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2006

Attitudes of sixth form female students towards the IT field

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ATTITUDES OF SIXTH FORM FEMALE STUDENTS TOWARDS THE IT FIELD

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Abstract

It is well-known that girls are not interested in computer science, information systems (IS) and software engineering studies. While the underlying reasons for this phenomenon have been studied in the US, Canada and Australia, only a few studies have been carried out in Europe and none in Scandinavia. To fill this gap in the research, we have analyzed the qualitative responses of 64 female sixth-form students concerning their attitudes towards studying information technology (IT), including Computer Science, Information Systems and Software engineering disciplines, and their views on IT as a profession.

The results suggest that the IT field is seen in quite a positive light by the girls. Although many of the respondents do not consider IT to be their profession, they nevertheless have positive attitudes towards the field. According to the respondents, the field is growing and developing; it is respected, and seen as the field of future. Girls who want to become IT professionals see that the profession entails good employment possibilities and benefits and is respected. Some girls have negative views towards the field. These views illustrate the underlying reasons that these girls do not want to study IT. These girls did not perceive the field to be human-related (the work is only computer-related, according to the respondents). The need for skills in mathematics and physics are also listed as key reasons that some girls do not want to become IT students

The results of the study suggest that there is a need to clarify among sixth form students the fact that IT jobs can be divided into computer science, information systems and software engineering, all of which require different competences.

1 INTRODUCTION

Women are in a minority as Computer Science, Information Systems and Software Engineering majors[1]. For example, in Finland (Oulu, Turku, Helsinki), only approximately 20-26 percent of girls intend to study Computer Science, Information Systems and Software Engineering[2]. In Canada the respective figure is even under 15 percent. These figures have raised concerns globally (Natale 2002; Farmer 2001). Moreover, universities are responsible for offering the highest education, and so for developing society indirectly by educating people that are in the best position to carry out such developments; hence it is vital for them to recruit the best available people. Currently, the low number

[1] For definitions of Computer Science, Information Systems and Software Engineering, please see Hirschheim, Klein and Lyytinen (1995), Iivari (1991) and Siponen (2005).

[2] At the University of Oulu's Department of Information Processing Science, approximately 25 percent of girls are intend to study Computer Science and Software Engineering. In Waterloo University in Canada, the respective figure is under 15 percent. At the University of Helsinki the figure is 26 percent, while at the University of Turku the same figure was 20.6 percent.

of female students is also a problem in this regard, given that potentially talented students are not seeking ways to study the field owing to their misconceptions towards it. To improve this situation (i.e., the question of how to increase women's interest in studying Computer Science, Information Systems and Software Engineering), several studies have been carried out, which have enhanced our understanding of the reasons that women are in the minority in Computer Science, Information Systems and Software Engineering studies. Graham and Latulipe (2003) studied 14- to 16-year-old girls, and concluded that the use of role models had a positive effect on how girls saw computer scientists. They are ordinary people, not some kind of geeks. Similarly, Moorman and Johnson (2003) found role models useful for affecting girls' behaviour. Alternatively, Clarke and Teague (1996) explored why girls in high schools do not take courses on computing, and why girls are not interested in computing-related work and studies. They concluded that girls have a narrow conception of computing-related work, and that this is one reason that girls are not keen on studying Computer Science, Information Systems and Software Engineering. Unfortunately, while a few studies have been carried out in European counties, such as Ireland (Trauth 1995), Germany (Oechtering & Behnke 1995) and the UK (French & Richardson 2005), we find no such studies in Scandinavian countries. Consequently, there is a need to study the corresponding attitudes and views in Scandinavia. This paper aims to narrow this gap by exploring such misconceptions, attitudes and views towards studying IT (Computer Science, Information Systems and Software Engineering), and towards IT as a profession, in Finland.

The rest of the paper is organized as follows. The second section discusses the related work. The third section outlines the research method used, while the results are presented in the fourth section. The fifth section discusses the limitations and implications of the study. Finally, the key findings are summarized in the conclusion section.

