Perceptions and Experiences that Influence a Pakistani Woman's Decision to Pursue a Teaching Career in Computer-Related Technology

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Fewer women than men are involved in the fields of computer science and in other computer-related technology areas. Very few women are involved in university departments of computer science and in computer-related technology areas. In the United States, fewer than twenty percent of graduates of those programs are female. Fisher & Margolis (2002) say that despite the rise of a women's movement, women have lost ground in the world of computing. This is not only true for the United States, but also for Pakistan, the country under investigation for this particular study. The purpose of this study was to identify reasons why Pakistani women chose to teach in computer-related technology areas and how they thought they were being perceived by university administration, male faculty and their students. The participants were asked to identify social and professional experiences that influenced their decisions to work in these fields.

This study employed a qualitative design using a phenomenological approach. An interview guide was created to provide structure to the interview process through use of a set of open-ended questions. The questions sought to encourage participants to share their individual experiences, perceptions, and

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reflections on their work environment. The themes that emerged were based on the discussion with the interviewees and included the following items: (a) reasons for choosing a computer related area as a career option, (b) career choice in retrospect, (c) perception of women participating in computer-related technology areas, and (d) cultural influences and the environment.

The patriarchal culture prevalent in Pakistan expects women to consider the effect their decisions, including career choices, may have on the family honor as defined by patriarchs. A woman knows that if she breaks these societal rules, she might endanger her family's reputation. Women in the workplace are therefore placed in a very precarious and vulnerable position.

Because they accept the cultural and societal limitations, the way these Pakistani women described their situation differed somewhat from commonly held Western women's views. For example, none of the women talked about how the presence of more female faculty members within a department may help reinforce the idea that computer-related technology is not just a "man's field" and can be taught by both men and women, with equal competence. However, half of the respondents indicated they had to work harder than their male peers to prove themselves to university administration and colleagues but still described themselves as not being discriminated against.

Background

In Pakistan, women are also less likely than men to be involved in the field of computer-related technology. Numerous researchers (Camp, 1997; Fisher & Margolis, 2002; Leonard, 2003; Verbick, 2001) have explored reasons for the under-representation of Western women in technology, but little information is available that focuses specifically on Pakistani women and on how their culture and background may relate to their career selection and perseverance patterns.

The purpose of this study was to identify reasons why Pakistani women chose to teach in computer-related technology areas and how they thought they were perceived by university administration, male

faculty and students. Furthermore, the participants were asked to identify their social and professional experiences that influenced their decisions to work in this field.

As a developing economy that focuses on technological success as its economic cornerstone, both men and women should be encouraged to participate in this workforce. Since men are currently disproportionately represented in the workplace, the focus of this study was on experienced women teachers in the field of computer-related technology. Knowing more about women teachers' experiences in the field of computer-related technology could possibly facilitate efforts to encourage more capable women to consider these careers in their decision process.

Research Design

This study employed a qualitative design using a phenomenological approach. The primary focus of the study was to explore the experiences of women who chose a career in teaching computer-related technology. In order to gain insight into their experiences, women were asked how they thought they were perceived by their male colleagues, their students, and their family members. Interviews were conducted with current or former female teachers in computer-related technology areas. This study was conducted with a purposefully selected sample of women participants who were either selected by contacting the Pakistani chapter president of the Association of Computing Machinery-Women (ACM-W) or recommended by study participants. Initially, the ACM-W chapter president helped by providing e-mail contact information for women involved in the organization that worked or taught in the field for five years or more. The researcher felt that interviewing women with five years of working/teaching experience in the field helped add depth to the study.

By initially asking the Pakistani ACM-W Chapter President for help in identifying subjects, the researchers hoped to establish greater credibility for the study with potential participants. The researcher received initial contact information for 19 women who met all the criteria for participation. All potential participants were e-

mailed, requesting phone interviews and five replied with interest in participating in the study. Three of these participating women provided contact information for an additional woman who met the criteria and was willing to participate, therefore, helping the researcher identify and interview eight women technologists.

The participants were purposefully selected to reflect experienced female university faculty members teaching in computer-related technology areas from diverse locations. Purposive sampling assured access to women with a range of experience in the field of computer-related technology.

