thirty-four years. She was the PI for both NSF-BPC project, the Grace Hopper Regional Consortium, and NSF-S-STEM project, Julian Scholars. Gloria is a member of ACM-W's Women's Council, where she founded the concept of small celebrations for women in computing and where she now serves as project leader for ACM-W Student Chapters. Her research interests include evolutionary computation and gender issues in computing.

Dr. Dawn Laux, Purdue University

Dawn Laux is a Clinical Assistant Professor in the Department of Computer and Information Technology (CIT) at Purdue University. She has been with the University since 2007 and is responsible for teaching database fundamentals courses and introductory technology courses. Dawn has 10 years of industrial experience in the information technology field, and her research area of interest includes technology readiness, the social impacts of technology, and increasing interest in the field of computing.

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Abstract:

The Grace Hopper Celebration of Women in Computing is an annual, international meeting designed to provide support and inspiration to women to pursue and stay in computing careers. This week-long conference provides attendees with access to many technical and non-technical presentations, nightly fun activities, many mentoring opportunities, and a plethora of industry recruiters hoping to hire talented female students and professionals. Unfortunately, the cost and length of time of the event is prohibitive for many students. Fortunately, there are many smaller versions of the celebration events at the regional level.

The Indiana Celebration of Women in Computing (InWIC) began in 2004 as a way of offering the Grace Hopper Conference experience without impeding on students' desire to attend classes and reducing costs to make it affordable to larger groups of students. In the past, the venue for this event, which occurred every two years, was an inn at a state park, which provided a quiet and relaxing setting for networking, mentoring, learning, presenting, and having fun. Beginning with 2015, this regional conference will become an annual event in a more central location that is closer to an international airport to be more accessible to more students in the region as well as be more conveniently located for industry sponsors who recruit at the event. This paper and presentation will share the event's general program as well as participant feedback collected at the 2014 InWIC meeting, which demonstrate that the event has been successful in reinforcing the decision of pursuing a computing career path by young female computing students.

Background

According to the US Bureau of Labor Statistics, the Information Technology (IT) sector is expected to add almost 1.2 million jobs by 2022, but the number of computing college graduates will cover less than 40% of these openings.[7] Although women earned more than half the college degrees awarded in 2012, less than 20% of those degrees were in the computer and information sciences disciplines.[7] By reducing the gender gap in computing, the IT worker shortage can also be reduced.

The National Center for Women in Computing (NCWIT) created the Pacesetters program as a fast-track approach for addressing the gender gap in computing. The strategy recommendations from the Pacesetters program are[8]:

1. Improve the first course experience
2. Create community and visibility
3. In reach (recruit women from within your organization)
4. Support and draw on female talent pools
5. Influence the influencers
6. Tap new pools of talent

CIO magazine suggests the following six approaches for recruiting and retaining women in IT[6]:

1. Provide paid parental leave for both men and women
2. Highlight the flexibility available at your organization

3. Reward women in the same way as men (equal pay)
4. Include female leadership in the organization (as role models)
5. Encourage girls early to consider IT
6. Create a strategy to diversify

There are other similar guidelines available, but from reviewing the preceding recommendations, it is clear that building a sense of community, providing positive (female) role models, and enabling mentoring, all contribute to helping reduce the IT gender gap. Events such as the Grace Hopper Celebration of Women in Computing are designed to accomplish these goals.[4] Unfortunately, not all female computing students are able to take advantage of attending a Grace Hopper Conference (GHC) due to high costs and/or concern over missing too many of their classes. Nonetheless, those who attend GHC often return to their college programs rejuvenated and more confident about succeeding in computing.

