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Educated Physically Disabled Women in the Information and Communication Technology Sector

Jukka Mononen, University of Oulu, Faculty of Information Technology and Electrical Engineering, Oulu, Finland
Raija Halonen, University of Oulu, Faculty of Information Technology and Electrical Engineering, Oulu, Finland

ABSTRACT

The purpose of this study was to analyze how highly educated women with physical disability (WwPD) are employed and integrated in the information and communication technology (ICT) field as experienced by themselves. This question is important due to the lack of knowledge regarding the employment of highly educated WwPD in the ICT sector. An empirical study was carried out with the help of a qualitative research method that involved eight interviews. The study showed that disability has a significant impact when women choose the ICT sector for their studies. However, one of the significant findings was that the individuals characters matter the most.

KEYWORDS

e-Inclusion, Higher education, ICT Work, People with Disabilities, Women with Physical Disability (WwPD)

INTRODUCTION

This paper introduces research that focused on highly educated women with physical disability (WwPD) and their experiences when getting jobs in the information and communication technology (ICT) sector after graduating with a diploma suitable for this sector. Studies on female employees in the ICT sector have been carried out for some decades (e.g., Statistics ICT in Nordic countries, 2001; Preston, 2006; Abdelgawad et al., 2012). This paper adds an important viewpoint to the research, i.e., that of physical disability.

According to Banks and Lawrence (2006), people with disability (PWD) are able to work in non-manual jobs better and longer than in manual jobs. This might be partly due to the general assumption that the ICT sector is not physically demanding, which was also expressed by some of the interviewees in the current study.

Regarding working, Nikulainen and Pajarinen (2013) reported that employment in the ICT sector saw a significant increase during the 1990s, but after being fairly stable in the mid-2000s, it started to decline before 2010. However, they also reported that manufacturing, services, and software in the ICT sector have experienced different trends, as the manufacturing and service industries have declined in recent years and the software industry has grown significantly.

Furthermore, the study of Nosek et al. (2003) strongly argued that disability and education have a strong direct effect on women's employment. Clayton et al. (2012) confirmed that the underrepresentation of women in the ICT sector seems to persist. Unemployment perceived by PwD was also reported by Abdelgawad et al. (2012), who studied the influences of supportive actions carried

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out by the public services sector in Norway. According to the authors, the number of unemployed PwD did not decrease despite the supportive actions that targeted them.

Vidacek-Hains et al. (2011) have studied PwD in relation to education. According to their findings in Croatia, the number of PwD who want to pursue their higher education is increasing. They noted that there are several institutional resources available that make it possible to offer higher education to people with learning difficulties or other disabilities. Likewise, the government in Finland is committed to increasing educational equality and access to education. PwD are encouraged to build their autonomy and social participation by gaining more education. Finland is committed to supporting people's access to education despite their issues related to age or disabilities (STM, 2012, p. 41-12.)

We ask the following question in this paper: How do highly educated WwPD get employed in the ICT sector as experienced by themselves? The topic was investigated by questioning how disability affected choosing the field, gaining employment, and working in the ICT sector.

In the current study, a qualitative research method was applied together with semi-structured interviews that were conducted with eight Finnish WwPD. The disabilities of the interviewees varied widely. All but one of the interviewees had completed a university degree or a polytechnic degree that was suitable for the ICT sector. In addition, all of the interviewees had either worked in the past or worked at the time of the study in the ICT sector.

Our study concerned only physical disabilities due to their permanent nature. The analysis of the interviews carried out in the current study showed that disabilities do significantly impact the choice of studying in the ICT sector. Contrary to earlier knowledge about difficulties of gaining employment, the current study suggests that, in general, it is not too difficult to get a job in the ICT sector if one has a higher education degree related to the sector. However, the study revealed that WwPD also have negative experiences related to getting employed.

LITERATURE REVIEW

The Nordic countries have paid attention to female employment for decades. The statistics reveal that the share of women in the labor markets ranged between 64% (in Finland) and 83% (in Iceland) in the late 1990s (Statistics ICT in Nordic Countries, 2001). Related to gender issues, Triventi (2013) verified that wage-related discrimination between genders is lower in Nordic countries and higher in the Czech Republic and the UK. Machova and Filipova (2013) explained the wage discrimination with family characteristics, which were also mentioned by Triventi (2013).

In the ICT sector in the Nordic countries, more females were employed in the ICT manufacturing industries than in the ICT service sector. In practice, women's employment in the ICT service sector is lower (29%) than in the service sector in general (43%) (Statistics ICT in Nordic Countries, 2001).

In their qualitative study Trauth et al. (2004) analyzed the underrepresentation of women in the IT sector, especially in the US. Their study included 44 interviews with women representing several nationalities and ages. Trauth et al. pointed out that the individual differences among people matter, and that employment strategies and management should understand these differences and take actions based on an understanding that such differences can benefit society. According to von Hellens et al. (2011), the number of women in the ICT sector continues to decline.

Considering the gender perspective, Preston (2006) interestingly reported that more than 50% of the male students thought about a relationship where they worked fulltime and where their female partner worked part-time, while about 40% of the female students thought about a relationship where they worked part-time and their male partner worked fulltime. Hunter (2006) analyzed gender-based discrimination from two viewpoints: based on existing reports about issues related to an antidiscrimination law and based on experiences shared during interviews with female IT professionals. Her study showed that most women she interviewed either do not perceive discrimination or do not want to report it. In addition, most perceived or reported cases of discrimination in her study were related to pregnancy or maternity.

