

**EFFECTS OF GENDER SOCIALIZATION ON
FEMALES IN THE OPEN SOURCE COMMUNITY**

Whitney Powell
Appalachian State University

Whitney.Ellis.Powell@gmail.com

EFFECTS OF GENDER SOCIALIZATION ON FEMALES IN THE OPEN SOURCE COMMUNITY

Keywords: Open source, women, computing, technology, IT, gender socialization

ABSTRACT

While women in computer-related fields represent a small group, the number of females in the open source community is even smaller, and the ratio of females to males is becoming increasingly disproportionate. Current statistics and previous research provide a number of reasons why females are being discouraged from entering computing fields—particularly the open source community. My research employs the use of a survey given to a group of 37 females to gather their thoughts regarding open source software and development and what factors may be inhibiting female involvement. The information collected is quantitative data that may explain some of the reasons why females are avoiding or being discouraged by the open source field.

INTRODUCTION

The term “open source community” refers to a large group of individuals committed to the collaborative development and maintenance of Open Source Software (OSS) or Free/Libre Open Source Software (FLOSS). OSS is made available freely to download, alter, and redistribute to the public. The open source community thrives on a culture that is based on inclusion and equality thus being dedicated to providing free software to the public (Holliger, 2007).

As our society becomes increasingly dependent on information communication technologies (ICT), available software is critical to meet the requirements of a globally diverse range of users. Additionally, multiple methods must be employed in order to meet these same

needs. OSS development is just one of those methods, but is quickly becoming the most successful. Inclusion of both males and females is necessary when it comes to a society based on ICTs, because software is gendered in both design and use (Lin, 2005). The absence of female developers, in fact, disadvantages OSS.

Over the years, women activists have been trying to further prove the point that more diversity will lead to better technology. As the development process in the field is constantly growing and changing, more input should create better output.

BACKGROUND

Women who want to pursue a career in the open source community face many obstacles. Between the years 2000 and 2006, the number of women employed in the IT field in positions such as managers, computer scientists/systems analysts, programmers, software engineers, support specialists, database administrators, network/computer systems administrators, and network systems/data communications analysts decreased by 7.7% (Chabrow, 2007). From 2000 until 2005, the percentage of undergraduate females majoring in computer science decreased by 70%. In the Open Source Software (OSS) community, statistics from 2006 show that only 1.5% of all OSS developers are women. “Research suggests that barriers to women’s participation may be deeply embedded (sic) in the culture of OSS” (Holliger, 2007).

One large deterrent for women is that the open source culture creates the impression that its participants have a long history with computers, providing them with the proper knowledge base they need in order to offer valuable contributions. In reality, women do tend to engage themselves with computers later in life than men and at less advanced stages. This action further limits females in an environment that almost entirely emphasizes independent learning. Women who have tried to advance themselves in the development area of OSS often find they are

undervalued simply because they have not been coding since a young age. Rather than being encouraged for becoming active in a stereotypically male-dominated environment, most females face a discriminating environment. This reaction not only turns those females away who make an attempt to enter this realm of computing, but it also facilitates an image that the community is rejecting them over a lack of experience (Fisher et. al, 1999).

The Carnegie Mellon University School of Computer Science, one of the most prominent computer science departments worldwide, successfully increased their female admission rate from 5% to 42% (Fisher et al., 2002). The school recognized that previous programming experience is by no means a requirement for success in a computer science field. In addition, they removed this requirement from their curriculum and created a more flexible first year program for students with a diverse range of prior experience. The increase in female involvement was phenomenal. Results like these demonstrate the value of thinking outside the box and the potential gains for software when women-friendly practices are adopted. This action has perpetuated the feeling that women developers feel less secluded (Krieger et al., 2006).

Another barrier is the “hacker” ethic that is deeply rooted within the open source culture. The hacker ethic is often described as controversial, competitive, and brutal. Some common means of communication for the diverse range of users within open source development include, but are not limited to, Internet Relay Chat (IRC) and online message boards. Most open source companies and software developers provide their source code on their website and offer these mediums of communication to the public in order to receive instant and effective feedback so that they can continuously tweak and improve their product (Holliger, 2007).

It is within these modes of communication that a great deal of controversy is created among contributors. These arguments, and occasionally heated debates, are often referred to as

flame-wars. For the open source veteran, this experience may not be offensive, but for many females entering this area for the first time, it can be daunting and discouraging. This may also be another reason why such a large portion of females are, again, almost immediately discouraged (Holliger, 2007).

