Encouraging Women Participation in Free and Open Source Software Organizations: The GNOME OPW Initiative

Victoria Martínez de la Cruz** and Carlos Iván Chesñevar

Department of Computer Science and Engineering
Universidad Nacional del Sur
Av. Alem 1253, (8000) Bahía Blanca, ARGENTINA
Email: me@vmartinezdelacruz.com, cic@cs.uns.edu.ar

Abstract. Even though the global demand for computing talent is surging, women's representation in the computing profession has steadily declined. This phenomenon is not new and is present worldwide, not being associated with a particular country or culture. The reason of why women tend to avoid computing careers does not have a clear answer yet and is being researched by several organizations, institutions and companies. The GNOME Outreach Program for Women (OPW) internships has been inspired by this fact. Focused on the context of Free and Open Source Software (FOSS) organizations, the GNOME's OPW is performing a great effort for the integration of women in this particular area of CS. This paper analyzes several issues on how can women be encouraged to participate in FOSS organizations, based on the experiences of a former GNOME OPW intern. In addition we discuss the role of different stakeholders (organizations, universities) in improving women participation in FOSS organizations in Argentina.

Keywords: FOSS, Women participation, Computer Science

** The first author is a Licenciate student in Computer Science at the Universidad Nacional del Sur in Bahía Blanca, Argentina

Encouraging Women Participation in Free and Open Source Software Organizations: The GNOME OPW Initiative

Blind for review purposes

No Institute Given

Abstract. Even though the global demand for computing talent is surging, women's representation in the computing profession has steadily declined. This phenomenon is not new and is present worldwide, not being associated with a particular country or culture. The reason of why women tend to avoid computing careers does not have a clear answer yet and is being researched by several organizations, institutions and companies. The GNOME Outreach Program for Women (OPW) internships has been inspired by this fact. Focused on the context of Free and Open Source Software (FOSS) organizations, the GNOME's OPW is performing a great effort for the integration of women in this particular area of CS. This paper analyzes several issues on how can women be encouraged to participate in FOSS organizations, based on the experiences of a former GNOME OPW intern. In addition we discuss the role of different stakeholders (organizations, universities) in improving women participation in FOSS organizations in Argentina.

Keywords: FOSS, Women participation, Computer Science

1 Introduction and motivations

The analysis of gender differences in Computer Science is not a new topic [4], even though the impact of such particularities has deserved recently a special interest in the literature [10, 6, 9]. As the authors point out in [10], computing innovation is (and has been) at the heart of major advances in several important sectors like education or healthcare. In order to achieve breakthroughs, computer engineers and scientists must approach problems from different perspectives. For this group diversity in multiple dimensions can have a bigger impact than the isolated competences of individuals [8]. The global demand for computing talent is growing in the 21st century, requesting the participation of both male and female professionals. However, women's representation in CS-related professions has steadily declined in the recent years; according to [10], the proportion of females in the US earning CS master's degrees fell from 34% in 2000 to 27% in 2009, while the share of women earning doctoral degrees maintained at 22%. For the case of females in the US earning undergraduate degrees, the proportion went from 37% in 1985 to 18% in 2009. This phenomenon is not new, and is

present worldwide, not being associated with a particular country or culture. In the case of Argentina, Santiago Ceria[1], pointed out that in the '70s the number of women who got a degree in Computer Science from the University of Buenos Aires was around 60%, whereas it has dropped down to 13% nowadays [3]. In general terms, it can be said that the question of why women tend to avoid computing careers does not have a clear answer yet, and is being researched by several organizations, institutions and companies around the world as this represents lost opportunities for innovation given by the shrinking pipeline of women interested in computer sciences. Within the latter, the development of Free and Open Source Software (FOSS) plays a major role in which the above problems are also to be considered. As a response to this situation, the GNOME OPW internships are performing an important effort for the integration of women in this field. This paper analyzes several issues on how can women be encouraged to participate in FOSS organizations and initatives, based on the experiences of a former GNOME OPW intern.[2] We discuss as well some organizational aspects and policies associated with different stakeholders (organizations, universities) which could help improving women participation in FOSS in general and in Argentina in particular. The rest of this paper is structured as follows. In Section 2 we highlight the main organizative aspects of the GNOME Outreach Program for Women (OPW). Then, in Section 3 we discuss some of the personal experiences of the first author of the paper, who participated as a GNOME OPW intern in 2012-2013. We provide a first-person report, in which expectations, fears and outcomes of the GNOME OPW internship experience are discussed and contrasted. Section 4 analyzes some open questions and challenges associated with how can women be encouraged to have a more representative participation in FOSS-related initiatives. In the light of the GNOME OPW experience, we provide also some guidelines and considerations that could be helpful for further promoting women participation in FOSS at universities, software organizations and companies. Section 5 discusses related work, and Section 6 presents the conclusions and discusses some possible actions for the future.