The Indiana Celebration of Women in Computing (InWIC) began in 2004 as a way of offering the GHC experience without impeding on students' desire to attend classes and reducing costs to make it more affordable. The success of the Indiana regional event spurred more celebration events to be offered across various regions of America and in several countries.[2] For anyone interested in organizing their own Celebration event, NCWIT offers a resource to guide organizers every step of the way.[9]

Organization of Past InWICs

Regional Celebration events involve considerable planning by volunteers. Because the goal is to enable as many female students to attend as possible, the costs are minimal. For locations with a student chapter of the ACM-W, The Association for Computing Machinery (ACM) Council on Women in Computing[1], members help with the planning and implementation of the event.

Many businesses who are interested in hiring female students with computing experience have an opportunity to serve as a sponsor. The cost of sponsorship, depending upon the level of support, may include one or more complimentary registrations for company representatives, a number of scholarships for students to defray most of their costs of attending the regional event, recognition of their support on various media, and invitations to be a presenter of select program sessions.

A career fair is a popular activity at the event, and it offers benefits to everyone in attendance:

1. Businesses are able to introduce themselves to and interview female students with computing skills.
2. Female students can seek out internships, fulltime jobs, and even possible mentors.
3. Event organizers acquire funds (through the sponsorship fees) to make the event cost-effective for the students.

The organization of past InWIC events included the following sessions:

- Poster sessions and lightning talks in which selected students present their research, special projects, survival tips, solutions for unique challenges faced (such as first person in family to attend college, ideas for paying for college, work(study)-life balance, etc.)

- Two keynote speakers, generally one from academia and one from industry, who share their background, challenges along the way, reasons they love IT, etc.
- Panel sessions that include more recent female IT hires who share what their days are like working in IT, how they find time for fun, etc.
- A hands-on evening activity to encourage networking, building community, and seeing examples of IT used to create useful, unexpected, fun products.
- A special meeting for underrepresented minorities to get mentoring advice from keynote presenters.

In the past, the InWIC meetings happened once every two years. Feedback from some sponsors and student attendees prompted a change to the timetable to make InWIC an annual event.

Impact on Attendees

The InWIC 2014 conference organizers constructed an anonymous two-page survey on the last sheet of the printed program that all participants received. Attendees were asked to tear out the page and complete both sides of the survey and place it in the survey envelope. Of the 104 registered InWIC attendees, fifty returned their completed surveys, which is a response rate of nearly 50%.

The survey was constructed using some duplicate survey items from both the 2013 Grace Hopper Celebration (GHC) survey[11] and the survey developed by Rockman et al[10] for a 2009-2012 National Science Foundation (NSF) grant assessment project (BPC-A: Collaborative Research proposal 0940595), where surveying of numerous Celebrations' attendees occurred. By using the same survey items for the InWIC 2014 assessment, a comparison between the regional event (Indiana) and (inter)national event (GHC) is possible.

First, the 2014 InWIC survey results will be shared. Second, the InWIC survey results will be compared with the NSF project's results. Finally, the InWIC and GHC survey results will be compared.

Table 1 contains a subset of the forty-item survey. A five-point Likert scale was used with response choices: "strongly agree", "agree", "undecided", "disagree", and "strongly agree". The Participant Rating column reflects the percentage of respondents who checked either "agree" or "strongly agree."

The preceding survey results show that the majority of respondents felt that InWIC components were valuable or changed their lives in valuable ways. Remarkably, five of the survey items were given positive marks by every respondent. Only five of the line items received scores in the seventy or eighty percent range. The remaining questions lie at the ninety percent level. Pairing the preceding positive response rates with the high survey response rate supports the claim that the Celebration was successful and deserves emulation by additional regional areas seeking to increase the participation of women in computing.

