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What attracts women to the IT field?

The first process of Occupational Socialization

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ABSTRACT

Socialization in an occupation differs in important ways from organizational socialization. Entering a defined occupation is apt to involve a lifelong commitment, yet it is one that individuals often drift into gradually. Entering occupations involves five different, but overlapping processes: attraction, access, adjustment, identification and commitment (Trice & Beyer, 1993). The first of these five processes refers to the specific features of the occupation that get individuals attention and attract them to the occupation. Such features include specific members of the occupation to whom newcomers get attracted such as successful heroes and mentors. It could also be the activities distinctive of the occupational culture or the kinds of extrinsic and intrinsic rewards that the occupation appears to offer. This research study focuses on the attraction process of occupational socialization to the information technology (Ahuja, 2002) field of female students in order to understand women's experiences and initial perceptions of the IT occupation. This study gathers empirical evidence from current female students in IT-related majors based on a qualitative approach and the use of focus groups as the elicitation technique. The goal of our research study is to contribute to a better understanding of the initial process of occupational socialization of female students in IT majors. The findings of this study, we believe, can help in improving and customizing recruitment strategies for female students that would emphasize the most attractive features of the IT occupation as perceived by women. In this research in progress we present the findings of our study based on eight focus groups conducted with students of three IT related academic majors in two academic institutions in the United States.

Keywords

Occupational Socialization, Focus Groups, IT Workforce, Recruitment in IT, Women in IT.

INTRODUCTION

The role of IT personnel is critical in the development, acquisition, management, use, support and maintenance of information technologies and systems (Guzman & Kaarst-Brown, 2004; Kakabadse & Korac-Kakabadse, 2000). As a result, the demand for skilled IT workers is constantly increasing but the number of skilled IT professionals is vastly lower than the number of IT positions (Trauth, 2002), even taking into account periodic economic slowdowns and occasional declines in demand for new hires. The impact of these shortages often creates problems that may have a ripple-effect throughout the economy as the release of products are postponed, contracts go unfulfilled, companies are forced to outsource/offshore IT processes, and unsold products and services are left in their wake (Hoffman & Thibodeau, 2003).

Both academics and industry professionals have worked on recruitment and retention strategies. Recruitment has been difficult because of declines in the number of graduates in information technology related majors in the United States. Excluding a few years surrounding the so called "dot.com boom" (i.e., 1998-2000) when people were pursuing IT majors as a likely way of making money, enrollments in information technology majors of students have continually dropped every year since 2000 (Babbitt, 2001; Bentsen, 2000). Recent data indicates that enrollment in undergraduate IT related majors has dropped 18% in 2003 and 24% in 2002 (Bentsen, 2000; Frauenheim, 2004). In addition to the recruitment problems, retention has been difficult too because IT professionals report high intentions to leave their jobs (Hu, Poon, Zhong, & Wan, 2004; McMurtrey, Grover, Teng, & Lightner, 2002; Moore, 2000).

An important issue addressed by researchers is the recruitment and retention of women and minorities. Women, as well as African Americans, Hispanic Americans, and Native Americans are represented in the IT workforce in percentages that are far lower than their percentages in the population as a whole (Tapia & Kvasny, 2004; Trauth, 2002). This reality again contributes to the IT skills shortage and has been a subject of interest in the United States in the last decade. As a result, in 2000, the Information Technology Workforce Program (ITWF) was established by the National Science Foundation (NSF) to support research studies on the under-representation of women and minorities in IT¹.

Based on the facts and national interest in this topic, the present study seeks to contribute to the understanding of the attraction process of occupational socialization to the information technology (Ahuja, 2002) field of female students in order to understand women's experiences and initial perceptions of the IT occupation. The findings of this study, we believe, can help in improving and customizing recruitment strategies for female students that would emphasize the most attractive features of the IT occupation as perceived by women. In this way, the study is aimed at promoting women's entry into the IT workforce since that is a noticeably absent trend in society (Ahuja, 2002).