2   GNOME Outreach Program for Women internships

The GNOME Foundation[3] is a non-profit organization based in Cambridge, Massachusetts (USA), coordinating the efforts associated with the GNOME project. The GNOME Project was started in 1997 with the aim of producing a free (as in freedom) desktop environment, aiming to create a computing platform for use by the general public that is completely free software Nowadays GNOME is a popular desktop environment for GNU/Linux and UNIX-type operating systems used by millions of people around the world. The GNOME Foundation was founded in 2000 by Compaq, Eazel, Helix Code, IBM, Red Hat, Sun Microsystems and VA Linux Systems. The Foundation acts as an official voice for the GNOME project

---

[1] Executive Director of the Sadosky Foundation

[2] First author of this paper.

[3] http://www.gnome.org/foundation/

and it is also involved in the production of educational materials and documentation to help the public learn about GNOME software. In addition, it may represent GNOME at relevant conferences sponsored by others, helping to create technical standards for the project and promoting the use and development of GNOME software. The idea of having a special internship program for women was inspired in many ways by the low number of women participating in Google Summer of Code,[4] and by the fact that this was also a reflection of a generally low number of women participating in the FOSS development. The GNOME Foundation first started the internships program with one round in 2006, and then resumed the effort in 2010 with rounds organized every half a year. At the beginning only GNOME was taking interns for different projects, but since 2012 many other FOSS organizations joined the program including Deltacloud, Fedora, Debian, JBoss, Mozilla, Open Technology Institute, OpenITP, OpenStack, Subversion, Wikimedia, The Linux Foundation, Tor, among others. The organizations diversity gave the applicants the opportunity to choose the project that best suits their interests and also enabled the organizations to experiment and analyze the impact of having interns working with them. More than 75 women from around the world had their chance to get involved in FOSS projects and nowadays are regular contributors. As a result, some of them also got jobs in companies supporting FOSS. Knowing how to code is not mandatory in order to apply for an OPW internship. There are many different ways to contribute to FOSS besides software development, comprehending system administration, user interface design, graphic design, documentation, community management, marketing, identifying issues and reporting bugs, helping users, event organization, and translations. The collaborative application process is simple but effective and has been the basis of the program since its first round. Applicants have to make a small contribution to the project they are applying to work with the help from their mentors, and fill an application letter with some background information. This initial contribution allows applicants taste how is to contribute to an open source organization, creates an special bond that keeps them in the loop whether or not they are selected for the current round and shows if they have both passion and skills needed to work on their chosen projects. The internship is expected to be a full-time effort, meaning that the participants must be able to spend 40 hours a week on their projects, and is intended to last for 3 months. Interns do not need to relocate, as they can work remotely from home, and are asked to write about their work and their experiences in a personal blog. The latter helps creating an interesting database of knowledge and feelings related to the OPW and with the work in FOSS organizations, useful for future interns and people interested in women in CS.

---

[4] `http://www.google-melange.com/gsoc/homepage/google/gsoc2013`

3   Experiences from a former GNOME OPW intern

In this section we will provide a brief account of the experiences of the first author[5] of this paper.