Besides gender issues, earlier research has recognized discrimination based on disability. Based on their selective review, Burke et al. (2013) provided an overview of research findings related to employers' attitudes toward hiring disabled people. They examined influential factors, including the hiring process, provision of accommodations, work performance, and affective reactions and behavioral intentions toward PwD. Despite the relatively positive results, the authors suggest conducting more research on hiring and retaining workers with disabilities. In many countries, the law guarantees the rights of persons with disabilities. For example, in the UK, the Disability Discrimination Act (DDA) makes discrimination on grounds of disability unlawful (Banks & Lawrence, 2006). Verloo (2006) argued that as a pioneer in gender equality policies, the European Union is reaching toward multiple equalities when seeking for ways to restrict discrimination.

ICT has been reported to enhance access for PwD as well as to build barriers for them (Simpson, 2009). Singh (2013) revealed the status of PwD in India, which has one of the largest disabled populations in the world. He strongly emphasizes the role of ICT as an empowering tool that enables socioeconomic development at the individual, community, national, and global level. Similar to Simpson (2009), he also argued that lack of access to ICT produces digital divides for PwD.

In Finland, the unemployment rate of PwD is significantly higher than that of the non-disabled, and it is rather challenging for persons with disabilities to find their first job in Finland. As a result of this issue, the administrative sector under the Ministry of Employment and the Economy helps PwD to get employment (STM, 2012, pp. 45–49). To investigate how PwD perceive their employment in the ICT sector, Mononen and Halonen (2014) carried out a study in which the working positions of the informants varied from a CEO to a tester. In that study, six of the nine interviewees had not noticed that their disability had influenced their employment in any way. One of the interviewees revealed that he had applied twice for the same job; in the first round, he informed he was disabled and never got a response. In his case, the second application led to the interview.

Even if not commonly known, the number of women with disabilities between the ages of 16–64 years comprises almost 17% of the US noninstitutionalized civilian population, while about 43% of women over the age of 64 are disabled (Waldrop & Stern, 2003). Hughes (2006) reported that approximately one of every five women in the US has a disability that limits their life activities. Another study from the US revealed that women with disabilities have significantly lower self-cognition and self-esteem, lower rates of salaried employment, and greater isolation than women without disabilities (Nosek et al., 2003). In the UK, the number of disabled people in the working-age population is about 7 million, i.e., approximately 19% of people between the ages of 16–64 (Meager & Hill, 2005). Trauth et al. (2015) pointed out that PwD are aware of their constraints and that many of them think that an ICT career might suit them very well because of their disabilities.

Based on their literature review, Schartz et al. (2002) introduced a theoretical model of environmental factors, organizational factors, attitudinal factors, and individual characteristics in relation to outcome variables. They suggested that more research is necessary to assess future employment options for qualified PwD. They identified the following three themes to be relevant for the employment of PwD in the ICT sector: positive employment experiences, concerns about providing reasonable accommodations, and hierarchy of disability prejudice. The use of the Internet among PwD was analyzed by Vicente and Lopez (2010). According to their study, larger income decreased the probability of technology concerns, while higher education increased positive experiences with the use of ICT. Furthermore, employment was seen as a significant driver toward the use of ICT. However, PwD seemed to be less likely to use the Internet even if they had the same income level as their counterparts without disabilities.

Higher education was noted also by Baumberg (2015) who reported that flexibility in work is more common among better-educated people and that finding more suitable work is easier when one has better education-based qualifications. Baumberg (2015) noted that people with lower education are not sufficiently employable to get the type of work they could do despite their disabilities, and thus they might have only a remote possibility to find suitable work. Regarding higher education

of disabled students, Vidacek-Hains et al. (2011) proposed a supportive and effective academic environment for students who have disabilities. Such an environment would offer contemporary ICT for the students. Based on their research, the authors believe that such learning environments would be valuable in the future.

Interestingly, disability can be seen as an asset in the labor market, as reported by Mononen and Halonen (2014). Alm Andreassen (2012) highlighted that a disability can be seen as an asset when seeking a job. She mentioned positions for workers with disabilities in health and social care services, where experiential knowledge of disability can be a positive attribute and can lead to expanded perspectives regarding disability employment policies.

In her literature study Stendal (2012) argued that there is wide agreement about ICT being a valuable tool for PwD. Stendal classified the themes discussed in the research papers as follows: access to technology; inclusion, exclusion, and empowerment; and training and rehabilitation. Disabled people can utilize ICT in their social life, in their studies, and for their personal needs. However, PwD do not utilize ICT to its full potential. Studies also show that PwD's attitudes and concepts toward ICT vary from country to country (Stendal, 2012).

RESEARCH PROCESS

This section is divided into the following three sections: the Sample section describes the research data and how it was collected. In the Analysis and Results section, the interviewees' answers are discussed question by question. The last section summarizes all of the main results of this research.

Sample

The empirical research sample consisted of semi-structured interviews (see, e.g., Lamb & King, 2003) with eight Finnish women. We used a variety of approaches to reach suitable interviewees, but during the early stage of research we noticed that it was very difficult to do so. The issue emerged probably due to the fact that there are a quite limited number of women in Finland who have some kind of physical disability, who have higher education, and who have worked or are working in the ICT field. In addition, employers and other institutions in Finland are not allowed to register employees' disabilities. Organizations must not give any information revealing discrimination or related attributes about their members due to legislation.