The results of the content analyses presented in this paper are based upon the responses of eight participants. The interviewer did not seek additional interviews beyond the eight original participants because she began to experience saturation of the data and repeatedly getting similar answers and patterns in responses. Five of the women interviewed were between 25-30 years of age. Six of the eight respondents had never been married. All the women had been employed in computer-related technology for five or more years. All of the participants had teaching experience and some had additional work experience in industry. In terms of experience, five of the respondents had taught in the field for less than five years and two of those had moved on to careers in industry.

Instrumentation

An interview guide was created to provide structure to the interview process through use of a set of open-ended questions. The questions sought to encourage participants to share their individual experiences, perceptions, and reflections on their work environment.

An open-ended format was used allowing participants the ability to control the depth and breadth of information shared. Furthermore, semi-structured open-ended interviews provided deeper understanding of key issues. This methodology also presented opportunities to ask follow-up questions to clarify and elicit additional information. Most interview questions were focused on women's experiences teaching in the field.

After conducting a pilot study to validate the interview guide, interviews were conducted over the telephone. Complete and detailed notes as well as audio tapes were kept of every interaction. These recorded phone conversations were transcribed by the researcher to make sure no data was lost and the information provided was recorded accurately. Participants agreed to make themselves available for follow-up interviews if more data were needed to complete the study.

Analysis and Discussion

The first analysis step was to interpret and understand the data collected. This required reading and re-reading the narratives from the interviews searching for patterns, themes and exceptions. The next step was to code the information. This step helped to identify patterns that emerged from the interviews. The researcher organized these data accordingly in related groupings. Then, themes and exceptions within the different groupings were analyzed. This helped in discovering relationships between the categories. Connections helped create sequences and were instrumental in helping the researcher answer each research question. The last step in the analysis was the actual interpretation where the data was synthesized and summarized to attach meaning and significance to the analysis. While discussing the different themes that emerged as a result of this study, the researcher supported the analysis of each theme with various quotes from the actual interviews to add validity to the themes. Each quote is followed by a code to identify the participant that made the stated quotation. This will help the reader make connections with the conclusions and add more transparency to the study.

Choosing computer-related career options
Most participants discussed their reasons for choosing the field of computer-related technology areas. They admitted that they did not have many professional options to choose from as women and thought that the field was interesting enough to explore. Some of the more culturally accepted career options available to Pakistani women

are medicine and teaching. Four major themes emerged from the women's discussion of how and why they selected their field of study. However these themes are not necessarily mutually exclusive or discrete. Those four themes were:

- job flexibility that allowed women to meet social responsibilities,
- availability of opportunities,
- cultural acceptability to family and community, and
- encouragement from previous teachers coupled with interest in the field.

The job flexibility theme is illustrated by the following: "I think that if I didn't have a family and kids to take care of, I would've liked to be in industry working because there are more options available but because I can't, teaching is good" (8/T, 2006). This statement got further corroboration by respondent (3a/T, 2006) "Women, on the other hand need the kind of job that will help them juggle their housework with it, so this is a good place." Most participants mentioned that the family's satisfaction with their career choice was an important deciding factor in their decision process. The cultural values in Pakistan seem to prevail in this process. According to Haeri (2002), most women do not like going against their family's wishes, and therefore, family support in the decision making process is instrumental.

The next theme, availability of opportunities, was mentioned by various respondents including "Now, thankfully, at least in engineering, we have more options of either pursuing computer engineering or electrical… women are still not going into the other engineering fields" (3a/T, 2006). This seems closely related to the theme of cultural acceptability. The lack of interest of men in teaching careers further creates more opportunities for women as technical teachers. "Men usually don't' want to (teach) because they are paid less and they are just waiting around for better opportunities or more education abroad or something…" (3.5/K, 2006).