I heard about the Outreach Program for Women internships through a technology blog and instantly knew that I wanted to be part of it. Well-known personalities from the open source world were going to be present, and the idea of working with people from across the globe and with great experience to share was incredibly tempting. I applied for both GNOME and OpenStack, and when the time came I chose OpenStack. OpenStack is a cloud computing project that is free open-source software, launched jointly by Rackspace Hosting and NASA in July 2010. Its mission is to provide a flexible and portable solution for both public and private clouds of any size. Cloud computing was a topic totally unknown for me, so it was a big challenge. Little by little, with the help of my mentor and fellow interns, I started to learn the basics and I became part of the OpenStack community. In my experience, one of the biggests fears of a newcomer is to do something wrong, e.g. by making a system crash or providing a defective solution. This is even harder if there is no one to count on and to ask for help when the first blockers appear. In my opinion, the OPW internships make a huge difference by asking the participating organizations to provide mentors, and working on improving the mentorship features[6]. In every round coordinators ask for feedback in order to get better (if possible) for the next round. It also worths mentioning that the whole community was aware of our presence. Community managers introduced the new group of interns to everyone in our first week at OpenStack[7]. That way everyone knew our background and, in spite of having a tight schedule, they were willing to guide us and to make us feel comfortable. During the internship I could learn about different issues concerning the FOSS development environment. That involved not only the actual code and the functionalities provided by the software, but everything related to the workflow of the community. I could experience the crucial parts of the developing process, from the ideas brainstorming to the release date, and I could see how things are done in such massive coding projects. I have also been part in every day duties as housekeeping, bug triaging, bug fixing and reviewing. All this process of learning evolution was shared in my personal blog as

---

[5] Licentiate student in the 4th year of a CS career in Bahía Blanca, Argentina

[6] Mena-Quintero, F. (2008, March 25). Summer of Code Mentoring HOWTO. GNOME. Retrieved May 16, 2013, from http://people.gnome.org/ federico/docs/summer-of-code-mentoring-howto/index.html

[7] Maffulli, S. (2013, January 25). The OpenStack Blog. OpenStack Community Weekly Newsletter (Jan 18 - 25). Retrieved May 15, 2013, from http://www.openstack.org/blog/2013/01/openstack-community-weekly-newsletter-jan-18-25/

part of the OPW internships requirements. Near the end of the internship I was already an active part of the community, and that was the most encouraging sensation. I was already involved with important coding projects, I was starting some initiatives[8] and we were getting ready for the OpenStack Summit 2013 in Portland, Oregon[9]. The Summit was the perfect closing for the experience. We could meet personally with everyone we had worked with for the past months, we joined the design sessions for the future release and we also presented our experiences as first interns for OpenStack[10] Nowadays I am still an active contributor on OpenStack, accepting new challenges and learning about new topics every day. I am glad to affirm that the GNOME OPW internship was a really enriching personal and profesional experience. Some of the aspects I would like to highlight about GNOME OPW are the following:

- Having a community to count on and a personal mentor to follow is important for every newcomer, no matter whether male or female.
- Communication in FOSS organizations is highly valued. The organization of GNOME OPW aims to provide a friendly communication environment.
- Being able to perform different tasks for the same project helps to maintain the motivation.
- Writing about my work, tips and tricks, experience and thoughts in my personal blog allowed me to meet many people interested in the same topic as myself and opened a completely different range of opportunities.

It must be remarked that in their last calls the GNOME OPW has attracted several motivated and talented applicants. Many of the interns involved could have their work included in the software releases with some of them completing major features during their internships. Also, of the 45 GNOME interns who completed the program before 2013, more than half of them continue to be involved in the GNOME community, and 6 have become mentors for other interns. In the last round, the program has expanded to include 25 interns working with 10 FOSS organizations and it continues to grow.