2 PREVIOUS STUDIES ON WOMEN'S ATTITUDES TOWARDS IT

Extant research has studied women's attitudes towards IT in relation to prejudices, computer usage, software, stereotypes, socialization, the gender gap, and underestimation of abilities (Table 1).

Topics	Writers	Country
Prejudices	Clarke & Teague (1996)	Australia
	von Hellens et al. (2001a)	Australia
	Leever et al. (2002)	United States
	Nielsen et al. (1999)	Australia
	Scollary et al. (2003)	Australia
	Teague (2002)	United States
	Trauth (1995)	Ireland
	Trauth (2002)	Australia and New Zealand
	Trauth et al. (2003)	Australia
Computer usage	Clarke & Teague (1996)	Australia
	French & Richardson (2005)	United Kingdom
	Graham & Latulipe (2003)	Canada
	Leever et al. (2002)	United States

	Moorman & Johnson (2003)	United States
	Varkila (1992)	Finland
Software	French & Richardson (2005)	United Kingdom
	Graham & Latulipe (2003)	Canada
	Leever et al. (2002)	United States
	Moorman & Johnson (2003)	United States
Stereotypes	Clarke & Teague (1996)	Australia
	Graham & Latulipe (2000)	Canada
	Leever et al. (2002)	United States
	Teague (2002)	United States
	Trauth (2002)	Australia and New Zealand
Socialization	Clarke & Teague (1996)	Australia
	French & Richardson (2005)	United Kingdom
	von Hellens et al. (2001a)	Australia
	von Hellens et al. (2001b)	Australia
	Leever et al. (2002)	United States
	Moorman & Johnson (2003)	United States
	Trauth (1995)	Ireland
	Teague (2002)	United States
	Trauth (2002)	Australia and New Zealand
	Trauth et al. (2003)	Australia
	Trauth & Quesenberry	United States, Australia, New Zealand and Ireland
The gender gap	Clarke & Teague (1996)	Australia
	French & Richardson (2005)	United Kingdom
	von Hellens et al. (2001a)	Australia
	von Hellens et al. (2001b)	Australia
	Leever et al. (2002)	United States
	Moorman & Johnson (2003)	United States
	Oechtering & Behnke (1995)	Germany
	Teague (2002)	United States
	Trauth (1995)	Ireland
	Trauth (2002)	Australia and New Zealand
	Trauth et al. (2003)	Australia
	Trauth & Quesenberry	United States, Australia, New Zealand and Ireland
The underestimation of abilities	Clarke & Teague (1996)	Australia
	von Hellens et al. (2001b)	Australia

	Moorman & Johnson (2003)	United States
	Teague (2002)	United States
Role Models	French & Richardson (2005)	United Kingdom
	Graham & Latulipe (2000)	Canada
	von Hellens et al. (2001b)	Australia
	Leever et al. (2002)	United States
	Moorman & Johnson (2003)	United States
	Trauth et al. (2003)	Australia
Attitudes of university students towards the information technology field		
	Jousranta (2002)	Finland

Table 1. Previous research on women's attitudes towards IT.

2.1 Prejudices

Leever *et al.* (2002) argued on the basis of literature review that a gender bias exists in the workplace. Goff (1997, 61) hypothesizes that a male candidate is more likely to be chosen for an IS position and that women in IS jobs suffer a lack of respect in the workplace. (Leever *et al*. 2002, 169-170.) According to Scollary *et al.* (2003), women in IT do not have equal promotion opportunities. Trauth (2002) explored and interviewed 31 women in Australia and New Zealand. They all worked in the IT field. Trauth found that women experienced discrimination and other barriers in their attempts to enter the IT world (Trauth 1995; Trauth 2002; Trauth *et al.* 2003). Von Hellens *et al.* (2001) study also confirmed that women have experienced instances of even patronising behaviour towards them.