With the third theme, cultural acceptability to family and community, respondents stated that the most important reason for choosing a career in computer-related technology was the support of

their family. Teaching in computer-related technology is usually considered a good career option and is culturally more acceptable because women are considered to be natural nurturers and such careers are thought to complement their nurturing personalities. "Society overall has become a bit more open towards women, the acceptability that women can be in your class, they can work, they can be normal in class, they don't have to cover themselves up and be invisible. The acceptability has increased. It is easier (for men) to relate to women who are at work or in classes" (2.5/N). The culture in Pakistan is very group-oriented, so it differs from the West (Khandwala, 2003). This means that even if counter to personal preferences, most Pakistani people find it very difficult to make choices that do not satisfy their families. In Pakistan, very few people will try to go against the expectations of society or try to break cultural barriers. Cultural barriers will not allow women to make individual choices and ignore how these choices affect their families. Women in Pakistan know that every choice affects their family in one way or another. They have to repay their family's trust by making the right decisions. Women also realize that going against the cultural grain and breaking traditions could jeopardize their family's honor (Haeri, 2002). The patriarchal culture prevalent in Pakistan expects women to consider the effect their decisions may have on the family honor. A woman knows that if she breaks these societal rules, she might endanger her family's reputation.

The fourth theme, encouragement from previous teachers coupled with interest in the field, seemed to be of importance as corroborated by the following statement "…when I was in school, one of my teachers said that it (computer science) might be a good thing for me to try and I thought she was joking, but then I decided to give it a try and I liked it" (8/T, 2006). Respondent 2.5/N further commented that "once you take a stand and let people know that this is what you want to do, and you are a part of extracurricular activities and organizations…then people pay attention. They know that you mean to do this."

Based on similar parallel background with the women interviewed, the researcher knows the importance attached to a family's support for a woman. The metropolitan areas of Pakistan

have modernized over the last two decades and the beginnings of a shift in culture may be observed, but some elements remain rigid, such as a woman and her direct link to her family's reputation. This would explain why most of the women interviewed mentioned family support and their approval as the biggest influence in their decisions.

Career choice in retrospect

Most respondents discussed how lucrative industrial careers in technology and related areas were, and that teaching in academia paid less than working in industry. All the women interviewed admitted that they were generally happy with choosing computer-related technology careers, but some respondents admitted that they were less interested in teaching than working in industry. If they had the opportunity, they might prefer to work in industry for higher pay. However, this latter group suggested that the pressures of having a family and taking care of the household did not allow them to pursue careers in industry. They stated that careers in academia better served their life styles while they tried to balance work with family responsibilities and teacher work schedules were usually more flexible and less rigid than typical jobs in the corporate environment. This is further illustrated by the following quote from one study participant: "Men want to work in the industry because there is more money to be made. Women, on the other hand, need the kind of job that will help them juggle their housework with it, so this is a good place" (3a/T, 2006). However, this is not a phenomenon isolated to Pakistan. Women across the globe share this issue. For example, Vaas (2000) indicated that many successful career women in the West owe their professional successes to choosing their careers over having children. Additionally, Frenkel (1990) suggested that most women face issues that force them to choose between career and family.

In Pakistan, a man is still expected to be the primary breadwinner in the household. According to Aslam (2000), Pakistani women's contributions to family and the national economy remains overlooked, invisible, under-compensated and un-quantified. This belief was supported and accepted by most respondents. However,

there were two women that expressed the desire to be financially independent and ambitious. One of these two women had received a grant for research at a university outside of Pakistan and had gotten her Doctorate abroad. She had taught at a Pakistani university for a while but then decided to take a job to do more research overseas.

It was also interesting to note that even women who were not married cited housework responsibilities among priorities and claimed that working in academia helped with their roles in their homes. This may be because most professional women in Pakistan, even when financially independent, do not live on their own but rather are expected to live with their parents until they are married. While living with family, they are expected to take care of the house and help their mothers with the household chores. Sometimes, these women may also be contributing to their family financially. Therefore, the concept of independence in this culture varies greatly from the Western concept of family.

Sufficient numbers of women

None of the women talked about how the presence of more female faculty members within a department may help reinforce the idea that computer-related technology is not just a "man's field" and can be taught by both men and women, with equal competence. This came as a surprise to the researcher who was expecting a different response to this question. Literature often suggests that more female faculty involvement in departments of computer-related technology encourages greater interest from potential female students. A stronger female presence is purported to help female students challenge assumptions about the field being predominantly male and to encourage female students to work harder. Reinen and Plomp (1993) discussed the importance of female role models. The potential value of women role models has further been recognized by women elsewhere. Shackleton and Craig (1993) suggested that women may feel less intimidated by technology when they see more women teaching in technology-related areas in universities. However, this seems to contradict the following participant's experience:

> *"There was a time when I was the only woman in the department and now we make up 20% of the department. But I feel the same*

exact way that I felt then. I deal with my male colleagues the same way I did then. I see no difference because I don't think it makes a difference. Everyone would have their own experience though, depending on where they are teaching "(7b/T, 2006).