Due to the above-mentioned restrictions, the interviewees were sought via some national journals about disability, social media, and through private networks. A few interviewees were contacted through these means, and some of the interviewees told their friends about this research, who then made contact with the researchers. We can thus talk about a small-scale snowball effect (see, e.g., Noy, 2008). Overall, this research data was quite challenging to collect; interviews were conducted between September 2014 and September 2015.

The questions were based on the literature review conducted in a previous phase of the study (Mononen & Halonen, 2014) and were submitted to the interviewees before the actual interview to enable pre-thinking. In the current study, all of the interview questions were open-ended questions in order to provide a real opportunity for the interviewees to express what they had on their minds.

In the current study, all of the interviewees were asked twenty-one questions related to their disability, studies, and work. The researchers promised the interviewees that their identities would remain hidden and no details would be revealed when reporting the results. Each interview took about 30-45 minutes and they were conducted in Finnish. All the interviews were audio-recorded and transcribed by the first author. The quotations were translated by the authors. Six interviews were conducted via Skype, while the remaining two interviews were conducted face to face.

A brief description of each of the eight women interviewed is provided below. The descriptions were based on the answers given by the interviewees, and they were approved by the interviewees before publishing.

Maria (neuromuscular disease, 32 years) had graduated from a university as a Master of Science in interactive technology. At the time of the interview, she was finalizing her Ph.D. studies. She uses a wheelchair. In childhood, she dreamed of becoming a lawyer, a psychologist, or an architect after becoming aware that she could not do physical work. Maria was about 7 years old when her parents purchased their family's first PC, and in high school she decided to study the ICT field. Maria said that in the beginning, she used the computer mainly for gaming and word processing.

Anna (cerebral palsy, mainly affected in the lower limb, 36 years) graduated as an electrical engineering Master of Science in Technology. Anna's disability affects mainly her lower limb's activities and her physical balance is abnormal. Anna realized at a very young age that she cannot do physical work and that she must work in an office. Anna said that it was quite obvious that she was going to study at university, because studying was easy for her. Anna shared that she chose her field of study because she was interested in math and computing. Anna's family purchased a computer when Anna was about 10 years old. At the beginning, she programmed worm games.

Sarah (multiple sclerosis [MS], 39 years) had two degrees in different fields. She completed a Ph.D. in biology about 10 years ago and later graduated with a Vocational Qualification in Business Information Technology. Sarah said that her disabilities affected her choice of education the second time she was choosing a program, because at that time she knew about her MS disease. Sarah received her diagnosis about 10 years ago. Sarah's disability affects her physical ability and she is not able to walk long distances. She said that in childhood she did not utilize IT at all, but later at work she learned how to use computers.

Julia (dysmelia, congenital transtibial amputation, and total congenital amputation on her other hand, 41 years) graduated as an industrial engineer from a polytechnic school. She is walking with prosthesis. Julia said that her disabilities have not affected her choice of field of study. She had not been involved with IT before her studies.

Rachel (congenital deficiencies: high-level amputation of both legs and one arm, malformations in the other hand, 56 years) got a Master of Science degree in mathematics and computer science, and she later completed her Ph.D. in biostatistics while also working. Rachel said that when selecting her field of study, she had to consider what would be realistic for her. She became interested in IT at the age of 15 when she programmed her father's assignment with Basic and received good feedback from him about the work she'd done. Rachel said that when she was young, consumer electronics were not as widespread as they are today.

Mary (short stature, 57 years) received her Diploma in Business Administration in accounting. At her current work, she has completed graphical design studies in different universities and polytechnics. Her disabilities have not affected her study-related choices and she has been open-minded regarding her field of study. Her disabilities have influenced her, for example, in dimensional issues. They also prevent her from walking long distances or up and down stairs. When Mary was young, she utilized a computer mainly for word processing.

Susan (postnatal tetraplegia caused by polio, 65 years) received a Dressmaker Diploma in her youth, but she noticed very early that she could not work in that occupation because her lack of muscular force. After that, she completed her Diploma in Business Administration, after which she began her Master of Economics studies. After graduation, she worked for a while in the economics sector, and it was during this time that she became inspired about IT. As a result, she decided to pursue information processing designer studies. Her disabilities significantly affected her selection of a field of study. Before beginning her latest studies, she did not utilize IT very frequently.

Tina (postnatal amputation of the upper knee, 67 years) received her Bachelor in Science in Mathematics and Information Processing. Tina said that when she was young, she dreamed about healthcare occupations, but these were not appropriate for her due to her disabilities. Tina said that her leg was amputated when she was young. She uses prosthesis when she moves, and she also uses forearm crutches outside. Tina said that there was no PC in their family when she was young.

ANALYSIS AND RESULTS

This research analysis phase was performed using an inductive approach when applying content analysis (see, e.g., Campbell, 2013). Analysis of the individual responses aimed at finding common factors and forming generalizations, and in this way, it produced new knowledge.

Four interviewees revealed that their disability had strongly affected their decision-making process when choosing their field of study. The women expressed that the main reason for selecting this field was because ICT sector jobs are not generally physical demanding and they thus knew that they could work in ICT sector positions after graduating despite their disability. Two interviewees said that their disability had not affected their choice of study at all. The remaining two said that their disability has played some kind of role in their decision making, but there had also been other alternatives to study.