There exists a strongly prejudiced mentality within the open source social world. In theory, since there are little to no barriers in gaining access to open source projects and their communities, there should be little to no problem for participants. In spite of this openness, there are still many complaints from female developers regarding the unfriendly atmosphere both online and offline. In addition to verbal and targeted discrimination, more discrete forms of discrimination in open source development are found in the developers' documentation. A common form is the use of "he" rather than "he or she" or "they" (Lin, 2005). While this may or may not be the developers' intent, it still does not offer the welcoming atmosphere most newcomers would desire and often leaves females feeling alienated. This feeling of alienation coupled with the attitude often conveyed by a competitive, male-dominated group has a tendency to discourage women (Lin, 2005).

One of the biggest stereotypes attached to technology-related fields in general is the anti-social aspect of it. Contradictory to proprietary software development, the open source community does not really have its own "face." This is something the open source community is looking to change simply because of the typical stereotype that portrays developers of open source software as pale, anti-social geeks working out of their basement living off of junk food. This stereotype gives the open source community a less than accurate image of what the field is really like and tends to be a deterrent for people who are not already involved within the community, particularly females. It also gives the impression that open source development is

not a collaborative field, which is often a quality females prefer more than men in the workplace (Henson, 2002). People who have participated in open source projects know that this is far from the truth and that open source software development is all about collaborating to make the best products. The problem is software development is as social as one makes it. If a person prefers to sit alone and code, it will be more of an anti-social activity. If someone prefers to work in a truly collaborative environment instead of just participating collectively on a project, sitting with a group of people writing code will be equally or more effective. Sitting in front of a computer all day writing and talking about code is not a requirement of working in the open source community (Fisher et al., 2005). There are times when a situation calls for independence in order to get a job done, but that is true in all professions.

More often than not, people involved in open source software development have been working with computers for a long time. Being a male-dominated field, many of those males started playing with computers when they were very young and were naturally attracted to the machine and figuring it out (Fisher et al., 1999). Computers became a passion for them at an early age. Because of this fact, a lot of females have the perception that in order to be involved in the open source community you have to “dream in code”, read computer books, work with computers as a hobby, and if you are not doing any of those things you do not belong in that department (Fisher et al., 1999). Dreaming in code is the concept where developers who are completely engrossed in their work are unable to stop thinking about it—even in their sleep. While this case is true for some people, it is not necessary for everyone and is not required in order to become a successful contributor in the open source community. For women lacking the same level of passion for the field, they tend to second-guess themselves and confidence becomes an issue. The fact that a person does not spend every waking hour coding, researching,

or learning more about computers does not mean they are not capable of performing at an equal or higher level.

METHODOLOGY

To begin my research, I gathered journal articles, news articles, white papers, and previous research relating to females in technology and open source in particular. I looked for papers specifically targeting the lack of females in this area, and was able to find further resources in previous research.

It was through these references that I found links to organizations explicitly for females in the open source community. Many of these sites provide mailing lists for their organizations. I joined several of them including the SYSTERS mailing list for the Anita Borg Institute for Women and Technology, GNOME Women, LinuxChix, and Fedora Women. These mailing lists provided further insight into the women's realm of open source development. Conversations amongst the mailing list subscribers supplied me with notes from women's open source conferences, seminars, webinars, and events, as well as firsthand accounts from several women's issues in the community regarding gender socialization.

I created a group on Facebook regarding my research to further help me gather participants for my surveys. Next, I created a blog (<http://osfemales.short-stack.net>) to document my research progress using Drupal, an open source content management system. Through this system I was able to link many of the organizations such as the Anita Borg Institute and other groups for women in technology in order to inform my contributors of the nature of the survey. Through Survs.com, I created and distributed a survey to 37 females from 9 different countries. The women surveyed are all involved in computing fields both in and out of the open source

development community. The surveys have resulted in quantitative data in order to support my research.

FINDINGS

In order to properly depict the results, a few generic questions were asked at the beginning of the survey. Of the 37 females who took the survey, 80% said they use open source software on a regular basis. Forty-four percent (44%) of them prefer open source software to proprietary software. As shown in Figure 1, sixty four percent (64%) agreed or strongly agree that they are actively involved in the open source community. Active was defined as bug reporting, development, participating in open source forums, and giving input on open source projects. Eighty percent (not shown in Figure 1) also said they were interested in learning more about open source development.

