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Ruth A. Guthrie

*California State University, raguthrie@csupomona.edu*

Louise L. Soe

*California State Polytechnic University - Pomona, llsoe@csupomona.edu*

Elaine Yakura

*Michigan State University, yakura@msu.edu*

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# Support Structures for Women in Information Technology Careers

**Ruth Guthrie**

California State Polytechnic University  
[raguthrie@csupomona.edu](mailto:raguthrie@csupomona.edu)

**Louise Soe**

California State Polytechnic University  
[lsoe@csupomona.edu](mailto:lsoe@csupomona.edu)

**Elaine Yakura**

Michigan State University  
[yakura@msu.edu](mailto:yakura@msu.edu)

## ABSTRACT

This paper examines issues of support for women with Information Technology (IT) careers. Interviews of 38 women with careers in information technology sectors of different industries lasted about 90 minutes and consisted of open-ended questions regarding aspects of their careers and career paths. Research on the lack of women in STEM disciplines focuses mainly on undergraduate education and attracting women to STEM disciplines, focusing on 'filling the pipeline.' This research seeks to understand what it takes to have a successful, satisfying career, especially areas of support for women that may influence their success in IT careers. Knowing this may give women help in planning their careers and navigating a male dominated industry.

## Keywords:

gender, IT profession, women in computing, support, IT careers

## BACKGROUND

This study builds on two previous papers that examined issues of IT culture and pipeline studies to gain insight into why women do not choose careers in IT (Roldan, Soe and Yakura, 2004; Soe and Yakura, 2008). This paper focuses on areas of support for women that may influence their success in IT careers: support from parents and spouses; career enhancers; mentoring; workload; and accommodations made for women.

Literature in many areas shows how different social and policy support structures open the doors for female career success. However, the topic of how to support women at work is complex (Halpern, 2005). If women have flextime, they can work while their children are at school or asleep, and stay at home with sick children. However, often women with a longer workweek, are faced with high-job stress and are passed over for promotions because they are seen as not carrying the same workload as their male counterparts. Family leave, a great benefit to men and women, is often seen as a weakness and liability. Women are reluctant to take advantage of these programs because they fear how they will be perceived at work. Indications are that their fears are well founded. While legally there may be no bias, perceptually there is a stigma associated with leaving your job for your children (Kimmel and Amuendo-Dorantes, 2004).

This paper seeks to explore support issues further for women IT professionals.

## METHODOLOGY

Thirty eight women with IT careers in Southern California were interviewed in this qualitative study. The initial list of women contacts were graduates of the Computer Information Systems and graduate business programs at Cal

Poly Pomona. Using a snowballing technique (Berg 2001) other interviewees from local companies, professional organizations, and LinkedIn were contacted. Women from “extreme” cases (in career longevity, age, organizational level) as well as “typical cases” were selected to achieve “maximal variation in the sample” (Flick, 1998). The resulting sample represents different cultures, different levels in their organizations and different industries (see Table 1).

The interviews were open ended, lasting from 60 to 90 minutes. Women were asked to reflect about several different aspects of their careers, including what types of support they received from family, firms and mentors. Interviews were recorded and then transcribed and coded, using the qualitative data analysis software Atlas-ti 5.0 (Lewins and Silver 2007). Coding was done using top-down and bottom-up (in-vivo) coding (Lewins and Silver 2007). Top-down codes reflected research assumptions covering issues such as cultural references at the societal, occupational, organizational, and workgroup levels, and other recommendations for improving the status of women in IT, such as mentoring and networking. The bottom-up coding looked for recurring themes that evolved during the study. For example, women describing their success as ‘lucky’ and women speaking at length about career satisfaction gained from solving problems for people and working with clients. We then switched to a grounded approach (Strauss & Corbin, 1990), using in-vivo coding to identify to identify cultures and sub-cultures that women described, to differentiate between positive and negative quotations about the same topic, and identify other issues that emerged from the data.