LITERATURE REVIEW ON OCCUPATIONS

Trice and Beyer (1993) suggest that, historically, the development of occupations is opportunistic in the sense that they are created by situational factors such as new technologies for instance that require maintenance, set up, or service. Later in the maturation of an occupation, members claim the right to perform a distinctive set of tasks. In general, an occupation cannot be said to exist until there is a consensus that certain individuals are expected to perform these tasks and to exercise degrees of control over how they are done. An individual may perform those specific tasks because he or she possesses a relatively distinct and unique knowledge and skill base, which members of the occupation must master and be able to put into practice. Furthermore, "the distinctiveness of an occupation resides in its unique body of knowledge." (Trice & Beyer, 1993). On the other hand, the degrees of control are defined by professional associations that take control of the standards of the occupation in terms of training, membership, and right behavior. Within the IT field for example, the Association for Information Systems (AIS), the Association for Computing Machinery (Babbitt, 2001), and the IEEE Computer Society (IEEECS) are the associations that have recently developed undergraduate curricula for the computing programs mentioned. In a cooperative effort, these institutions have recently published a 'Guide to Undergraduate Degree Programs in Computing² for undergraduate degree programs in Computer Engineering, Computer Science, Information Systems, Information Technology, and Software Engineering. In this way, these organizations have begun to exercise their control over IT occupational training.

To sum up, the typical process of how occupations (in general) become identified as such in society includes the following distinctive stages:

1. An occupation starts as a result of a new situation that requires performing specific sets of tasks which generates and accumulates a body of knowledge.
2. Members construct an association to claim control over the occupation.
3. The association establishes educational processes, and programs of teaching.
4. The association creates certifications, examinations and codes of ethics. Later, the association may request governmental sponsored legislation controlling licensure.

Many high-status occupations are composed of subcultures of academics, managers, and practitioners (Freidson, 1986). As a result, "occupations are not usually made up of one homogeneous community but increasingly may be characterized by distinct subcultures and internal status systems that must adjust to one another." (Trice & Beyer, 1993). Because occupations are dynamic they are also subject to decline, revival and death (e.g., blacksmiths).

Trice (Trice & Beyer, 1993) defines three themes to guide the study occupations:

- 1) Occupations are distinct cultures in and of themselves, and when practiced within organizations – as they usually are – they can be potent subcultures.
- 2) When studies of occupations as subcultures are developed, the emphasis in these studies is not the organization as a single group but instead upon the interrelationships and adaptations of the multiplicity of subcultures within the organization.

¹ <http://www.nsf.gov/pubs/2003/nsf03609/nsf03609.htm>

² http://www.acm.org/education/Overview_Draft_11-22-04.pdf

- 3) Occupations are dynamic, not static collectivities. Control over their unique body of knowledge, rules of membership, and so forth ebbs and flow overtime.

As a final note, occupations often have notable exemplars: Edward R. Murrow and Mike Wallace for journalists, Clarence Darrow for lawyers, Frank Lloyd Wright for architects to mention some. These heroes and heroines are rarely associated with a given organization and instead they are associated with their occupations. Examples of heroes and heroines in the IT field are: Bill Gates, Linus Torvalds (creator of Linux), Sergey Brin and Larry Page (creators of Google), and Augusta Ada Byron (aka, Lady Lovelace) the first programmer.

OCCUPATIONAL SOCIALIZATION

Socialization is the process by which someone learns the ways of a given society or social group so that he/she can function effectively within it (Elkin, 1960). Entering new jobs and organizations, new hires typically experience some degree of surprise and uncertainty as they face unfamiliar environments (Louis, 1980). Socialization in an occupation differs in important ways from organizational socialization. Entering an organization frequently involves only a temporary commitment and has a well-demarcated beginning. In contrast, entering a defined occupation may take many years and the beginning of the process is not necessarily well demarcated because entering is gradual. As a result, different processes appear to be relevant to describing how people become members of occupations and organizations.