Also based on literature review, Teague asserts that women in IT face discrimination (Teague 2000, 149). Clarke and Teague (1996) assume, again based on literature review, that girls do not participate in computer science classes because they feel that teachers have prejudices concerning girls' abilities in computing (Clarke & Teague 1996, 241.)

Nielsen *et al*. (1999, 264) found, through interviews and surveys among Bachelor IT students at Griffith University, that condescending behaviour towards female students takes place. Women are subjected to a continuous disparagement.

2.2 Computer usage

Moorman and Johnson (2003, 193) examined high school students' computing abilities, and their interest in studying IT as a college major. The study group included 941 mid-western American high school students. While Moorman and Johnson (2003, 195) report the use of computers to be equal among girls and boys, more girls than boys regarded a career in computing as boring. Clarke and Teague (1996 p. 241) explored why there are not many girls in computing courses at university level**.** Their sample consisted of 34 male and 34 female students who enrolled in a university computer science course, 33 secondary school girls (between 13-17 years old), and 19 women working in IT careers. Clarke and Teague (1996, 243) found that girls had learned computing at school and found it boring.

Graham and Latulipe's (2003, 322) study (n = 40) was to attract female high school students to computer science. They also aimed at determining whether early exposure to the computer course

might have any affect on such attitudes. Graham and Latulipe (2003, 325) found that girls used computers almost every day for emails, word processing, surfing on the web, chatting and research.

Varkila (1992, 29-30) shows that computer usage among students is male dominant. Men use computers more than women, but the type of computer usage is similar for both genders. Based on a literature review, French & Richardson (2005) assert that women see computers as tools to get a job done quickly, and men see computers as toys, and enjoy surfing and playing.

2.3 Leisure Software

Leever *et al*. (2002, 171) argued that leisure software has been primarily designed to appeal to men, but recently more games have been designed for women. They maintain that the software industry has noticed that girls want different kinds of software and games than boys (Leever *et al*. 2002, 171). Based on a literature review, French & Richardson (2005) assert not only that the main users of computer games are boys, but also that the main characters in the games are male.

Moorman and Johnson (2003 p. 194) found in their study that 72.4% of male respondents play computer games, while the corresponding figure for female respondents was 45.9%.

2.4 Stereotypes

The stereotype of the male hacker is reported as one reason women are not keen on studying computer science (Leever *et al*. 2002, 172). Young women want to avoid the "geek with a monitor tan" image (Graham & Latulipe 2003, 322). According to a study by Clarke and Teague (1996), girls see computer users as male hackers or as word processing operators (Clarke & Teague 1996, 243). Trauth (2002) noticed that many personal traits that respondents (women in her study) possessed led many of them to become "odd girls out".

According to Teague (2000, 149), women are indoctrinated to live according to stereotyped roles in society, during their high school years in particular.

2.5 Underestimation of abilities

According to an empirical study by Moorman and Johnson (2003, 195), girls underestimate their own skills in comparison to others' skills, particularly in comparison to males. Even if girls have the same or better grades than boys in maths and computer science, they underestimate their own skills compared with those of boys, according to these findings. Female students view themselves as less competent in advanced skills, for example writing programs (von Hellens *et al.* 2001b).

2.6 Role models

Positive role models are important for removing stereotypes (and changing attitudes) and they help girls to see that IT workers are simply ordinary people, not anti-social techies who "eat code" (Graham & Latulipe 2003, 325). Female role models can show that women's success in the IT field is possible (Leever *et al*. 2002, 174). According to Moorman and Johnson's (2003, 195) study, female role models will help to change the perception that computer science is a male field. According to Trauth *et al.* (2003) too, young women need role models.

2.7 Attitudes of university students towards the field of information technology

According to Jousranta's (2002, 21) study, the structure of society is becoming more and more computer-related: IT is important in many walks of life. Hence Jousranta sees the IT field as the field of the future. Jousranta also found that the respondents believed the IT field to have well-paid positions.