<b>Industry</b>	<b>Education</b>	<b>Ethnicity</b>	<b>Other</b>
Engineering – 20%	BA/BS – 55%	Caucasian – 55%	Average Age – 38yrs
Financial – 15%	MS – 37%	Asian/Pacific Islander/East	US Citizen – 75%
Big 4 or Management	PhD. – 5%	Indian – 32%	
Consulting – 13%	No Degree – 3%	Hispanic – 13%	Women with children – 54%
Education – 10%	Professional Level		
Entertainment – 8%	Professional – 42%		Women with dependents of any kind – 61%
Health – 8%	Managerial – 47%		
IT Products/Services – 3%	Other – 10%		
Insurance – 3%			
Other – 20%			

**Table 1 – Women in IT Study Group Demographics**

**FINDINGS**

Several themes emerged during the interviews. Women shared personal and work experiences, and talked about characteristics in themselves and the profession that made them successful. This paper focuses on elements that supported women’s careers: early encouragement and support from parents, career barriers and enhancers, mentoring, workload, and firm-provided special accommodations for women.

**Support from Parents and Spouses**

During the interviews, women talked about what led them to careers in computing. Several of them were introduced to technology by their fathers, who held technical jobs as engineers or IT professionals. The stories women told about their fathers, as technological advocates for their daughters, were endearing. One woman who was a Project Manager at a University said,

*“I was a little girl and my dad worked for Rockwell making one of the first hand-held calculators. I remember sitting in the back of the car and going “Oh my God, 2 plus 2 always equals 4. it’s right.” I remember being amazed. ... then he gave me a programmable calculator, and I got even more excited. Subj:R14*

.....

*He brought home the first calculator that only had 4 functions. He brought home a digital watch that had a silicon chip in it. We were always on the cutting edge without even knowing it. ... if my mother had lived I probably would not be the same person - my Mother would have said "Oh, girls don't do that." Subj:R14*

One father arranged on-site interviews for his daughter and got her a job as a systems administrator. She was unsure at first, then flourished at the job. One father with four daughters raised them to know they were 'equal to anybody, man or woman'. The influence of mothers was also evident, although to a lesser extent. Women said their mothers told them they could succeed at anything. Foreign-born women talked about obeying their parents and being more passive, but that did not stop their success. An IT audit manager reported her mother's advice:

*"My mom is not like most women you would know, especially from a third world country. This is the only thing she required of me. 'Whatever you do, make sure you have a career. Do not ever rely on anyone, not even your husband. You need to always be able to stand on your own two feet. For, you never know when things are going to go south.'" Subj:R33*

During the interviews, women who mentioned their husbands, said they were supportive and understanding. Women also talked about communicating workload issues to their husbands and using them as sounding boards for what was going on in the office.

*"Luckily my husband is very understanding, so I will say that I am going to be very busy for the next three weeks. I tell him I will be home a little later, and he is OK with that." Subj:R22*

A few women, at high organizational levels, had husbands who stayed at home with their children.

*"Obviously, looking at the percentage of the females who made it to partner, all female partners that I know, all their husbands don't work. Their husbands give up their careers for their spouses to make it to partner." Subj:R34*

**Career Barriers and Enhancers**

In the interview dataset, the categories of career barriers and enhancers are listed in Table 2, by order of frequency.

<p><b>Frequently Cited Career Boosters</b></p>	<p>Be able to solve a client's problem          Understanding politics          Networking          Education          - training opportunities          - cross training          - formal education          Having a boss or sponsor to advocate for you          Teamwork</p>	<p>Change jobs to get lots of experience (like cross training)          Don't take things personally          Understand the business          Seeing the bigger picture          'Having a little extra'          Directly asking for what you want          Make sure people are aware of your work - reputation          Have Confidence          Do favors for people and be gracious</p>
<p><b>Frequently Cited Career Barriers</b></p>	<p>Not 'looking right' to have the job          Unclear how to move up          - too many people at top          - career path is dead end</p>	<p>Keeping current with technology          Family issues          Having to prove yourself          Recognize a bad situation early</p>