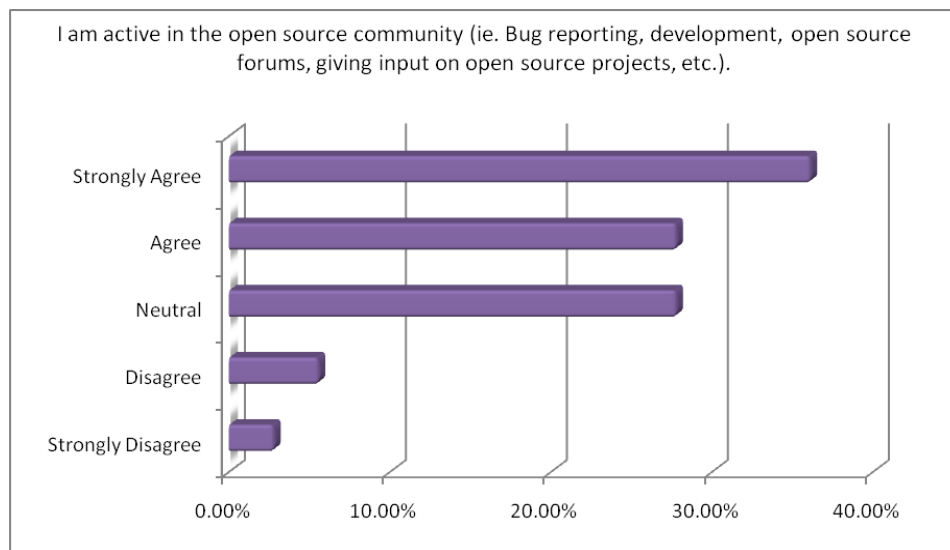


Figure 1

Male to Female Ratio

In order to see if being in a male-dominated field is a contributing factor for women, I asked a number of questions addressing the ratio of males to females and how it influenced their

decision to be a participant in the open source community. When asked if they felt outnumbered or alienated in this field, 72% said they felt outnumbered; however, only 24% said they felt alienated. Fifty-four percent (54%) of those surveyed said they would be more inclined to participate if there were more females involved.

Awareness

Forty-one percent (41%) of the females surveyed said they were unaware of active Linux users' groups (LUGs) at universities. Ninety-two percent (92%) indicated they felt that universities do not do enough to encourage females to participate in computing fields in general. When asked if similar LUGs or groups for females interested in open source and development would interest them, 52% either agreed or strongly agreed. Seventy-five percent (75%) said they knew other females who would be interested in involvement within the open source community. The 37 females who took this survey were from 9 different countries, as displayed in Figure 2.

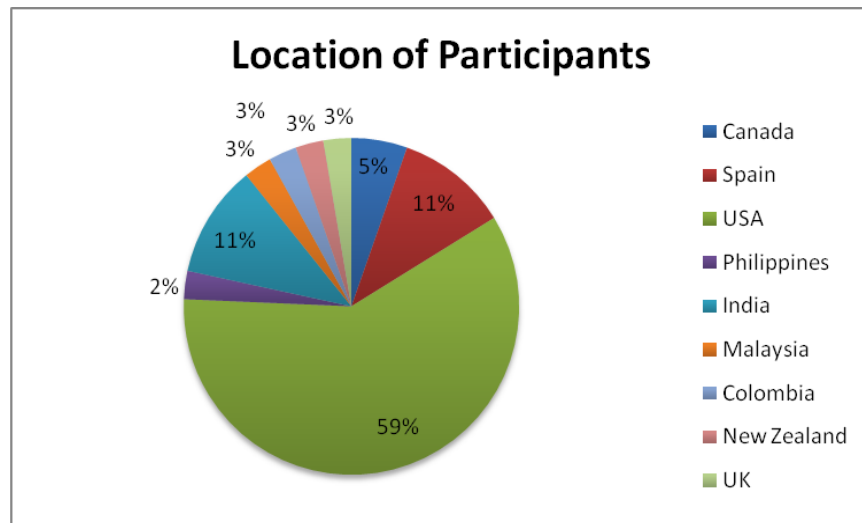


Figure 2

Discrimination & Harassment

Some of the questions on the survey were posed in order to determine whether or not discrimination and harassment were causal factors to the low number of females involved in this

field. As shown in Figure 3, 50% of the women agreed or strongly agreed that they had witnessed gender-based discrimination within the open source community either online, in meetings, or in class. Regardless of that fact, 80% said their interests in open source software and development are not influenced by gender socialization or discrimination. Fifty percent (50%) said they had experienced harassment online or offline, but 38% indicated that harassment is not a deterring factor.