4 Challenges and open questions about women and FOSS

As stated in Section 1, women are under-represented in FOSS development even as compared with the number of women studying Computer Science in colleges around the world and with the number of women employed in proprietary software development. The GNOME OPW program provides a highly collaborative

---

[8] BLANK for blind review

[9] OpenStack Summit Portland 2013. (2013, January 2). OpenStack. Retrieved May 15, 2013, from `http://www.openstack.org/summit/portland-2013/`

[10] BLANK for blind review

environment where women can get help working on their contributions and opportunities to dedicate a full-time effort to learning and contributing to FOSS. As it stands, the program also provides assistance to women for finding mentors to help them with their projects. By participating in the program women develop a good understanding of the power of FOSS and skills necessary to continue contributing to it. In the above setting some interesting issues to discuss arise, such as: a) Why should we have special focus on women and open source software intiatives? Which are the differences with men as far as successful developments is concerned?; b) What makes GNOME OPW internships experience particularly important from a woman perspective? Why is it "woman oriented"?; and c) Why contributing to a FOSS organization is a great way to learn and get more experience? As pointed out by Justin James in his TechRepublic article[11], there are several theories about *why not many women are involved in IT*. In particular, some FOSS-specific reasons are mentioned specially on the basis that only **1.5%** of FOSS developers are women. Some of the possible hypothesis that could apply are:

– The FOSS community is hostile to women and discourages their participation.
– Women developers are not attracted to the typical FOSS project.
– The companies that typically pay developers to contribute to FOSS also happen to not hire many women. This is doubtful, considering that a company of the size of IBM would have a hard time being a discriminator employer on that scale.
– Female developers do not do the kind of work that FOSS project require.

Justin James also mentions other issues - reluctance of women to feel part of a geek culture, avoidance of crash & burn projects, cultural reasons and lack of encouragement -, which jointly may hinder women for a better participation in the IT arena. The following quotation, provided by Justin James in his article, suggest an interesting insight with respect to the role of women in IT:

> [...] I believe the problems start in a girlâs early teen years when they are most influenced and I think it comes down to not having enough positive role models, negative pop culture imagery, and not having access to mentors.
> [...] Without positive role models, the problem is self-perpetuating. Girls will not see the opportunities for themselves in technology will not choose careers in technology and therefore there will be fewer role models, and on and on. We are losing out on the pipeline where if you get girls involved early enough in computers and technology, they will have an interest in careers in technology. [...]

---

[11] http://www.techrepublic.com/blog/programming-and-development/
it-gender-gap-where-are-the-female-programmers/2386

Most actually grow up with a negative stereotype about the technology industry and being a geek. They tend to imagine that, computer professionals and those who work heavily in IT live in a solitary and antisocial worlds, which is not a very appealing image for a young girl growing up.

(Nelly Yusupova, the CTO of Webgrrls International)

In our view, the GNOME OWP initiative aims at tackling many of these different problems in an integrated way. As detailed in Section 3, the whole internship experience is designed as to encourage women to interact with peers in a friendly environment, providing dialogue-oriented channels suited to the needs of female professionals.

5   Related work. Discussion

The study of motivation for FOSS developers is clearly an important point when analyzing gender differences in the FOSS community. In [11], the authors aim to create an understanding of what motivates people to participate in FOSS communities. In their proposal they theorize that learning is one of the motivational forces, and the background is given by the learning theory of *Legitimate Peripheral Participation*. This is supported by analyzing the social structure of FOSS communities and the co-evolution between FOSS systems and communities. Different initatives around FOSS and women participation in CS have emerged in the recent years. In this setting, the Ada Initiative [12] is particularly relevant, as it is based on a non-profit organization supporting women in open technology and culture. The goals of this initiative are the education of people of all genders on how to support women in open tech/culture through teaching workshops, writing policies and guides. The Ada Initiative supports the so-called "Allies workshop", oriented to practical ways for support women in their community. Some of the topics covered in the Allies Workshop are how to provide brief and effective responses to sexism and discrimination, and how to use leadership status to support women in a community. It must be stressed that some initiatives[13] are particularly more prone to *femenist* views[14] than others. Under this perspective, a list of distinguished women involved in FOSS projects can be found at `http://geekfeminism.wikia.com/wiki/List_of_women_in_FLOSS`.