**Table 2 Career Barriers and Enhancers**

Women at all levels of work recognized the importance of networking, understanding the politics of the organization, and having a sponsor or boss who would promote and make opportunities for her. Earlier in their

careers, women identified a need for education and for seeing the 'bigger picture' in the projects on which they worked. They also thought women should openly ask for what they want, so their career expectations were clear to their managers. A few women mentioned 'Giving a little extra.' By this, they meant that it was advantageous to do favors, foster good relationships with people, and deliver something extra to the client. A cost analyst at an engineering firm said,

*"But sometimes it can be something that is not officially assigned, but you can deliver more than what they want. If you can show them that you can do something extra, above and beyond what is needed....it's meaningful because it's more interesting than what the job calls for."* Subj:R20

One woman in risk management worked for a woman manager who continually alienated employees in other departments. The interviewee said she had to build bridges behind her manager's back, in order to get information she needed to do an effective job. She didn't believe in "burning her bridges."

*"People in network security knew our perspective but they didn't really care to help us out at times because they didn't want to deal with my boss. I would build relationships with them and they would tell me something was going to happen. It would be a little diamond they were handing me. Then I would have to develop it and then say that I heard that something was happening and that would really start the wheels rolling. But, if I didn't have that relationship with them, they never would have given us the heads-up."* Subj:R15

Women felt teamwork, being able to solve a client's problem, and understanding the business were important career boosters. Several of them felt that doing different jobs within a firm or changing jobs gave them a broader perspective. Sometimes a devastating job loss led to an even better opportunity. They also identified a need for women to display confidence to ensure that the people above them were aware of their capabilities and accomplishments.

Most women gave the advice "Don't take it personally."

*"So, if someone puts your idea down, and I have been in situations where someone says "I think that's ridiculous." To be able to say that you don't agree, but it's your thought and you are putting it out for consideration. Being able to be gracious, even when you are on the line of fire which happens a lot."* Subj:R39

When an organization was too top heavy and had no women executives, or at most a token woman or two, women saw fewer opportunities for promotion. They also identified specific areas that were seen as 'dead ends' or having no clear path to the top. One woman who became the manager of an IT Audit group, recognized that managers of the audit group never advanced to the VP level in the firm.

Women felt the strains of worklife balance. Women who worked in consulting firms often needed to travel for work, and only saw their families on weekends.

*"The bottom line is that if you travel this much, you cannot do it. You have to face reality...It was a choice that I had to make. What is my top priority? Is it the family and the baby? Or is my top priority my consulting work? I chose the family and the child because I strongly believe that one way or another, I would figure out how to do both. But, at the moment, one of them has to be the first, whichever one is the most critical and important at the time"* Subj:R17

One woman manager, with several children including a disabled son, took less pay in a more flexible organization, so she could deal with their emergencies.

*"I can use my project management skills and get everyone on a routine, but that only goes so far, until somebody misses a bus or somebody has a medical emergency or daycare flakes out or whatever happens."* Subj:R14

Women reported having to prove themselves on the job and not 'looking right' for the job. Women who looked young had difficulties being taken seriously.

*"I was with the company for a little over three years there. What I noticed is when I was applying for the job, a lot of people were very skeptical of two things. They're not used to having an IT audit manager who is a woman and I look awfully young for the job." Subj:R33*

*"One of the directors told me, it's so hard to the point that one man tries so hard and fails, they get praise for it, because they tried. But, when we try so hard and fail, it's because we're a women and we don't know what we're doing. I, my first reaction to that comment was that I thought she probably exaggerated. But, dealing with these people long enough, I can see that happening and I can understand why most of these women have the mentality that they have, that they have to prove themselves so hard. Their role is constantly challenged. Their ability to get the job is constantly challenged. And these men are not shy about challenging all these things."Subj:R33*

The woman who made the following observation was not especially young, but she was the lone woman in a "macho" networking group. She worked with the telephone system, which the men viewed as lower status.