The term “occupational socialization” comprises the complete set of social processes by which an individual is attracted to, gains access to, becomes adjusted to, begins to identify with, and becomes committed to an occupation (Trice & Beyer, 1993). Occupational socialization is considered complete when an individual has internalized the beliefs, values, and behavioral norms of the occupational group. In today’s world, people have turned to the world of work as a primary source of economic rewards, interpersonal relations, recognition and emotional support Trice (Trice, 1993). The work of individuals’ lives has been organized around occupations. People generally work within an occupation over longer periods of time than they do within particular organizations. As a result, occupations play a prominent role in work life for many people.

According to Trice and Beyer (1993), entering occupations involves five somewhat overlapping processes: attraction, access, adjustment, identification and commitment (p.195):

Attraction: A person must know about and feel attracted to something in the occupation. It could be a hero of the occupation, the activities of the subculture, or the kinds of extrinsic and intrinsic rewards it appears to offer. The experiences and exposure to selected information are not the same for every individual. Moreover, individuals are not aware during these experiences that what is happening may affect their choice of occupation. They become aware of education, training, or job opportunities, they take advantage of the opportunities seen as most attractive, and are gradually drawn into the activities of the occupation, sometimes without much conscious intent. This process is the focus of our study.

Access: Various structural factors will affect whether a person has access to and can successfully enter an occupation. A variety of factors encourage and discourage individuals’ access to particular forms of occupational life. People may want to join an occupation but find that they cannot realistically do so. According to Trice, the structure of society excludes people from many occupations while encouraging others to become interested in an array of occupations. Social class sets severe limits on both a child’s knowledge about, and aspirations for a given occupation. Parental education, income, and occupations channel childhood fantasies and expectations about various occupations so that children from higher socioeconomic backgrounds learn about and aspire to many more occupations than do children of lower socioeconomic backgrounds (Shapiro & Crowley, 1982). Similarly, gender and race can restrict occupational awareness and aspirations (Sewell, 1969).

Adjustment: As individuals become acquainted with an occupation and its beliefs, values, norms, and activities, they need to decide whether they can fit within that occupation. In other words, do they have the intellectual and emotional capabilities to carry out its activities? Are they willing to conform to its norms? Does their personal temperament enable them to deal with the demands of the occupation’s pattern of activities?

Identification: Individuals become identified both socially and psychologically with the occupation. As the attraction process goes on over time, it eliminates other alternatives; the time commitment is sufficient to work only in one occupation and people identify that individual with the occupation.

Commitment: Over time, members become committed to occupations. They accrue certain benefits from being in the occupation that they would lose if they left it. They develop certain patterns of behavior in which they are inclined to persist (Salanick, 1977); and develop loyalties to other members of the occupation (Ritzer & Trice, 1969).

Occupational associations play an important role in promoting identification with and commitment to occupations in three ways: by providing a broader, more extensive reference group; by providing organized political influence at a state or national level; and by giving members recourse to authorities outside the employing organization to which they can turn.