Table 1: Positive response rates for InWIC 2014

Question	Participant Rating
1. I plan to complete/have completed a computing/related degree.	98%
2. Attending InWIC increased my commitment to complete my current degree program.	93%
3. Attending InWIC helped me see myself as a "computing person."	88%
4. Attending InWIC positively impacted my professional development.	94%
5. Attending InWIC made me feel part of a community of women in computing.	94%
6. Attending InWIC fed my interest in a computing career.	91%
7. Attending InWIC inspired me to emulate the successful women I saw at the conference.	98%
8. Attending InWIC increased my network of technical women.	86%
9. Attending InWIC motivated me to stay in touch with people I met at the conference.	77%
10. Attending InWIC gave me tools to be successful in my career as a technologist.	74%
11. Attending InWIC provided me with valuable opportunities to participate in mentoring (either as a mentee or mentor.)	71%
12. Attending InWIC taught me about career opportunities at sponsor companies.	100%
13. Networking opportunities were valuable.	96%
14. Access to potential mentors was valuable.	94%
15. The professional development opportunities were valuable.	91%
16. The range and type of topics covered was valuable.	96%
17. A Day in the Life panel session was valuable.	100%
18. The graduate poster sessions were valuable.	77%
19. The opportunity to meet all corporate sponsors was valuable.	91%
20. The late-night fun activity was valuable.	93%
21. The Get Fit and Learn Dance session was valuable.	91%
22. The first lightning talk sessions at 9 am were valuable.	97%
23. The second lightning talk sessions at 10:15 am were valuable.	94%
24. The session on being an underrepresented minority was valuable.	100%
25. The undergraduate poster sessions were valuable.	100%
26. The graduate school panel session was valuable.	100%
27. The career fair was valuable.	93%

As remarkable as the respondent rates contained in Table 1 appear to be, when identical survey items are compared with those contained in the NSF-funded project mentioned earlier, the results gain more importance. The main facet of the project (The Grace Hopper Consortium) funded twelve new Celebrations that joined four established Celebrations, with InWIC being the inaugural Celebration in 2004. The premier professional organization of computer science, the Association for Computing Machinery (ACM)[5] created ACM-W. ACM-W maintains several projects that recruit, retain, and celebrate women in computing, and Celebrations are one of these projects.

Table 2 below contains InWIC survey items paired with the NSF project survey items (in bold), and the response ratings follow in columns two and three. The NSF on-line responses were collected anonymously from 542 Celebration attendees in 2012 attending Celebrations in Indiana, the Carolinas, Minnesota, Kentucky, Virginia, Southern California, Minnesota, Louisville/Cincinnati, and Missouri/Iowa/Nebraska/Kansas with a response rate of 64%. In every case, the InWIC positive response rates exceed those of the composite group of 2012 Celebrations.

Table2: Positive response rates for NSF grant 0940595

Question	Participant Rating NSF	Participant Rating InWIC
1. Attending InWIC increased my commitment to complete my current degree program. **The conference increased my commitment to a technology career.**	82%	93%
2. Attending InWIC made me feel part of a community of women in computing. **Attending the Celebration made me feel part of a community of technical women.**	88%	94%
3. Attending InWIC fed my interest in a computing career. **Attending the Celebration made me feel more confident/ energetic about my career.**	86%	91%
4. Attending InWIC inspired me to emulate the successful women I saw at the conference. **I felt inspired by the role models I saw at the Celebration.**	92%	98%
5. Attending InWIC increased my network of technical women. **I expanded my network of technical women.**	70%	86%

Finally, Table 3 shows the 2014 InWIC survey responses compared to the 2013 GHC responses[11], collected from a conference held four months prior to InWIC 2014. Once again, not all survey items are identical, only similar, so we provide the GHC survey items in bold font for comparison purposes.

The GHC survey had a 37% response rate with 1757 attendees filling out the anonymous on-line survey. Item 3 in Table 3 indicates little difference between the response rates of InWIC and GHC attendees. InWIC strives to invite keynote speakers comparable to those who speak at GHC, so the similar ratings for "role models" from both survey groups are reasonable. The fact that the remaining three ratings are ten to twenty percent points higher for InWIC is very encouraging in terms of the benefits of a regional Celebration event for attendees.