*"... even though I had the exact same degree as some of the guys in the networking department, and I did telephony and they did data switches, and I kept up with them in grades, and everything was equal, I was not equal. I presented that to my boss, but he didn't do anything. It might have just been him, but I am quite certain that people above him felt the same way." Subj:R19*

Another barrier was a lack of meaningful work that yielded visible accomplishments and enhanced the woman's reputation. One high-level manager tried to figure out how to build a career as a 'direct generator of revenue,' rather than playing a support role to the business. Work directly related to the business units is higher in status than support or "overhead" work. Several interviewees mentioned that it was better to work in a group that was not part of the IT department. By moving their careers to a higher status position, or moving into an organization where IT is the business focus, women can gain more power and exposure in their careers. One woman advanced when she remained and 'saved the day' when her company was having difficulties, and the people above her left for other jobs.

### **Formal and Informal Mentoring**

Few women worked in organizations with formal mentoring programs. Women from engineering, the Big-4 and the insurance industry said the mentoring programs were ineffective because of lack of interest of the mentor and lack of fit to the mentee's career. At one Big-4 consulting firm, employees got a 'buddy' and a 'performance manager'. If the woman got a performance manager who advocated for her, then she could gain billable project hours. Mentoring of some kind seems to be an essential part of Big-4 culture all the way to the partner level, although mentors are responsible for multiple mentees. Most women at Big-4 firms praised their mentors (often their first managers who continued to help their careers even after they switched managers). One young woman used the opportunity of reviewing her mentor (part of his performance review) to resolve successfully an issue that bothered her. Another young woman described an unfortunate situation in which her mentor ignored her, and then asked her to lie about his performance. She soon left the firm, but she did not "burn any bridges," a phrase commonly heard in these interviews.

The definition of mentor varied. Women found informal mentoring much more successful. Women earlier in their careers identified women as informal mentors. They self-selected women who were leaders in the organization as mentors, referring to the "strong woman" who was a role model. Sometimes their contact with this woman was temporary and short-lived, but the woman inspired them. (Some women also talked about mothers as "strong women" who provided important support to them.) Women who had worked in the IT industry longer identified

mostly men who were their bosses. When a woman had a boss who was an advocate for her, she felt more supported and had better access to opportunities.

*“I didn’t know what kind of management job I would be walking into but when one opened up, he was right there pushing me into it. He promoted me. That’s where things started to move for me. I was put into more high visibility jobs. More exposure, and I got creditability as a result.”*Subj:R18

.....  
*“My ex-manager had about 25 years in the company, so he would help me understand what the agendas were, what the politics were, what the major issues were. It could be easy to take a side and then get caught up in it. Certainly if I wanted to change positions, he was there to advise me. Managing employees, because he had managed people for 20 of the 25 years he was there, and he would help me. That was really valuable to me.”* Subj:R18

Typically, women maintained these relationships throughout their careers, going back to the same informal mentor, even when they no longer worked together.

The interviewees were interested in establishing a formal mentoring program for women undergraduate students, even though they realized formal mentoring programs were not always effective. They felt that a female mentor offered insights that male mentors could not.

*“But the ones I get the most out of are women in leadership positions, because our motivations for leadership are different. Men can work all the hours in the world and be aggressive and women cannot necessarily do that, no matter what their challenges are. The barriers they have are a little higher, to get into those positions. They have to do things differently than the men.”* Subj:R14

### **Workload and Work Accommodations for Women**

Differences in workload were related to industry and professional area in IT. The workplace accommodations for women also varied greatly.

Internal IT auditors tended to work normal workweeks. Managers and women in financial and Big-4 consulting companies worked 60-70 hour workweeks, often traveling. Women with overlong workweeks worried about the effects on their families.