3 RESEARCH METHODS AND SETTING

The aim of the study was to explore the attitudes of female sixth form students towards the IT field. Qualitative content analysis was employed as the research method for this study. Two reasons justify the use of qualitative content analysis. First, the aim of the study was to understand what girls think about IT in reality. Indeed, content analysis allows one to use a theory-creating research setting. This study explores the girls' attitudes without any particular theory in mind, and aims to conceptualize the girls' original attitudes as they emerge from the essays written by the girls. Content analysis is appropriate for this purpose.

Second, content analysis is useful in abstracting the key information from rich material, such as the data in this study, without losing any important information from the material. That is, a good content analysis aims to compact the important information and put the key message of the rich original material in a brief and concise form (Strauss & Corbin 1990, 22.). The categories created through the use of content analysis should be same as the original thoughts of the research population. Hence, the categories synthesized from the text are considered valid if they express the respondents' true opinions. To show this, we offer original quotes from the text to support our findings and categorizations.

The research population consisted of essays by 64 people. The essays were collected from female sixth form students in the year 2000 (n = 54) and in 2003 (n = 10). The essays were the results of two different essay competitions, which were held by a Finnish university. The strength of the essays is that they describe their writers' genuine opinions, unlike interviews, in which the respondents are open to prompting. Therefore, it is no wonder that the use of personal documents, such as essays, have a successful and long history in qualitative research and social science (Taylor & Bogdon, 1998). In this study, a female sixth form student is understood as a female student who is aged between 16 and 19 years old and is studying in an upper secondary school in Finland.

4 RESULTS

The results highlighted both positive and negative images towards the IT field. These two main classes are divided into five subclasses: field, professions, employees, studies and information technology (Table 2). The results are analyzed category by category, starting with positive images.

Positive images	Number/percent	Negative images	Number/percent
Field		*Field*	
□ highly-valued	21/32.8%	□ competition	3 / 4.7%
□ developing, growing	12/18.8%	□ urbanization	2 / 3.1%

□ field of the future	9 / 14.1%		
□ challenges	2 / 3.1%		
Profession		*Profession*	
□ benefits	34/53.1%	□ boredom	8/12.5%
□ employment	19/29.7%	□ monotony	9/14.1%
		□ occupational hazards	13/20.3%
		□ antisocial aspects	9 / 14.1%
		□ rush	3 / 4.7%
		□ stress	3 / 4.7%
Employee		*Employee*	
□ elegant and dignified	7 / 10.9%	□ geek	22/34.4%
□ capable	7 / 10.9%	□ antisocial	8 / 12.5%
□ gifted	8 / 12.5%		
□ high education	8 / 12.5%		
Studies		*Studies*	
□ necessary	2 / 3.1%	□ physics and mathematics oriented	4 / 6.25%
□ good employment possibilities	8 / 12.5%	□ interruption	3 / 4.7%
Information technology		*Information technology*	
□ useful	16 / 25%	□ computerization	4 / 6.25%
□ acceptable	5 / 7.8%		

Table 2. The results of the study.

4.1 Positive images

Although many girls do not perceive IT as being their profession, they nevertheless have positive attitudes towards the field. According to the girls, the IT *field* is *growing, developing, and respected,* and it is seen as *a field of the future*:

"Information technology is a continuously expanding field. Development in IT is happening all the time: better and better devices are being invented."

"Many people appreciate the IT field. It is one of the fields of the future."

While two girls consider the field not to be among the most respected by the general public, they nevertheless think that the popularity of the profession is rising:

"The field is not one of the most highly respected of professions, but appreciation for the profession seems to be increasing."

Two girls think that working in the *field* is *challenging*:

"The work is very challenging and success is great."

Thirty-four girls think that the profession's *good employment possibilities and benefits*, including travel, a good salary and a company car, are tempting:

"There are of course good aspects to the work: the salary is good, you get to travel and you have a company car, maybe even a company house."