As shown in Table 1, one interviewee had completed a polytechnic degree and six interviewees had a university degree. Two of them had a doctoral degree, three had a master degree, and one had a bachelor's degree. One of them who had a master degree was a doctoral student. One of the interviewees had taken courses at both the polytechnic level and the university level, but she did not have a finalized degree.

Six interviewees in this study were employed full-time and two were retired. During the study, three of the interviewees worked in the private sector and three in the local government sector (see Table 2). Interviewees' work experiences in the ICT sector varied, as two interviewees had about 6 years of experience and one interviewee had 39 years of experience in the ICT field. The remaining five interviewees had about 15 or more years working experience in the ICT sector.

The interviewees' job titles varied from a graphical designer to a researcher and a development manager. It was noticeable that almost all of the interviewees had worked for their most recent employer for a long time. Three of them had changed their workplace more than twice. One of them had returned to the same workplace where she had been working before graduation. Two women had started a full-time job before graduation. Many of the interviewees had acquired work experience at summer jobs and internships while they were studying. Seven women got full-time jobs very easily after graduation despite their disabilities. One of the interviewees shared as follows: "At that time

Table 1. Interviewees' Education Level

Degree	Amount
Doctor	2
Master	3
Bachelor	2
No-degree	1
TOTAL	8

Table 2. Interviewees' Work Situation

Employer	Amount
Private sector	3
Public sector	3
Retirement	2
Unemployment	0
TOTAL	8

when I started looking for a workplace, I got two jobs already on the first day, and I was having a hard time to choose one of them.”

Another respondent shared: “After my graduation, I have not been even one day without a workplace!”

However, many of the interviewees said that they had been lucky and that they could imagine that other disabled people may not be as fortunate as they were. For example, they shared the following:

I was very lucky and I have thought many times afterwards that if I had not gotten my recent job, it would be challenging to find a job. Even if I have been lucky, I've noticed that PwD must have a higher education than non-disabled in order for PwD to get the same level of work. I also think that employers require more work effort from PwD.

One of the interviewees said that her disability had had a negative effect on her employment after graduation. She said that she had not even been able to apply for a job at the workplaces. She explained that there had been buildings with physical obstacles and that she faced difficulties in moving due to her physical disabilities. She thought that at present, these kinds of barriers were mainly removed. She also reported the following:

At the employment office, they said that they don't need to help me to find a job because of my disabilities. I called the inspector at the Ministry of Labor and they contacted the local employment office and ordered them to find me a job. This was how I got a job. I have always had to fight hard on behalf of my rights.

Seven interviewees told that they had not mentioned their disabilities in their applications or CV. One of the interviewees shared openly in her job application about her disabilities. She explained as follows: “I told about my disabilities in my application because I thought that was fair. They are going to sign a contract of employment with me, not with my disabilities.”

Passing disability issues from applications and CVs was justified by the interviewees, for example, as informed by three interviewees:

I didn't tell about it, because I didn't even think that I should tell about it. I took it for granted that someone would employ me! Nowadays I could tell about my disabilities.

I don't tell about my disabilities in the application stage. However, when I get an invitation to the job interview, I tell about my disabilities if I know that the workplace is located in the kind of place where it is difficult to move or where tasks can include things that are difficult for me due to my disabilities. I have never mentioned in applications about my disability, because it's not a merit that improves your chance of getting a job. It's important that you tell about your disabilities openly at the job interview and especially at the workplace when you start there.

During their job interviews, the interviewees had noticed that their disability had an impact on some of the interviewers they encountered. They mentioned that interviewers were confused. When attending job interviews, the interviewers had asked, for example, how the respondent can travel and how former customers have reacted to their disabilities. The interviewees reported that some job interviewers had asked the following questions:

Do you even have a driver's license?

I want to ask you directly. How do people usually react when they see you are disabled?

This job includes travelling. How can you deal with this in spite of your constraints?

Most of the interviewees reported that they had not noticed that the injury had affected the job interviewer's behavior in any way. One said that she had had negative experiences in one job interview, where her disability had affected the behavior of the job interviewer negatively. One interviewee said that her injury had negatively affected her a few times at the stage when the job interviewer had called her to participate in the job interview and she had told about her disabilities.

Four interviewees said that their disabilities were so visible that they do not need to broach the subject of their disabilities in the job interview. Three of the interviewees mentioned that they openly spoke about their disabilities during the job interviews, and they also said that they ultimately told about their disabilities if the job interviewer did not ask about them. One of the interviewees said that she had never talked about her disabilities during a job interview.

One of the interviewees said that she would not have received her current job without her disability. She revealed the following: "My disability was an advantage, because one employer asked me to apply for the open position. They said that from their viewpoint, it is a benefit that I worked for their company."

Five of the interviewees said that their disabilities had not influenced the process of finding their next job. One said that her disabilities had influenced her when finding her next job. The remaining two said that they had not changed their employer at all since graduation. It is noteworthy that one of the respondents had returned to the same workplace where she had worked before graduation. Almost all of the interviewees had had long careers in their most recent workplaces.

One of the interviewees said that she had experience with society offering models that support PwD to get employment and that reduce the threshold for companies to employ PwD. Regarding these supportive models, she revealed the following:

I somehow feel that some of the employers take advantage of society's support models. They hire you if they get support for your salary costs from the society, even if they need your labor input anyway. I think that if you work somewhere, you need to get proper salary for your efforts.