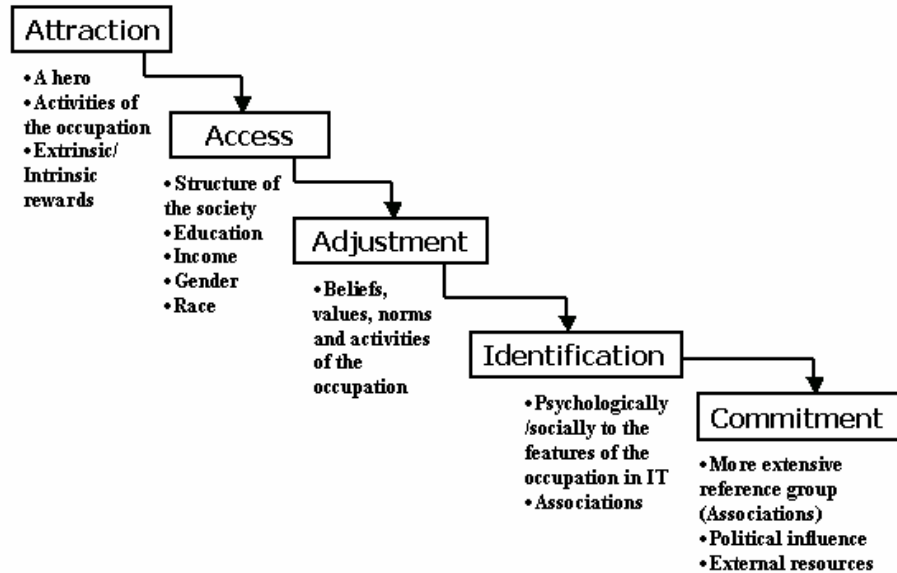


Figure 1. Occupational Socialization

THE ATTRACTION PROCESS

People come into their careers with values derived from family, school and community and people seek during their careers to find jobs and organizations that permit them to exercise those values (Schein, 2004). The attraction process can be the combination of all those factors. In this study we explore the initial process of occupational socialization as a way of giving us a more specific approach to current female preferences. Occupational socialization occurs both formally and informally. Educational and training programs aimed explicitly at imparting technical knowledge used in the occupation and at indoctrinating aspirants into the cultural expectations of occupational roles constitute the formal side of socialization. Informal socialization emerges spontaneously as people interact in carrying out occupational roles. An informal part of informal socialization is learning the culture of an occupation, particularly the ways in which members cope with work-related anxieties so that they can continue to perform required tasks confidently and safely (Trice & Beyer, 1984).

The attraction process will often be facilitated by experienced members of that occupation (peers, mentors, or leaders). The combination of technical training and cultural indoctrination becomes socialization – the process by which people learn how to perform specified social roles in a way that is acceptable to members of a relevant cultural group and come to internalize those expectations.

The importance of an individual who acts as a role model is consistent with career development theorists' recognition of the important contributions that public figures, family and teachers make in the development of career aspirations amongst youth.

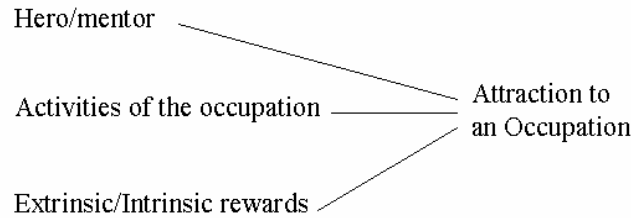


Figure 2. Attraction Process to an Occupation

METHODOLOGY:

To enhance our understanding of what attracts women to the IT field as the first process of the occupational socialization and to stimulate women in making explicit their views, perceptions, motives and reasons about this topic, we chose to conduct our data collection in the form of semi-structured focus group meetings to produce data and insights, through the group interaction, that would be less accessible without the interaction found in the group (Morgan, 1997; Pini, 2002). The study occurred at two academic institutions in Central New York, one private university and a state university. The data was collected over a period of approximately 5 months from October 2004 to February 2005.

The focus group protocols were developed through a very thorough process of literature review, brainstorming sessions between the research team and finally the comments, feedback, and suggestions for improvement from senior researchers in this area. We developed the focus group protocols in accord with the literature identified above and other relevant research questions identified in an earlier program of research on the occupational culture of IT personnel (Guzman et al., 2004; Stam, Stanton, & Guzman, 2004). In keeping with common practice in qualitative research (Denzin & Lincoln, 1994; Janesick, 1998), we evolved the line of questioning to match our growing understanding of occupational socialization. The core of the interview protocol consistently covered areas such as reasons for choosing an IT major, current perceptions about it and perceived differences in age, gender and ethnicity.