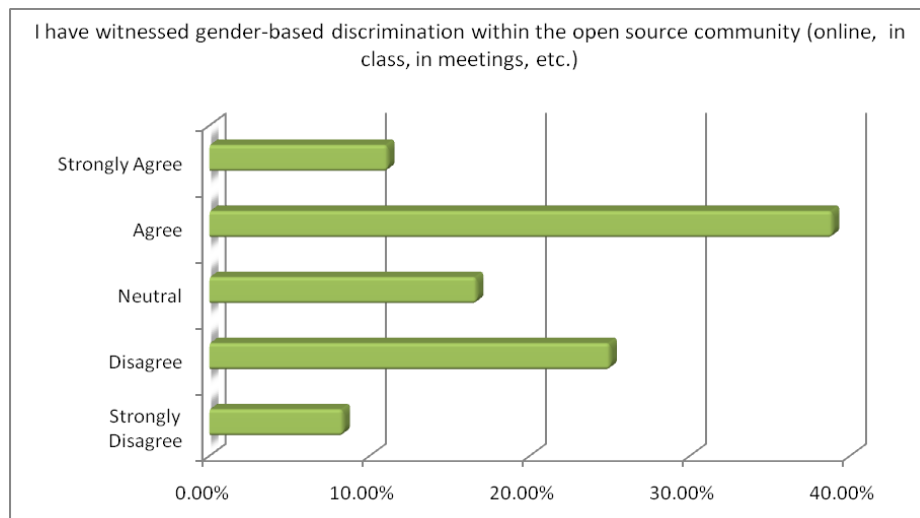


Figure 3

Confidence & Commitment

As shown in Figure 4, 100% of the survey participants agreed or strongly agreed that confidence is an important factor when entering the open source community, and 72% indicated that prior experience with computers is important in becoming successful. Eighty-nine percent (89%) said that they participated in the open source community both at home and at work. Fifty percent (50%) said they agreed with the concept of “dreaming in code” and thought it was applicable to open source development.

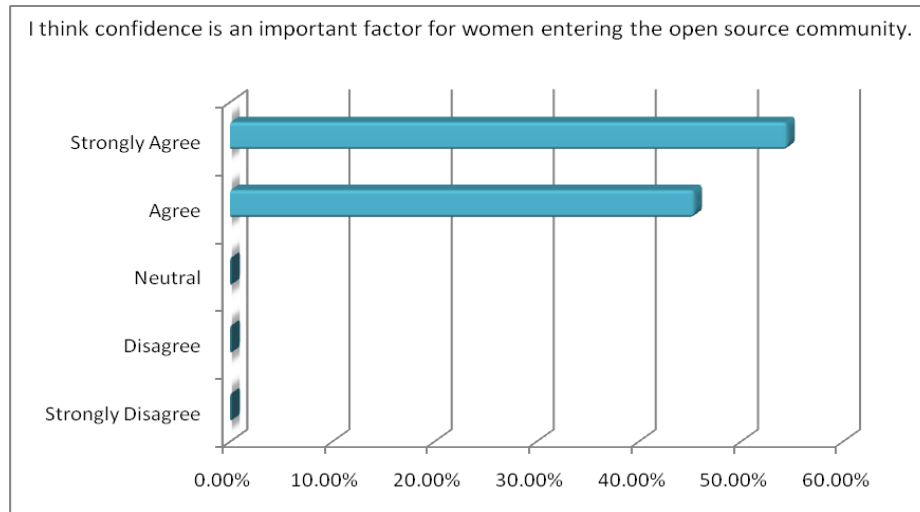


Figure 4

Stereotypes

Seventy-seven percent (77%) of the women surveyed said they prefer open source due to the community and the support it provides. Fifty percent (50%) indicated that they prefer participating in the community within a collaborative environment rather than working independently. As shown in Figure 5, 72% disagreed or strongly disagreed to the stereotype that open source software development is an anti-social field.