Other interviewees did not have experiences with these kinds of models, but they thought that it is a positive concept. Some of them also doubted that the employers did not have enough information about these kinds of supportive models. Many of the interviewees said that their employer would have made small accessibility changes to the work environment at their own expense, if they had been needed. For example, one of the interviewees said: "I think that accessibility changes are very expensive to do, for example, a slanted road in the stairway. The coverable costs, which an employer can get from society, are quite low."

It appeared that most of the interviewees had experienced how their disability had had a positive impact in the workplace and the way their co-workers and customers reacted to them. The following examples reveal the positive attitudes that interviewees expressed:

It has been easy to develop spontaneous relationship with customers, because I am accessible and I have spoken openly of my disabilities and other issues about myself.

At the beginning of my career, some people had prejudices toward me, and some people, for example, pushed their help even if I didn't need it. When co-workers got to know me better, all went well.

Disabilities haven't significantly influenced my experience at the workplace, but some of my co-workers can appreciate me more than normally because I have had to struggle in more difficult conditions than they have. But this hasn't affected any concrete issues.

My work title kind of partly protects me against prejudices. I have thought that if I was a seller or an instructor where first impressions are very important, it could be more challenging to impress people.

One said that she needed an assistant's help in the workplace. She was able to perform her work tasks by herself, but she needed help for peripheral functions, for example, at lunch.

Five of the interviewees said that they needed help or assistive devices at work, but the need for help was mainly limited to reaching objects located high up or carrying tools like computers. The other three women did not need any special help. All of the interviewees got help regarding ergonomic issues from their employer, if they needed it. The interviewees described their assistive devices and need for help as follows:

I use my computer mouse upside down. I use voice recognition software for writing. Sometimes my colleagues can offer to carry my laptop if we go to some meeting that is located somewhere else. But if they don't ask, I carry it by myself. I don't need further help from my colleagues. Recently, I got a motorized door in my office, but it wasn't absolutely necessary. My colleagues help me with carrying my tray during lunch.

All of the interviewees mentioned that they use ICT during their spare time, at least to some extent. The use of ICT was mainly limited to social media, Internet surfing, listening to music, videos, and data gathering. However, one of the interviewees laughed and said the following during the interview: "I am responsible for purchasing the consumer electronic devices for my family, even though I'm a woman."

To conclude the research interviews, the interviewees were also asked to discuss their ideas regarding how disability had impacted their employment. The following quotations present a few topics that came up in the interviews:

Basic self-esteem is important to make it possible for you to convince employees. You have to trust yourself that you can manage your tasks. Don't let other people lead! The ICT sector suits PwD well, except for travelling.

It is useful for PwD to get as much higher education as they are capable of achieving. If you get your first chance (in the workplace), next time it's much easier. Earlier, PwD graduated in unrealistic occupations. I think it's easier to get a job if you have chosen the most suitable education area.

The society doesn't encourage PwD enough to get higher education. Our society usually offers easier solutions for PwD. I know many PwD whose potential hasn't been used entirely. It's very important that PwD are active themselves in pursuing their education, and they have to be determined to do so. Work life is quite crude at this moment. You should be as open as possible and tell about your constraints. This way it's easier for your co-workers to react to you and your disabilities.

It appeared that the main themes of the ideas revealed by the interviewees were as follows: 1) disability affects the choice of a place to study and 2) disability affects employment and acting in the workplace.

SUMMARY

This chapter outlines the empirical part of the study and the obtained results. The results of the study are reported in response to the following research question: How do highly educated WwPD get employed in the ICT sector as experienced by themselves?

Impact of Disability on Choice of Field of Study

This study found that disability had been quite a significant factor when the interviewees had made decisions about their field of study, but in childhood they had also had other dream occupations.

Only two of the eight interviewees said that their disability had not affected their choice of their field of study at all. Two of the interviewees said that their disability played some kind of role when they selected their field of study. The remaining four interviewees said that choosing to study the ICT field was quite obvious because work in the ICT sector is not physically demanding and they could thus work in such occupations despite their disabilities. Therefore, we can state that WwPD recognize their physical constraints very well. The interviewees in this study had extremely high education. Two of them had doctoral degrees and one was a doctoral student.

Impact of Disability on Employment in the ICT Sector

The study results showed that disability had negatively affected the employment of one of the interviewees. The others said that it was quite easy to get jobs after graduation or even before graduation. This might be due to the Finnish ICT boom, which saw its golden years around 2000. Many of the interviewees had graduated before or right after 2000.

Many of them also mentioned that they had been lucky and that they could imagine that other disabled people may not be as fortunate as they were. They also said that getting their first job had been significant in their careers. They said that during your first job, you are building your own workmanship, and that this experience protects you the next time you apply for a job.

The study verified that highly educated WwPD can be employed in the ICT sector, although some of the interviewees had encountered individual negative attitudes in relation to their disabilities.

Impact of Disability on Working in the ICT Sector

This study showed that interviewees' disabilities did not negatively affect them at the workplace. A few of them experienced that their disability had had a positive effect at their workplaces. One said that co-workers could appreciate her more than usual due to her disability. One interviewee said that it is easier for customers to approach her because she is different. She also said that it is easy to create friendly relationships with customers. A few said that new people can be prejudiced at the beginning, but when they get to know them better, they usually forget their constraints. Many of the interviewees brought up that WwPD must tell openly about their disabilities and their constraints, as doing so makes it easier for people to know how to react to their disabilities.