Most participants stated that they did not think that having more women colleagues would change the way they experience their individual jobs. These respondents said that when they are teaching, they know that their professional success depends upon their own individual capabilities and strengths within the classroom. As illustrated in the following statement, "the encouragement or discouragement you get is not from how many (women) there are, but how seriously the students and administrators take you and your capability of doing your job" (3a/T, 2006). Participants did not think that knowing more colleagues who experience similar issues of balancing work and the family or the pressures of having to prove themselves by working extra hard, could help them personally.

Cultural influences and the environment

One of the respondents pointed out that she thought that perhaps men treated women poorly in Pakistan because it was a developing country. This idea was similar to statements made by Easterly (2002) that the oppression of women may stem from an inequality in culture that is most prevalent in countries that are economically lagging behind the developed world. It has been suggested that if men indeed oppressed women in these societies, perhaps it is because of their own frustration with the system. Men who do not have any other means to vent may be inclined to oppress another section of society that is weaker or more vulnerable than themselves.

"When I was trying to go abroad for my job, I had to provide the government with an affidavit (proof, certificate) from either my parents or my husband stating that they had no problems with me leaving the country. Men do not have to do any such thing. I was insulted! I am a mature adult citizen and I need to show them a permission slip from my parents?" (3/N, 2006)

Half of the respondents described themselves as not being discriminated against but still indicated that they had to work harder than their male peers to prove themselves to university administration and colleagues. Perhaps these respondents did not consider this discrimination because they experienced these attitudes even before they chose this career. One respondent said that she did not think much of the bias she occasionally faced because she had come to accept it and was mentally prepared for it before she joined the university. This may suggest that some Pakistani women themselves might be desensitized to gender bias.

Perhaps this contradiction is explained by the idea that social conditioning plays a key role in these women's perceptions. Social conditioning may help perpetuate myths that a culture ingrains and thus condition women to ignore what others would describe as discrimination. Some women added that even if they felt that they had been undermined by their peers, administrators or their male students, they had not given it much thought because this was the "general framework of society." They had learned to ignore these issues and just work on their capabilities and strengths. They were often convinced that if they did their jobs well and brought something of value to their classrooms, they would ultimately gain the respect and trust they deserved.

Some respondents recognized that experiences might be different depending on the institution where they worked. Although most respondents were based in large cities in Pakistan, there may be stark differences in how each university was administered. One respondent specifically suggested that not all institutions were the same when she referred to some as "mediocre institutions." She claimed that such institutions were not dedicated to the students and were only using post-secondary education to make money. She also stated that these "mediocre" universities were affected by the perceptions of male teachers who teach in them, because the common patriarchal culture outside the university may prevail inside the university and support a potentially hostile organizational culture. In such a situation, female faculty may feel uncomfortable and out of place. This may trigger additional pressure for women to prove

themselves and thus may make female faculty members less confident while teaching.

Women who did feel discriminated against said that this feeling came from the belief they had to work harder to prove themselves. One participant suggested that some women might feel discouraged because of the "unprofessional" attitudes they have to face by university administrators and male colleagues.

Perceptions at work

Two women decided to stop teaching because they thought that they were treated unfairly by both the university administration and their male colleagues. Both women had been educated in international institutions in Western countries and had worked abroad before they decided to return to Pakistan. This may have resulted in culture shock as they were not mentally and emotionally ready for this transition back from Western to traditional Pakistani culture.

Three respondents believed that sensitivity about the way women are being perceived by society had nothing to do with society itself. Rather, these sensitivities had to do with the individual woman's perception of discrimination or gender bias. The respondents believed that if they had enough faith in themselves to know that they were capable of doing their jobs effectively, it did not matter what other people may think. They also believed that the individual's own confidence level was instrumental in making their mark in academia. One of the women acknowledged that just having the confidence to teach and impart something of value to students was gratifying and helped her to ignore potential bias.