The study included seven focus group meetings with an average of 7 participants in each group discussion. All invited participants were freshmen to junior students from three IT-related academic majors in the two academic institutions. We selected this type of participant because they can easily recall the reasons why they chose the field, as their decisions were made more recently than those who have been in the academic programs for a longer time. Focus group discussions lasted 55 minutes on average. Two of the focus groups were specifically organized with only female participants, and a female moderator, in order to provide more homogeneous and enabling environment for them to freely discuss and present their perceptions. The other focus groups had both female and male students. The focus group discussions were recorded and transcribed. Participation was indicated as F for female and M for male participants. Data analysis focused mainly on the responses provided by female students. Based on the attraction process of occupational socialization, the three components (the activity, the hero or the mentor and the intrinsic/extrinsic rewards) were coded using Atlas-ti for qualitative data analysis (Miles & Huberman, 1994).

RESULTS

Based on the female students' perspectives expressed during the focus group discussions, we present the different instances and explore the extent to which the categories in the attraction process of occupational socialization are relevant for women. Based on our analysis, we found that the female students' answers and perceptions regarding the attraction to the occupation were consistent with the theoretical framework provided by Trice and Beyer (1993) about this process.

Viewing the research from an interpretivist standpoint (Denzin & Lincoln, 2000; Norman, 2000), we combined top-down and bottom-up approaches in this analysis. In developing our coding scheme, we began by choosing main areas from Trice and Beyer's (1993) theory. The codes and the frequency of occurrence of the occupation attraction process categories appear in Table 1. These codes include situations of attraction as were described by the participants and repeatedly coded by coders. Female students provided detailed examples and perceptions about the three components of the attraction stage: a) attraction to the IT field caused by interest in performing IT-related activities. b) attraction to the IT field caused by intrinsic or extrinsic benefit such as salary or personal benefit, and c) attraction toward the IT field caused by an IT professional that is looked up to.

Code	Frequency	Percentage
a) Hero/mentor	6	11.3%
b) Activity	29	54.7%
c) Extrinsic/Intrinsic Rewards	18	34%

Table 1. Incidence of Codes in Attraction Process of Female Participants

The Activity:

Female students presented clear and specific examples of how their involvement in different IT-related activities at early stages of their lives was critical, making this one of their major attractions to the IT occupation later in their lives, which consequently encouraged them to pursue higher education in this field.

Interestingly, the activities that the participants were involved in ranged from very basic and simple use of the computer and other related technologies to a deeper involvement in solving computer related technical problems.

“I just liked to play around the computer, I very much liked the download stuff, then I tried to run the virus scanning, and I took form there and that’s why I am here today”

“I was always the computer fix-it type person for my family and my friends. The computer would freeze and my family would just leave it. I always took the initiative how to fix it”

“When I was a child, I always liked art and design but I also liked computers and this stuff, so I just decided to combine them together and to specialize in Graphic Design”

“I think I started to love the computer world when my father bought the first computer some years ago and I started to download different stuff like music, images... whatever”

“That’s what my dad always has done for us since I was little, anytime we bought a new computer, we would take the old one and take it apart and he would just explain the parts and what they do and how they work”

“I kind of got into the computer world because both my parents were very involved in IT and similar stuff. It’s defiantly something that I got introduced to when I was very young and as I grew up I enjoyed it more and more so I figured out that it would probably be the best fit”

The Hero/Mentor:

External influences and motivations, either directly or indirectly, on females attraction to the IT occupation and consequently to pursue their high education degree in this field were noticeable from their answers and perceptions.

Family members, especially the parents, friends and, in some cases, the school teachers were among the major groups of influencers identified by participants.