We also observed that almost all of the women we interviewed were able to work independently. One of the interviewees needed help from an assistant at the workplace, but the help was limited in other issues but work-related. The rest of the interviewees needed help only when reaching something located too high or when they needed to carry something heavy. Some of the interviewees needed special tools at the workplace, but such tools were limited mainly to ergonomic tools.

Based on our analysis we identified six high-level factors (Figure 1) that influence the success of WwPD in their working life in relation to their importance.

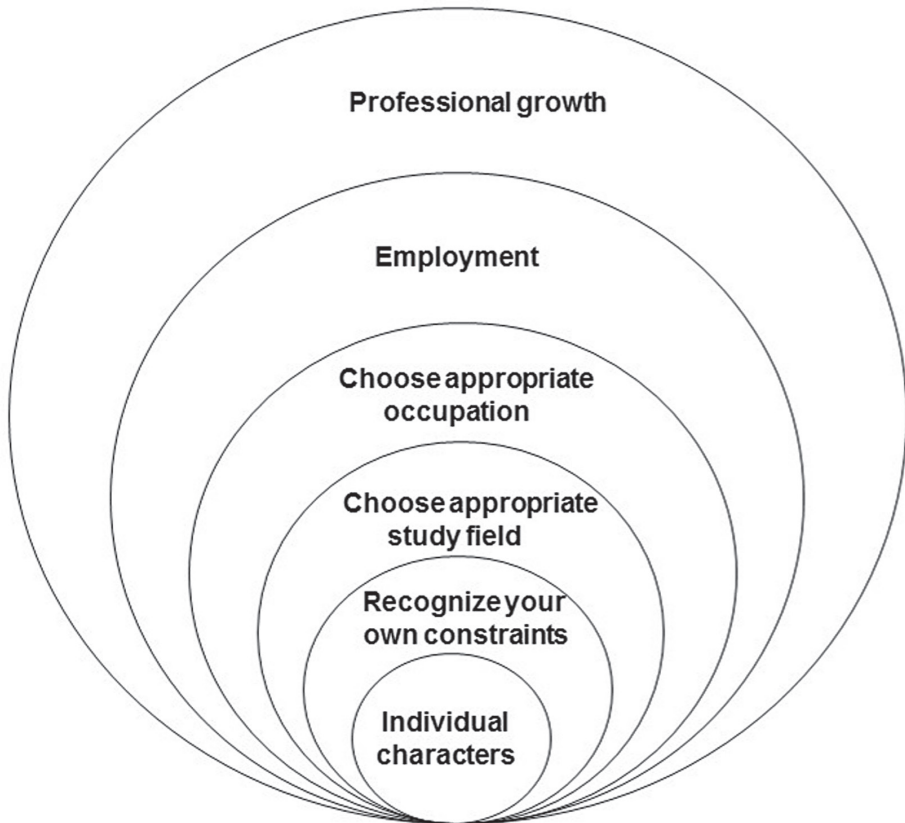
During the research process, we identified factors that had influenced the interviewees' working life success. The most critical success factor was individual characters, which seemed to be the core of success. We noticed the following common factors in the interviewees: They trusted themselves and they didn't see their disabilities as a weakness, even if they recognized their constraints that were caused by their disabilities.

We also noticed that individuals had to choose appropriate study fields if they wanted to succeed in working life. The individual had to be able to choose a study field that is interesting and a sector that is appropriate even if the individual has physical constraints.

It was also very important to WwPD to get their first job soon after graduation, which increased their possibilities in their future working life. Professional growth also improved their working success later in their working career.

As the success factors summarized in Figure 1 reveal, if the individuals had had high self-efficacy and had made an appropriate decision, they improved their chances to succeed in working life.

Figure 1. WwPD working life success factors



CONCLUSION

This study analyzed WwPD who have achieved high degrees in the ICT field. To solve the research problem, we asked: How do highly educated WwPD get employed in the ICT sector as experienced by themselves? The chosen viewpoint was that of the WwPD and the employers were not heard in the study.

We interviewed eight women whose age ranged from 32 to 67 years. Given its focus on female interviewees, this study contributes to results consisting only of male interviewees and their experiences of being employed in the ICT sector, which Mononen and Halonen (2014) presented in a previous study.

Finnish statistics have shown that PwD face a difficult employment situation in Finland (STM, 2012, p. 45). The same situation has also been reported elsewhere, and the issue is independent of the diploma people have earned (e.g., Vicente & Lopex, 2010; Vidacek-Hains et al., 2011). However, it appeared that almost all of the people involved in the current study were employed after completing their degrees. It also seemed that a few interviewees had experienced inappropriate behavior during job interviews.

Despite the smallish number of interviewees, this study verified that WwPD can be employed in the ICT sector in spite of their disabilities, and that they are able to integrate into the work environment even if earlier research revealed that the majority of PwD are unemployed in the US and in the UK (Nosek et al., 2003; Meager & Hill, 2005). According to the responses from the eight women, the

disabilities do not influence their work. However, a few interviewees revealed that there had been suspicious questions during the interviews when they were applying for jobs. On the other hand, some of the women had perceived that their disabilities had been seen positively at the workplace.