"A woman needs to be married to be validated. You need to have a man's name by your name to be a functional part of society, no matter who this man is (his own standing in society, what he does, etc.)" (3/N, 2006). Women in Pakistan are expected to marry early and therefore face barriers when trying to develop careers for themselves (Aslam, 2000). This expectation was corroborated by some participants as they talked about female faculty getting married and not coming back to the job. As a result, some university administrators were said to not take young professional women

seriously. It is harder for women to take care of their homes and then have full-time jobs because of the expectation and the importance attached to their roles of being homemakers. As noted by Liddle and Joshi (1986), "women have not achieved liberation from gender roles" (p. 174). Clearly, the majority of the respondents strongly supported a traditional view of gender roles. As described in the literature, they saw themselves as responsible for household chores first and made sure that their careers did not interfere with their responsibilities at home (Parveen, n.d.). It has been said that many female IT professionals owe their success to their decisions to not have children, thus diminishing the need for flexible or shorter hours (Vaas, 2000).

Most of the respondents learned to tolerate any bias that they perceived and in time conditioned themselves to ignore it. In Pakistan, even women with careers face the problem that they cannot live independently but rather require a male to look after them (Alavi, n.d.). The most striking insight gleaned from this research may be that the way many of these women think they are perceived is strongly linked to their own self perceptions which were conceived in life before they ever experienced professional bias. Half of the respondents decided that they had not felt discriminated against while teaching in the university and yet they felt they had not been taken very seriously and had needed to work extra hard to prove themselves

> *"It's a lot better in the academic world…it's a lot harder in the practical world. You feel more bias. If there are a couple of people and you are out in the field and it's hot outside and you need to go out and look at something, they'll tell you that you don't have to go. 'Why do you need to go outside? It's hot outside, let the men go and figure it out.' That definitely happens and that's a reality, so compared to that, the academic world is a lot better" (3a/T, 2006).*

Conclusions

Persons' perceptions can change depending on where they are in life, what they have been taught to believe, and how they view

society surrounding them. The respondents in this study talked about their own perceptions and how these self-perceptions defined the way they viewed teaching computer-related technology in the Pakistani educational system. Women teaching in this field in post-secondary educational institutions in Pakistan need to feel secure in their positions. They need to feel like valuable members in the educational system helping educate the leaders of tomorrow. The findings of this study revealed that while some women do perceive gender biases, other women may not openly admit to have been discriminated against because they have learned to ignore it. Such attitudes might discourage some women from choosing careers in computer-related technology.

In a globally competitive environment it seems imperative that we take advantage of all of our intellectual resources. To do that would require that we encourage more women to participate in the technical work environment and in particular the technical education environment. If we hope to recruit competent women technologists into the technical teaching workplace, the findings of this study seem to suggest that it be very important to consider not only issues such as pay equity, but to maintain a flexible work environment that allows women to meet both their job and family responsibilities, and to establish a culture with zero tolerance for prejudice and gender bias. This was suggested by the Pakistani women that participated in this study but it seems to be equally true in technical work places here in the Western culture.

It may seem easy for readers from the West to criticize the cultural experiences recounted by the women who participated in this study as indicative of a backward culture in an undeveloped economy. This may be a mistake however, as women in the West also experience job discrimination, pay inequity, and pressures to balance often conflicting family and career responsibilities. While the cultural traditions of both the United States and Pakistan are each uniquely different, the traditions of each culture impact career decisions women make as well as the discrimination and other barriers women must overcome in education and the workplace to maximize their professional contributions. Just as in Pakistan, career choices in the West are still influenced by culture-based perceptions

of appropriate gender roles and abilities as illustrated by young girls who enjoy and excel in mathematics and science studies at an early age but routinely elect not to pursue advanced mathematics and science studies and careers.

Pakistan, as a developing country and an aspiring technology-driven economy, needs its men and women to work together to help achieve the goals of economic growth and prosperity (Aaftab, 2005). For women to achieve their professional potential, the educational system and the administrators of both public and private universities need to assure that they make faculty aware that such prejudices should not be tolerated. When prejudices are discussed openly, and policies put in place to fight them, more women will be encouraged to pursue technical teaching professions. Women will know that the administration is ready to treat them as equals and protect them against discrimination. Knowing that women will be treated fairly will help them compete on the same level as their male counterparts. Regardless of the global region of the world, women have the intellectual ability to make important contributions to their nation's technological advancement and competitiveness.

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