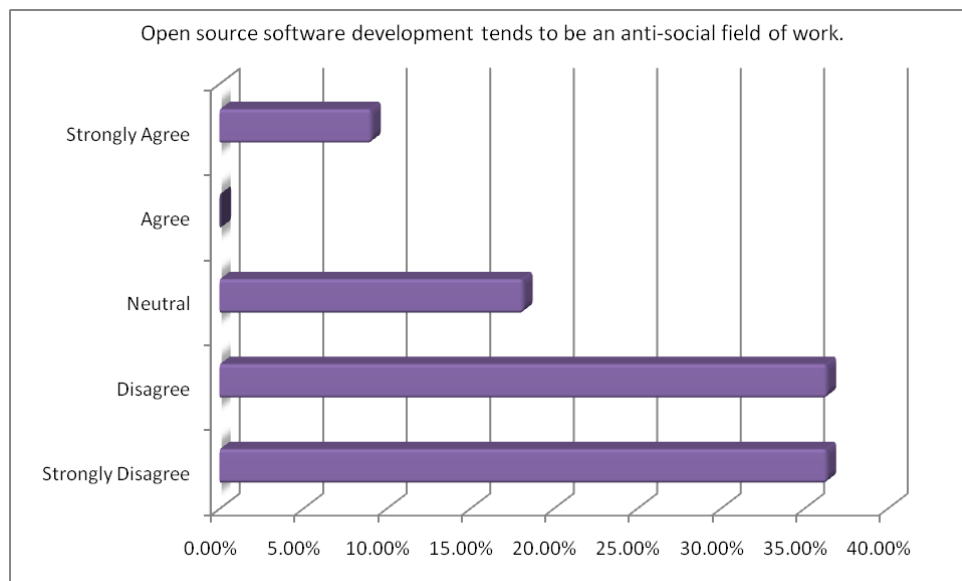


Figure 5

DISCUSSION

Because the females who participated in my survey were already involved in a technology-related field, they have seen firsthand the social aspects, advantages, and disadvantages of being a woman in a male-dominated field. The purpose of my research is to better understand how we can attract more females to this community and retain the ones we attract.

Being in a male-dominated field takes a level of getting used to, although it is not necessarily a deterrent. Seventy-two percent (72%) of the respondents said they felt outnumbered but only 38% said that this caused them to feel alienated. These are women already involved in a computing field. For women outside of the open source community, or any related field, that percentage is most likely higher. Being a female in IT, I know what it feels like walking into classrooms, meetings, and conferences where you can count the number of females on one hand. Like any new experience, the level of comfort will adjust accordingly, but making women feel welcome instead of alienated is a goal worth working towards. The feeling of alienation, while still a relatively low percentage, should be minimized in order to increase female involvement and attract newcomers. As mentioned in the literature review, more input will create better output. According to the survey results, more female involvement will allow the open source community to attract more females as the male to female ratio declines.

Based upon the percentages included in the awareness section of the findings, I am led to believe that many females who may be interested in technology are not given proper knowledge of the opportunities available in order to participate in the open source community. Because 92% said they felt like universities didn't encourage females enough to become involved in computing fields and 41% said they were not even aware Linux users' groups existed, it seems as

though there is not a lot of activism for this community. Females already involved in these types of organizations need to reach out to women they know and encourage them to join. The survey results showed that 75% knew other females who would be interested in becoming involved in the open source community, so where are they? We need to make them realize what is out there. Previous research indicates that females get involved with computers later on in life than males. For many of them, college could simply be the first time they have been exposed to Linux or any other open source software. More publicity and marketing for Linux users' groups in the right places could interest a lot more people, both males and females. Linux users' groups are not in any one place; they exist around the globe.

Discrimination and harassment are not as easy to identify, as there are many varieties of both. While half of all women surveyed said they had witnessed discrimination or harassment within the open source community, the percentage of women affected by it was low. Something as seemingly harmless as ignoring their contributions or pointing out the obvious fact that they are a female are forms of discrimination that occur frequently within the open source community. Harassment usually comes in the form of snide remarks and jokes and is meant to be meaningless; however, newcomers may misinterpret it to be an unwelcoming message instead. Even hearing something along the lines of, "There's a girl here," can be discouraging. It may be a celebratory moment when the ratio begins to decrease, although, pointing it out only creates discomfort. Despite the existence of both discrimination and harassment, the survey results suggest these are things we should not have to worry about as much as attracting female involvement initially. In any ideal work environment, these factors should be kept as low as possible.