*“It was very tough during the first year of Sarbanes Oxley, very tough, because lots of the middle staff jumped ship. They were seniors but they could get director positions because everybody wanted someone with Sarbanes Oxley experience. So we lost the middle resource, the assistants. When we were out at a job on an audit, it was just me and an intern. Or me and a staff, who had no experience. So not only did you have to stay there and train them and explain things to them, you still had to do your own job, which meant I had to do everything, the senior job, the manager job, because they were not there. It was a very difficult year. That’s part of what drove me to leave. I felt like I was punishing my family.”* Subj:R38

Several women described their hours as cyclic, requiring more hours during certain times of year. Several women said they were ‘workaholics’ and liked to take work home. One woman, a telecommunications manager at a University, indicated,

*“I sit with my laptop on my lap every night and work. Thank God, he (the husband) doesn’t care. We watch a movie together, and I will be working while we watch the movie. I like to multitask. .. I also have an iPhone, so during dinner I was reading resumes because I am on a recruitment committee, which ones I want to call for an interview. I worked like a fool last week. Normally, I like to at least have Sunday off and maybe part of Saturday. If I had to think about it, 12 to 15 hours a day. I get so much email it is insane. To my employees I always write back thanks, so they know I read their email.”* Subj:R19

One woman in the healthcare industry said:

*“My bosses, the old one, and the current one, they don’t believe in watching the hours. They expect you to be professional and do what is necessary to get the work done. So, to the extent I get my work done, I work a 40-hour week. In almost 4 years career ... I can count with my fingers how many times I’ve had to work more than a 40-hour week.”* Subj:R33

Another manager, who had a 25-year career, found that her non-profit healthcare company focused on getting the work done, not on the location or time of day. She managed employees who telecommute. The organization saved office space with this arrangement.

*“One of my direct employees has a child with sickle cell disease. Every three weeks the child goes to the hospital for blood transfusions. I understand how that is. But life goes on. When she told me about that, we sat down and figured out what to do. She is very capable, she is very intelligent, she has a very strong background, she produces very high-quality work. I told her to manage her schedule, that when she needs to go, she should go. It has worked out very well. You know what happens? Every time she takes her daughter to the hospital for a blood transfusion, she sits next to her daughter with her laptop, her air card, her palm pilot, cell phone, still on the conference, still on email, still reachable, and she gets the work done. I told her, to me, I am not going to keep track of where you are. As long as you figure out how you are going to get it done and balance it, we can make it happen.”* Subj:R17

In most other cases, organizations did not have official policies on telecommuting. Accommodations for women, especially those with children, varied widely. Managers decided on telecommuting, through informal agreements with employees, usually those they trusted. Women indicated they were more productive working off-site because they did not have so many interruptions. However, some felt isolated and missed the social interaction. While interviewees were asked about accommodations for promoting women or creating equal opportunity, very few mentioned any programs other than ones required by law, such as family leave.

Women spoke about the benefits of taking disability instead of family leave. A professional woman who worked in the health industry, said

*“When I was on maternity leave, which was twice since I have been here, my boss had to call me once, and he was really upset because he had to call me. I was on disability and I was not supposed to be working. The thing with family leave is that they offer it, but they do not have to guarantee your job. If you are in fear of losing your job, you wouldn’t want to take that. On disability, they have to give you your job back when you come back. But not with family leave. I wasn’t really nervous about leaving, so I was able to take all of that time.”* Subj:R16

*“I have never heard of a man taking family leave (here). When my husband took it, it was when it first became available. Six weeks of it was going to be paid, just like disability.... He had to educate his Human Resources Department about it.”* Subj:R16

A few women mentioned that telecommuting was possible, depending upon your boss. Non-managerial interviewees talked about work as non-accommodating. Generally, if women work from home or start a family, they run the risk of not being promoted or not being seen as serious about their work. Women worried about what impact family might have on their careers and how work might impact their families. One young woman, who had just begun her career at a ‘laid-back’ company stated:

*“Another weakness, well not weakness, but something that is going to hold me back a little is having kids and being intimidated about getting married, and having to have time off. But I think, well, males have to do that do. But I think that being a female, I think companies look down on it. I have been struggling with that, and telling myself that everyone gets married, and everybody has time off when they have a child, so I won’t be discriminated against. I guess I feel guilty about wanting to take that much time off to have a kid so that part is a little in my mind, but I am*