"The field is well-paid and employees get good benefits. A company will give its workers a company car and laptops"

Seven girls consider *employees* in the field to be *elegant and dignified*:

"... they dress smartly in black trousers and jackets, and carry expensive-looking briefcases with them."

Eight girls consider *employees* to have a *high level of education* with advanced skills:

"The information technology employees that large and small companies are hiring are well-educated and skilful."

Eight girls see the *employees* of the field as trained and *gifted people*:

"I think that if you want to become successful in the IT field you need particular talent: it seems that whiz-kids and geniuses dominate the field."

Eight girls think that *studying* the IT field offers *good employment possibilities*. Moreover, two girls think that it is *necessary* to study IT anyway, because computers are everywhere, and needed in any profession:

"IT companies are hiring more IT employees, and therefore it would be good to study information technology."

"All of us should be able to know how to use a computer, since everywhere, whatever you're studying, you need to use computers."

Sixteen respondents suggest that *information technology* is *useful* and five girls think *information technology* is *an acceptable* thing and that we use it in our everyday life:

"For me, information technology is only a benefit which makes my life easier, and which will bring benefits to me and to our society."

4.2 Negative images

Two girls do not like the *field* because they think all the *work is only in big towns*, and three girls think that *competition* in the field is tough:

"The negative side of the field is that the jobs are mostly in cities, and if you are interested in those jobs, you have to leave your home area."

"As I mentioned earlier, the work is demanding and competitive, but if the demands are too great for you, you can always choose another field."

IT-based *professions* are associated with *rush*, *stress, and monotony,* and are seen as *dull*:

"My own view of the IT profession is that it is a dull profession, and therefore I cannot imagine myself as an IT professional."

"The work can be very hard and stressful, although you might think that they are just sitting in front of a computer."

Thirteen girls also think that the *professions* in the field have many *occupational hazards*: head, neck and shoulder pains:

"In the field of information technology, your pay includes not only a large salary, but also backaches and neckpains."

The *employees* are seen as *antisocial* and lonely:

"In brief, information technology as a job is boring and lonely, albeit well paid and highly-valued."

Nine respondents' image of a 'nerd' is changing from the 'man in a suit' to an ordinary man:

"The employees I know are ordinary people, who have to wear suits for business meetings. But they still wear tracksuit trousers in their homes, just like other people."

"Needless to say, many who work in the IT field do not use computers at home, and their real images are far from the image of a nerd."

Five of the girls have noticed how the media has affected their images; for example, the concept of the nerd has been created by the media:

"I think that the media has affected the development of the stereotypes. Magazine covers portray IT people who are either showing off their new sports cars, or who have their noses glued to the computer screen."

Four girls consider it negative that studying IT requires courses on *physics and mathematics orientation*.

One girl does not want to go into the field because she would have to *drop out of school* and go to work before she before graduating. Overall three girls mentioned the aspect of dropping out of school as a negative thing:

"Students are recruited in the very early stages with the consequence that they do not have time to complete their Master thesis until they have been working for many years. I could not do it."

Furthermore, four of the girls think that all activities will become computerized:

"I am afraid that, in this promised land of information technology, everything will be computerized"

4.3 IT as a profession

The reasons why girls choose or do not choose IT as a profession are shown in Table 3.

IT could be my profession	Number / percent	**IT would not be my profession**	Number / percent
physics and mathematics oriented	1 / 1.6%	IT jobs are not human related	15 / 23.4%
challenges	1 / 1.6%	the work is too computer related	11 / 17.2%
employment	6 / 9.4%	unfamiliarity of IT	9 / 14.1%
interesting	2 / 3.1%	craftmanship	2 / 3.1%
		physics and mathematics oriented	4 / 6.25%
		nervous	1 / 1.6%
		passing fad	1 / 1.6%
		preparedness to use computers	8 / 12.5%

Table 3. IT as a profession (n = 64).