Commitment is only going to come from people who are passionate and confident about the input they are giving within the open source community. Women in open source are as passionate about their work as men and some take more pride in their work because they are women. According to the survey results, 89% said they worked on open source projects both at home and at work. This includes taking their work home with them as well as participating within the open source community during their leisure time. Seventy-two percent (72%) agreed that prior experience with computers is a contributing factor in becoming successful, but many also added that because it is not a requirement it allows for new people to enter and learn from the community as well as on their own. Everyone who took the survey agreed that confidence is an important factor. This also applies to entering a male-dominated field and opening themselves to the discrimination and harassment that exists in addition to subjecting their ideas and suggestions to the public for critiquing.

After reviewing the survey results related to social aspects of the open source community, the previously established stereotypes are contradicting. It seems as though there is a general misunderstanding of the nature of the open source community and how it functions. According to the survey, the majority of participants believe that open source software development is not an anti-social field and prefer open source software over proprietary software because of the community and the support it provides. The high percentage of females who prefer to work in a collaborative environment rather than independently suggests that is how they do most of their work as well. The open source community thrives on collaboration because of the superior quality work that stems from it. The suggestion that the open source community is the polar opposite of that is misleading for outsiders.

CONCLUSION

In order to shift the male to female ratio within the open source community, changes will have to be made in an attempt to get more females involved. The biggest issue is promoting awareness and dynamically recruiting more women to become actively engaged. This might include steps as small as encouraging them to submit bug reports for open source software or share their input in open source projects.

Stronger and more diverse marketing of Linux users' groups internationally will also help in recruiting potential contributors as well as promoting more events specifically for females interested in open source development. Events for females in open source will create enthusiasm among a group of females rather than try to convince individuals to participate in a field alone in which they have never been.

In the meantime, emphasis needs to be placed on how to encourage women who are already involved or who are looking to get involved. Specifically, we need to correct the social stereotypes that are associated with open source software development. The open source community needs to show less discrimination and more inclusion in order to tone down the male-dominated atmosphere into something that promotes participation and not strictly individual work.

By taking all of these ideas into consideration, confidence levels will be higher for females who may be hesitant to contribute and the ratio will begin to even out.

WORKS CITED

- Chabrow, E. (2007) Numbers Show Big Decline of Women in IT. CIO Insight, Accessed 24 Nov 2008, <<http://www.cioinsight.com/c/a/Past-News/Numbers-Show-Big-Decline-of-Women-in-IT/>>.
- Fisher, A. and Margolis, J. (2005) Geek Mythology and Attracting Undergraduate Women to Computer Science. Carnegie Mellon University, Accessed 18 February 2009, <<http://www.cs.cmu.edu/afs/cs/project/gendergap/www/papers/wepan97.html>>.
- Fisher, A., Margolis, J., and Miller, F. (1999) Caring About Connections: Gender and Computing. Carnegie Mellon University, Accessed 18 February 2009, <<http://www.cs.cmu.edu/afs/cs/project/gendergap/www/papers/IEEE99.html>>.
- Fisher, A. and Margolis, J. (2002) Unlocking the Clubhouse: Women in Computing. Cambridge, MA: MIT Press, Accessed 15 December 2008, <<http://delivery.acm.org/10.1145/550000/543836/p79-fisher.pdf>>.
- Henson, V. (2002) HOWTO Encourage Women in Linux. The Linux Documentation Project, Accessed 25 Feb 2009, <<http://tldp.org/HOWTO/Encourage-Women-Linux-HOWTO/>>.
- Holliger, A. (2007) The Culture of Open Source Computing. University of Virginia, Accessed 24 Nov 2008, <http://www.ncwit.org/pdf/OpenSourceComputing_Web.pdf>.
- Krieger, B. and Leach, J. (2006) Gender: Integrated Report of Findings. Free/Libre/Open Source Software: Policy Support, Accessed 24 Nov 2008, <http://flosspols.org/deliverables/FLOSSPOLS-D16-Gender_Integrated_Report_of_Findings.pdf>.
- Lin, Y. (2005) Gender Dimensions of Floss Development. Mute Magazine, Accessed 24 Nov 2008, <<http://www.metamute.org/en/node/5596>>.