The authors speculate that the smaller, more intimate setting for InWIC pays big dividends. There were 4,758 attendees at 2013 GHC but only 104 attendees at 2014 InWIC. Additionally, it is likely that InWIC survey respondents felt that they increased their network sizes at a rate of 86%, compared to GHC's 67%, because many new network members were local to the attendee's

schools or lived within driving distance to them. Likewise, the feeling of community would be greatly enhanced by attending InWIC with students living within driving distance of each other.

Table 3: Positive response rates for GHC 2013

Question	Participant Rating GHC	Participant Rating InWIC
1. Attending InWIC increased my commitment to complete my current degree program. **GHC increased my commitment to complete my current degree program.**	71%	93%
2. Attending InWIC made me feel part of a community of women in computing. **I feel less isolated as a woman in technology.**	83%	94%
3. Attending InWIC inspired me to emulate the successful women I saw at the conference. **I felt inspired by the role models I saw at the Celebration.**	95%	98%
4. Attending InWIC increased my network of technical women. **GHC significantly expanded my network and provided me with opportunities to be mentored.**	67%	86%

The final discussion item in Table 3 relates to commitment to completing one's degree. Why would the InWIC rate be twenty points higher than the GHC rate? Perhaps attending InWIC with larger numbers of fellow students and local faculty members in an informal setting made women realize that they have allies who want to help them, and that, when they are in future classes, they need only look around the room to see women who can support them. Prior to attending InWIC, the same women may have seen mostly male students, contributing to their feelings of isolation.

Whatever the reasons for the differences in ratings between InWIC and GHC, it is important to point out that GHC receives a great deal of attention in the literature. As one example only, the Communications of the ACM recently published an important article about the likelihood of women in introductory computer science classes to enroll in the second computer science class, after attending GHC.[3] Previous to this paper, only two papers[12, 13] have compared Celebration survey results to GHC survey results, showcasing the excellent survey rates of Celebrations.

These three new kinds of papers help provide evidence of the worthwhile nature of Celebrations, compared to the more well-known GHC – significant because Celebrations have many benefits.

Future InWIC Plans

A plan for continuous improvement is essential for the future of InWIC, and lessons can been learned from previous InWIC events as well as other regional Celebrations across the nation.

Feedback received from InWIC 2014 participants has been used to improve the event. Input was received from both the survey as well as oral comments shared with the InWIC organizers. The feedback sources included students, sponsors, faculty, and professional attendees.

As stated previously, the regional event has evolved into an annual event. The feedback revealed that participants and sponsors alike felt that the two year gap between events was too long. The benefits provided by the conference were considered valuable enough to experience annually. Another change based on feedback involved altering the career fair. Historically it has occurred at the conclusion of the event with little to no time for recruiters to conduct interviews. Both students and sponsors requested more career fair time and space for interviews, which is a clear benefit for students and sponsors alike. Additionally, more emphasis on student interaction has been woven into the program. A session has been added to help students to network with professionals and faculty on topics such as improving resumes, interview tips, new employee lessons learned, graduate school options, successful internship experiences, etc.

Finally, based on a review of company recruitment schedules, beginning in 2015 InWIC will be moving to the fall semester. This move is an attempt to match potential employers with students before all allotted open positions have been filled. The hope is to grow participation in InWIC, just as the Grace Hopper Celebration is increasing in popularity. Not everyone attends the national event, so by improving the regional events, students are provided viable alternatives that deliver equally valuable opportunities for success.

Conclusion

Reducing the gender gap in computing is a goal for universities and businesses alike. Although satisfaction with the program may not equate with success in improved persistence in computing by women, Celebrations events are a recommended way to help current female students in computer-related majors build a sense of community, establish relationships with mentors, increase their network, and find tools to be successful in IT. Celebrations offer many benefits: They are very inexpensive to organize and hold; they are easier to attend due to the shorter schedule and commute time; and attendees are more likely to retain the relationships they build at the conferences.

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