“My dad kind of motivated me because he is in this industry, he works at a pharmaceutical company and he used to always come and talk about who is developing what and all new technology and programs stuff, I just loved to listen to him”

“My situation is that my Dad was always into computers, and I thought he was so cool, I always liked his job and specialty because he seemed to enjoy it”

“My boyfriend was the great source of motivation and influence; he just loves IT and enjoys it a lot. I just became like him”

“I always liked my computer teacher job at the high school, its not only that she enjoyed it, she was always enthusiastically talking about it and I just got interested in it and wanted to be like her”

Intrinsic/ Extrinsic Rewards

Female students' feelings and expectations from the IT occupation varied from pure financial rewards to non-financial (mainly social and self-satisfaction) rewards. Under the financial rewards or incentives area, the participants mainly focused on the expected high demand on the IT positions and the expected high salaries from these positions.

"I feel that the IT field interests me more than anything, and honestly, money is the best thing in it"

"I always knew that there is huge demand on IT positions and that it pays a lot of money"

"I chose an IT field just because it has the best chance after graduating and finding a job as opposed to other traditional fields"

The female students also highlighted the importance of having IT knowledge and skills as a tool that can help them in any future position. Before entering the field, participants realized that knowledge of information and technology are required in many occupational fields, and the perception of IT as a helping and qualifying tool caused many to study it while pursuing a career outside of IT.

"I just thought that having a background in information technology will help you in whatever field you go into."

"I guess I'm in the major just because it looks good. You can't just have management these days, you have to have something else, and a technology background looks really good on a resume"

"I thought of it more as a way to advance whatever position you want to do. You find a position that makes you happy and then use IT as a tool. It's something extra that you have in your back pocket over other people that you can use to advance your career."

"The world is so technological, everything right now is all about that. Any job you do has a technology aspect of it. So everybody might as well have a degree in IT because it's going to affect any job that you do."

"I just chose IT because I felt like I couldn't go wrong with IT".

Under the non-financial rewards and incentives category, helping themselves and others to understand this field and to solve its problems was the most important perceived non-financial reward by female students. The participants seemed to appreciate the fact that having IT knowledge and skills will help them to understand and solve associated problems. They perceived high level of satisfaction from solving their own problems and other's problems as well.

"I was just interested in knowing how does the computer run. This gives me a feeling of satisfaction and helps me to solve my problems myself"

"When I was in the high school, my teacher used to ask me to help others who are frustrated with the computer work, I really liked it and enjoyed helping people especially when you see their frustration goes away and you feel like you accomplished something"

DISCUSSION AND CONCLUSION

Consistent with Trice and Beyer (1993) theoretical framework, female students provided empirical evidence of the importance of the three components of the attraction stage in occupational socialization in the IT field. Although all three components were present in the female students' answers and perceptions, the weight of each category and consequently the effect of each category on the participants' future career decisions were different.

Important parts of the attraction process for those female students were at what stage of their lives those female students were introduced to computers, to what extent they became familiar with these tools and technologies, and to what extent they were interested in exploring its functions and parts. From both, the high frequency of the activity component in the participants answers and the way they described the importance of their early journeys with computers, we found clear indications that the activity part represents the most important part of the IT occupation's attraction process.

The perceived intrinsic/extrinsic rewards from the occupation were also at a high level of importance like the activity component. The perceived satisfaction from being able to help themselves understand this field and solving not only their own problems but also others' problems was weighted as importantly, if not more, as the perceived and expected financial rewards and incentives from working in the IT field. The effects of heroes and mentors were perceived to occupy the least influential component of the attraction process.

LIMITATIONS AND FUTURE RESEARCH

Note that this research reports data from a relatively small number of female freshman and junior students from a small number of IT related academic programs. For these reasons, and because of the relative high subjectivity of the qualitative and interpretive approach we used, the data and findings of this study should not be interpreted as generally applicable across all female students in IT majors. Rather, the data can be viewed as suggestive of the possible explanatory power of the attraction process of occupational socialization and the dynamics of the three categories. Additional research is required to study other categories such as high school female students and IT women in the workforce. In addition, more comprehensive research is needed to determine the generalizability, applicability and relevancy of the attraction process of occupational socialization in the IT field.

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