The obstacles that face women in the ICT industry in some countries, e.g. in African countries, have also motivated research on government's gender policies [1] suggesting as well government gender policies and offer suggestions on

---

[12] `http://adainitiative.org`

[13] `geekfeminism.org`

[14] Feminism[5] is a collection of movements and ideologies aimed at defining, establishing, and defending equal political, economic, and social rights for women. This includes seeking to establish equal opportunities for women in education and employment.

how to empower women on the use of ICT. In [7], the impact of women shortage in software industry is assessed in the context of Agile Software Development (ASD). According to the author, ASD is founded upon values that challenge such dysfunction in order to build self-organizing, collaborative and highly productive teams. In a significant functioning Agile practice, developers engage each other, product owners and sponsors in a shared concern for quality, predictability and meeting the needs of end users. In this context, agile values and practice can drive changes in the workplace to better attract and retain women software developers.

6   Conclusions. Future work

In this paper we have analyzed different issues on how can women be encouraged to get a better participation in FOSS organizations. As a focus for our analysis we have considered the particular experience of the paper's first author as a former GNOME OPW intern. As discussed, several aspects from the GNOME OPW internship centered at providing a rich experience for women, encouraging them to be part of an open software initiative from different perspectives (code development and assessment, project coordination). The working atmosphere was intended to be dialogue-oriented, providing good and fluent communication with mentors and peers, stimulating as well achievements and accomplishments within the organization. We think that several aspects of the GNOME OPW initiative can be used as a model for similar actions in the Argentinean context. In that respect, there has been considerable effort from some organizations like the Sadosky Foundation,[15], which has promoted a special initiative for research groups in Argentinean universities to better understand the low proportion of females (around 13%) in CS-oriented careers in Argentina.

The development and integration of successful strategies for promoting CS careers for women is indeed a challenge for government and institutions, and many interesting questions still remain open. Removing gender-based barriers in Computer Science in general, and FOSS in particular, is the ultimate goal to be achieved in this complex process.

---

[15] `http://www.fundacionsadosky.org.ar/por-que-disminuye-la-presencia-femenina-en-informatica`

References

1. Johanna Ekua Awotwi and George Owusu. Lack of equal access to icts by women: an e-governance issue. In *Proceedings of the 2nd international conference on Theory and practice of electronic governance*, ICEGOV '08, pages 452–457, New York, NY, USA, 2008. ACM.
2. Tracy Camp, Paul T. Tymann, J. D. Dougherty, and Kris Nagel, editors. *The 44th ACM Technical Symposium on Computer Science Education, SIGCSE '13, Denver, CO, USA, March 6-9, 2013*. ACM, 2013.
3. Telam Agencia de Noticias. `http://www.telam.com.ar/notas/201303/9560-investigaran-la-disminucion-\` `\de-la-presencia-de-mujeres-en-el-ambito-informatico.html`, 2013.
4. Paul de Palma. Why women avoid computer science. *Commun. ACM*, 44(6):27–30, 2001.
5. Merrian Webster Dictionary. Feminism (definition), `http://www.merriam-webster.com/dictionary/feminism`, 2012.
6. Wendy M. DuBow, Ignatios Vakalis, Manuel A. Pérez-Quiñones, and Jason T. Black. Growing female undergraduate enrollments in computer science: some successful approaches. In Camp et al. [2], pages 377–378.
7. Ken H. Judy. Agile values, innovation and the shortage of women software developers. *2013 46th Hawaii International Conference on System Sciences*, 0:5279–5288, 2012.
8. S. Page. *The Difference: How the Power of Diversity Creates Better Groups, Firms, Schools and Societies*. Princeton Univ. Press, 2007.
9. Katie Redmond, Sarah Evans, and Mehran Sahami. A large-scale quantitative study of women in computer science at stanford university. In Camp et al. [2], pages 439–444.
10. Telle Whitney, Denise Gammal, Barbara Gee, Jody Mahoney, and Caroline Simard. Priming the pipeline: Addressing gender-based barriers in computing. *IEEE Computer*, 46(3):30–36, 2013.
11. Yunwen Ye and Kouichi Kishida. Toward an understanding of the motivation of open source software developers. In Lori A. Clarke, Laurie Dillon, and Walter F. Tichy, editors, *ICSE*, pages 419–429. IEEE Computer Society, 2003.