*dealing with it. It is new to me. To be gone from work for 3 months, to take care of a child and then coming back to a workplace, that's a little scary for me. But that could be in any field."* Subj:R37

This sentiment reverberates with that of another, experienced woman:

*"But when I had my daughter, I was a high level manager, about to become a senior manager. I didn't get it that year and I knew why. Because I had just had my baby and I was on maternity. And I felt like I was punished for that. Nobody had told me that I wouldn't be getting it. They were prepping me to get it. I made sure that as soon as my medical leave was over, that I went back to work right away."* Subj:R38

Women who were more established, identified other options that worked for them and seemed to have more flexibility. One company let employees accrue paid time off, although, from the description, employees did not take it unless the company didn't have enough hours and wanted employees to stay home.

One woman in the healthcare industry, a manager of a large department, works two days a week at the company and telecommutes the rest. Another high-level manager commutes between LA and Phoenix, working on-site for three days and from home the rest.

## **CONCLUSIONS**

Support structures help women aspire to and maintain a technology career. Further, the right support can assist women in finding a career that is rewarding and offers opportunities for advancement.

The women interviewed in this study were highly satisfied with their careers and remarkably resilient when talking about their difficulties. The more experienced felt that earlier obstacles and failures prepared them for later success. They were confident that if they were fired or decided to leave, they would find work somewhere else. Overall, they found the IT profession difficult to transition into, because they did not 'know the dance steps'. Once they figured them out, they had satisfying careers. This study uses a grounded theory approach to develop themes for women's success in the IT field. Differences between industries and how women approached their careers are starting to emerge. For example, Big 4 consulting firms, not known for having many women in long-term careers, can be a great training ground for women early their careers. For women seeking more supportive work environments, IT audit as a profession and, healthcare as an industry stood out as being better than other industries. More work is needed to develop greater insight into issues of work, culture and equity. Being able to give undergraduate women these insights may ease the transition from student to professional.

The issue of status is emerging from this dataset. Women often get the task of documentation and are often put in positions of lower status, support roles. Future studies can examine how status impacts job satisfaction, career growth and families. It will also be interesting to examine the IT profession from a male perspective. Ultimately, a warmer climate for women in the IT field may have positive implications for both men and women.

## **REFERENCES**

- Berg, B. (2001) *Qualitative Research Methods for the Social Sciences*. Boston: Allyn and Bacon.
- Halpern, D. F. (2005) How time-flexible work policies can reduce stress, improve health and save money. *Stress and Health*, 21: 157-168.
- Flick, Uwe. (1998) *An Introduction to Qualitative Research*. Thousand Oaks, CA.

Kimmel, J and Amuendo-Dorantes, C. (2004) The Effects of Family Leave on Wages, Employment and the Family Wage Gap: Distributional Implications, *Journal of Law & Policy*, 15, 115, 115-142.

Lewins, A. and Christina Silver, C. (2007) *Using Software in Qualitative Analysis: A Step-by-step guide*. Los Angeles: Sage.

Roldan, Malu, Louise Soe, and Elaine K. Yakura. (2004) Perceptions of Chilly IT Organizational Contexts and Their Effect on the Retention and Promotion of Women. Ed. Suzanne Weisband. *SIGMIS Proceedings on Computer Personnel Research: Careers, Culture, and Ethics in a Networked Environment*. Tucson, AZ: ACM, . 108-13.

Soe, Louise, and Elaine Yakura. 2008. What's Wrong with the Pipeline? Assumptions about Gender and Culture in IT Work. *Women's Studies*, [37](#), [3](#), 176 – 201.

Stockard, R., Klassen, M., Akbari, A. (2005) Computer Science higher education pipeline. *Journal of Computing Sciences in Colleges*, 20, 3.

Strauss, A., and Corbin, J. *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. Newbury Park: Sage, 1990.