According to the respondents, the respect for the field, the profession's good *employment* possibilities and benefits tempt them to choose the field. Six girls think that such employment is tempting:

"Information technology is the profession of the future, in which people are investing a lot. So my road will be in computer education, if I want to get a well-paid job, or even any kind of job in the future."

Two girls think that information technology is a captivating and *interesting* thing:

"I have thought about going into the information technology field when I graduate, or studying something where information technology is included as a significant part of the studies. Information technology fascinates me and one reason for that is the low numbers of women in the field."

One girl also thinks that learning new things is a reason for choosing the field.

"I would like a job where you can learn new things all the time and you can develop and widen your skills. I think information technology provides excellent, varied possibilities for this."

One of the girls thinks that studying *physics and mathematics* is a good benefit if she wants to enter the field:

"I have not yet found the field that interests me, but, perhaps because of my studies in mathematics and physics, it would be possible for me to study, and even get a profession, in this field."

4.4 IT – not as my profession

Many girls have negative attitudes towards the field. These views explain the underlying reasons that these girls do not want to study IT. Fifteen girls perceived that the field is *not human-related* (the work is only computer-related, according to the respondents):

"Working in the field of information technology is not human-related, except that employees go to drink coffee together. The work is related to technical values, so my interest quickly comes to an end when I start to hear talk about it."

The work is only computer-related, according to the respondents. Eleven girls think that *working with a computer* indoors is a monotonous and dull thing to do:

"I could not imagine earning my bread in a dusty, boxy office, reading screens full of text and clicking away at the mouse. It doesn't sound like my dream job."

"The worst, most horrible image I have about my soon-to-be job is that I end up sitting in a small stuffy booth, referred to as an office, and tapping at the computer all day long without meeting a single living creature."

Skills in *mathematics and physics* are also listed as key reasons that four of the girls do not want to become IT students:

"If I wanted to get into the information technology field, I would have to be good at mathematics."

Nine girls think that they *do not know enough* about IT so they suggest that they cannot enter the field:

"I could not become an information technology professional. I don't understand anything about the machines – and every time I work with them, they start to act strangely."

"If I could do more than write emails and surf on the net, or use basic word processing, I would head straight to the nearest university to take up information technology."

One girl thinks that the field is not suitable for *nervous* people like her:

"But this field cannot become my field because I am nervous and I do not possess steady hands."

One girl thinks that the field is a passing fad, so she does not want to participate in it:

"If I consider my personal skills, the information technology field could be a likely study possibility. But I will still continue my lonely battle against the present bandwagon, and will say no to it."

Two girls want to *work with their hands*, so they think that the tasks involved in the field are not for them:

"I am more interested in working with my hands than in using machines in order to do something."

Eight girls think they will use *information technology* in their future work, but they do not want to be IT professionals:

"Information technology is not necessarily going to be my profession, but it will be a large part of the profession I practise in the future, because information technology will be a bigger and bigger part of every profession."

The reasons for which the girls do not want to perceive IT as their profession imply that the negative images of the field have affected the girls. The girls mostly see the IT field's public image as positive, but the negative images affect them so that they do not want to enter the IT field. These girls believed that the field was not human related. Skills in mathematics and physics are also listed as key reasons that some girls do not want to become IT students. It was also interesting that some girls observed that IT companies were recruiting students. They believe that such recruiting would hinder their IT studies, and as a result they do not want to start studying IT.

4.5 The comparison of the results with the previous studies

The results confirm the results of previous studies. As Jousranta (2002) reports, university students believe that the field of IT is growing, developing, and respected and it is seen as the field of the future. According to Jousranta (2002), information technology has a very important role in everyday life and if you want to get a job, you have to know how to use IT. This study also shows that university students think that information technology is a useful and acceptable thing and that we use it in our everyday life. Jousranta (2002) also suggests that the 'technology bubble' will burst, and the number of jobs will decrease. In this study some girls think that the employment prospects will deteriorate in the future.