Some interviewees also noted that there might be people at the workplaces who are prejudiced against disabled people, but that such prejudice tends to disappear when people get to know each other. Furthermore, the interviewees also pointed out that PwD should openly tell about their disability to ease other people's misgivings. The current study showed that individual attributes matter (see Figure 1), which was also reported by Clayton et al. (2012).

The current study also revealed that many of the interviewees got PCs when they were young, and their parents encouraged them to use ICT or even to learn coding, thus verifying the findings of Schartz et al. (2002), who noted, e.g., environmental and attitudinal factors that predict employment. This result also verifies the findings of Simpson (2009) and Singh (2013), who emphasized that access to ICT reduces digital divides. Therefore, we can assume that PwD's parents have a big impact on their interest in ICT, and in this way influence their choice regarding the field of study.

Baumberg (2015) observed that higher education improves PwD's possibilities to get jobs despite their physical constraints. Graham et al. (2015) showed that PwD are aware of their constraints and that they know very well what kind of work they are able to do. Likewise, Stendal (2012) reported that PwD can utilize ICT for their study and personal needs. In this study, attention was drawn to the fact that the interviewees were extremely well educated and had very high degrees. Many of them had more than one degree. One of the interviewees commented as follows: "It is useful for PwD to get as much of a higher education as the individual is capable of accomplishing." This reveals that PwD recognize that education helps them get employment.

The study also revealed that WwPD are able to work in different positions in the private and public sectors. In this study, the interviewees told that they are working, for example, as researchers or project managers. Likewise, Mononen and Halonen (2014) reported that PwD are able to work in different kinds of positions in the ICT field, ranging from CEO to tester.

A few of the interviewees said that they had experienced prejudice in a couple of interviews, but that those had been individual cases. A few of them revealed that disability can also be a good attribute in work life, because it is easier for customers to approach them due to their disabilities. Likewise, Alm Andreassen (2012) and Mononen and Halonen (2014) highlighted that disability is not only a hindrance when seeking for a job.

This study has some limitations. First, even if the number of interviewees allowed for rich qualitative research material, it did not support any quantitative analyses. The limited number of interviewees is due to the national regulations that forbid employers from recording whether or not their employees are disabled. The same regulations are valid at the country level and there is no register that includes information about disabled workers. The second limitation was that we did not reach women who have had problems getting ICT sector jobs and are unemployed. Like many of the interviewees said, they had been lucky because they had found jobs so easily. They also thought that it is not so easy for all PwD. Overall, we assume that women who have working experience participate more easily in this kind of research than women who are unemployed. The third limitation of this study was that employers were not consulted; the viewpoint considered here was that of the physically disabled employee.

Further studies could investigate how the results differ between genders in this kind of study. It would be interesting to explore if PwD need to have earlier work experience and better education than their peers to get the same positions. Currently, there are few, if any studies on wage-related research between PwD and non-PwD. It could also be interesting to examine case studies that have been carried out in other work communities where PwD are working and collect data from PwD's co-workers, supervisors, and other related stakeholders.

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REFERENCES

- Abdelgawad, A. A., Snaprud, M. H., Krogstie, J., & Brynn, R. (2012). Disabled people from welfare to jobs: A decision support tool. *Proceedings of the Sixth Asia Modelling Symposium* (pp. 132-137). doi:10.1109/AMS.2012.24
- Alm Andreassen, T. A. (2012). Disability as an asset? Reflections on employment patterns in the health and social care sector. *Disability Studies Quarterly*, 32(3).
- Banks, P., & Lawrence, M. (2006). The Disability Discrimination Act, a necessary, but not sufficient safeguard for people with progressive conditions in the workplace? The experiences of younger people with Parkinsons disease. *Disability and Rehabilitation*, 28(1), 13–24. doi:10.1080/09638280500165120 PMID:16393829
- Baumberg, B. (2015). From impairment to incapacity—educational inequalities in disabled peoples ability to work. *Social Policy and Administration*, 49(2), 182–198. doi:10.1111/spol.12118
- Burke, J., Bezyak, J., Fraser, R. T., Pete, J., Ditchman, N., & Chan, F. (2013). Employers attitudes towards hiring and retaining People with disabilities: A review of the literature. *Australian Journal of Rehabilitation Counselling*, 19(01), 21–38. doi:10.1017/jrc.2013.2
- Campbell, J. L., Quincy, C., Osserman, J., & Pedersen, O. K. (2013). Coding in-depth semistructured interviews problems of unitization and intercoder reliability and agreement. *Sociological Methods & Research*, 42(3), 294–320. doi:10.1177/0049124113500475
- Clayton, K., Beekhuyzen, J., & Nielsen, S. (2012). Now I know what ICT can do for me! *Information Systems Journal*, 22(5), 375–390. doi:10.1111/j.1365-2575.2012.00414.x
- Hughes, R. B. (2006). Introduction to the theme issue on women and disabilities. *Womens Health Issues*, 16(6), 283–285. doi:10.1016/j.whi.2006.10.004 PMID:17188222
- Hunter, R. (2006). Discrimination in IT organisations. *Labour & Industry*, 16(3), 91–108. doi:10.1080/10301763.2006.10669332
- Lamb, R., & Kling, R. (2003). Reconceptualizing users as social actors in information systems research. *Management Information Systems Quarterly*, 27(2), 197–236.
- Machová, Z., & Filipová, L. (2013). Gender wage gap: Discrimination or different preferences of men and women? A Case Study of Ostrava, Czech Republic. *International Journal of Information Systems and Social Change*, 4(1), 53–67. doi:10.4018/jjisc.2013010104
- Meager, N., & Hill, D. (2005). The labour market participation and employment of disabled people in the UK (working paper). University of Sussex: Institute of Employment Studies.
- Mononen, J., & Halonen, R. (2014). Educated people with disabilities in the ICT field. *Proceedings of the 20th Americas Conference on Information Systems*, Savannah, USA.
- Nikulainen, T., & Pajarinen, M. (2013). Industry restructuring in the ICT sector. Retrieved from <https://www.etla.fi/wp-content/uploads/ETLA-Working-Papers-17.pdf>
- Nosek, M. A., Hughes, R. B., Swedlund, N., Taylor, H. B., & Swank, P. (2003). Self-esteem and women with disabilities. *Social Science & Medicine*, 56(8), 1737–1747. doi:10.1016/S0277-9536(02)00169-7 PMID:12639590
- Noy, C. (2008). Sampling knowledge: The hermeneutics of snowball sampling in qualitative research. *International Journal of Social Research Methodology*, 11(4), 327–344. doi:10.1080/13645570701401305
- Preston, A. (2006). An empirical analysis of the career expectations of women in science and technology courses. *Labour & Industry*, 16(3), 21–38. doi:10.1080/10301763.2006.10669328
- Schartz, K., Schartz, H. A., & Blanck, P. (2002). Employment of persons with disabilities in information technology jobs: Literature review for IT works. *Behavioral Sciences & the Law*, 20(6), 637–657. doi:10.1002/bsl.510 PMID:12465132
- Simpson, J. (2009). Inclusive information and communication technologies for people with disabilities. *Disability Studies Quarterly*, 29(1). doi:10.18061/dsq.v29i1.167

Singh, J. (2013). Exploiting ICT for empowering people with disabilities (PWDs). *Indian Journal of Inclusive Growth*, 1(1), 113–119.

ICT Statistics. (2001). The ICT Sector in the Nordic countries 1995-2000. Retrieved from <http://www.cnnic.cn/download/manual/international-report/2004080503.pdf>

Stendal, K. (2012). How do people with disability use and experience virtual worlds and ICT: A literature review. *Journal of Virtual Worlds Research*, 5(1).

STM. (2012). *Ministry of Social Affairs and Health. A strong basis for inclusion and equality. Finland's Disability Policy Programme VAMPO 2010-2015*. Tampere University Print.

Trauth, E. M., Joshi, D., Graham, K., & Nithithanatchinnapat, B. (2015). An exploratory study of identity and IT career choice for military service members and veterans with Disabilities. *Proceedings of the 21st Americas Conference on Information Systems*, Puerto Rico.

Trauth, E. M., Quesenberry, J. L., & Morgan, A. J. (2004). Understanding the under representation of women in IT: toward a theory of individual differences. *Proceedings of the SIGMIS Conference on Computer Personnel Research: Careers, culture, and ethics in a networked environment* (pp. 114-119). doi:10.1145/982372.982400

Triventi, M. (2013). The gender wage gap and its institutional context: A comparative analysis of European graduates. *Work, Employment and Society*, 27(4), 563–580. doi:10.1177/0950017012460322

Verloo, M. (2006). Multiple inequalities, intersectionality and the European Union. *European Journal of Womens Studies*, 13(3), 211–228. doi:10.1177/1350506806065753

Vicente, M. R., & Lopez, A. J. (2010). A multidimensional analysis of the disability digital divide: Some evidence for Internet use. *The Information Society*, 26(1), 48–64. doi:10.1080/01615440903423245

Vidaček-Hainš, V., Kirinić, V., & Kovačić, A. (2011). Students with disabilities and other special needs in the process of higher education: Inclusion issues. *International Journal of Knowledge and Learning*, 7(1-2), 70–85. doi:10.1504/IJKL.2011.043892

von Hellens, L., Nielsen, S., & Beekhuyzen, J. (2011). Women working in the IT industry: Challenges for the new millennium. *Journal of Business & Economics Research*, 1(11).

Waldrop, J., & Stern, S. M. (2003). Disability status 2000: Census 2000 brief. Retrieved from <http://www.census.gov/prod/2003pubs/c2kbr-17.pdf>

Jukka Mononen has roughly ten years work experience in the private ICT sector in various tasks. He has a Bachelor's degree in Information Technology at the Kemi-Tornio University of Applied Sciences. He has also a Master's degree in Information Processing Science at the University of Oulu, and at the time of the study he was finalizing his PhD degree. He is interested in the following research areas: PwD's education and work life, organizational change, Human resources and databases.

Raija Halonen acts as a University Lecturer and Adjunct Professor in the Faculty of Information Technology and Electrical Engineering at the University of Oulu, Finland. Currently her main duty is to supervise theses (PhD, MSc, BSc) and to teach Bachelor students how to do scientific research. Before joining the academic world Raija has worked on information systems both in the public sector and in private IT enterprises. After receiving her PhD she acted as a Postdoctoral Fellow in the Centre of Innovation & Structural Change, National University of Ireland Galway where she continues as a Research Associate while working in Finland. She holds a position as an Adjunct Professor at the University of Jyväskylä, Finland. Lately she has studied ICT and social inclusion and ICT-enabled process improvement while continuing research on information systems.

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