Furthermore, as in Varkila's (1992) study, students at vocational school have a positive attitude towards IT. Students think that it is useful to know about IT, even if they do not have a clear idea as to how they will use IT in their professions. The girls represented in this study think they will use IT in their future work, but they do not want a profession in the information technology field.

Our findings confirm those of Leever, Dunigan and Turner (2002): women do not see IT-related jobs as negative, but they do not want to work in the field. Leever, Dunigan and Turner also reported that students believe IT studies and work to require skills in mathematics and natural science. This was also apparent in our study. A study by Margolis (2002) suggests that women avoid computer science, because they do not wish to be seen as "nerds". Klawe (2002) also thinks that the image of the nerd doing a dull and simple job does not attract girls into the IT field. The views expressed in Margolis's (2002) and Klawe's (2002) studies are also supported by this study.

A study by Moorman and Johnson (2003) found that women do not have enough female role models in the IT field. In the present study, too, one girl noticed that girls need female role models.

In Graham and Latulipe's (2003) study, the girls' opinions of computer science were negative at the beginning of the seminar. At the beginning, a computer scientist was seen as a geek who works with computers all day. The girls' views changed during the seminar, so that they saw the computer scientist as an ordinary person. The reasons for this change were the positive role models. These views are similar to the views of the girls in this study: the girls reported that since they have got to know people who work in the IT field, their attitudes towards IT have changed.

Teague (2000) reports that girls do not want a career in IT because they have misconceptions about the nature of IT careers. This is similar to our study: the respondents believe that in the IT field you just sit with a computer all day. Similarly, a study by Clarke and Teague (1996) suggests that stereotypes explain why women do not participate in computer science classes. Women see the IT field as related to mathematics and technology. Girls see a computing career as boring. These views are similar to those of the girls in this study.

5 DISCUSSION AND CONCLUSIONS

The study is open to some typical limitations, such as the small sample size. The results suggest that many girls have positive attitudes towards the IT field, including Computer Science, Information Systems and Software Engineering. According to the girls, the IT field is growing, developing, and respected, and it is seen as the field of future. The girls think that IT professionals have good employment prospects and benefits. Some of the girls also think that studying in the IT field will bring you good employment prospects, and that it is necessary to study IT anyway at some level, because computers are being used everywhere. IT professionals are also seen as well-trained and gifted people.

Some girls do not like the IT field because they think that the only work available is in towns, and that there is too much competition in the field. IT professionals are associated with rush, stress, monotony and dullness. According to the girls, IT professionals have many occupational hazards such as head, neck and shoulder pains. IT professionals are regarded as antisocial and lonely.

According to the girls, the respect shown for the IT field, and professionals' good employment prospects and benefits tempt them to choose the IT field. A small number of the girls think that IT is a captivating and interesting thing. One girl thinks that the opportunity to learn new things is a good reason to choose the field.

Negative views are the reasons that these girls do not want to study IT. According to the girls, the field is not human-related, and the work is only computer-related. The need for skills in mathematics and physics is one reason some girls do not want to become IT students. A few girls think that they do not know enough about IT and this is a reason that they cannot enter the field.

According to some girls, the underlying reason that girls do not want to get into the IT field is that they do not really know what the field is. The girls suggest that advertising is a good way to affect girls towards reducing their stereotypical views.

This suggests that stereotypes are one reason for the low numbers of women in the computing field. Advertising using female role models could be one way to affect girls and reduce their stereotypical views. Moreover, educational institutions before the university level should provide a wider picture of

the different work involved in the IT field. Not all IT positions require extensive skills in maths and physics. In fact, Information Systems and MIS positions may benefit from people with a humanities or social science background (Dhillon & Backhouse, 2001). Teachers in high schools and other equivalent institutions should be encouraged to tell this to their students.

Acknowledgements

We thank anonymous reviewers for their insightful comments concerning the previous version of the paper.

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