

A Study on the Impact on Life and Work Satisfaction and Stress with the Utilization of ICT¹ Equipment on the Body of Disabled² Workers

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Abstract

Background/ Objectives: Physically disabled workers have a higher employment rate than any other handicapped people. However, there is a lack of research over the usage of ICT equipment to help physically disabled workers. Hence, the purpose of this study is to determine the relationship of the ICT equipment on the physically disabled workers on their present satisfaction on work and life. **Methods/Statistical Analysis:** This study analyzed 5,515 disabled workers from the Ministry of Health and Welfare Panel Survey data in 2014. A t-test on SPSS 2.0 was used to determine any significance between the satisfaction of work and life. The effect size was determined using a regression analysis. **Findings:** The results showed significant difference between the usage of ICT equipment and non-usage of the equipment on the satisfaction of current life, work, and stress on disabled workers. Through the use of ICT equipment, their work satisfaction positively affected their life satisfaction. These findings revealed that the ICT machine is an important tool of everyday life for the people with disabled external body features, and also serves as an important tool for those with functional limitations due to the disability. **Application/Improvements:** A limitation of this study was that the panel data could not differentiate between the period of using the ICT tool and the ability to apply ICT to lives of the disabled, and did not reflect an influence factor on the physically disabled and the sensory impaired. In addition, a conclusion was presented based on the study's implications.

Keywords: Disabled, ICT Equipment, Job Satisfaction, Life Satisfaction, Physically Impaired, Stress

1. Introduction

Looking over the employment rate of the handicapped show that as of May of 2014, the highest percentage of total employment with disabled persons was 65.8%, while the non-physically challenged with brain lesions and the facially disabled was found at 3.2%, of the sensory disabled the visually impaired represented the highest rate of the disabled with 11.8% and non-visual sensory impairment disabilities like hearing and speech impairments with 9.8% of the disabled employment rate was much higher than the mentally handicapped which were close to 9.4%¹.

Although on April 11, 2008 the "Disability Discrimination Act" was enforced to achieve the effect of the Web Accessibility Improvement, domestic mobile access environment still appeared to be insufficient².

Due to the improvement of awareness of the disabled and increase in population of disabled and disabled workers, the interest of the barrier free increased which is a movement that removes the barrier that restricts the disabled from participating as a member in society. Over the past years, Korea has been promoting various programs that improve ICT accessibility for the disabled, especially as a country with high Information Technology (IT).

From the Disability Discrimination Law that passed in April 11th, 2008, Article 23 Section 1, The Obligation for the Nation and the local government to approach information and communication, states that the nation and local government must consider supporting the development and propagation of a tool that considered the characteristics of the disabled for their usage and accessibility to ICT and information network systems.

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By stating Section1, it set a legal-baseline for the disabled. Afterall, in 2010, from the Plenipotentiary Conference (PP), hosted by the the largest international organization, International Telecommunication Union (ITU) resolved a new resolution (Resolution 175), “Telecommunication/information and communication technology accessibility for persons with disabilities, including age-related disabilities”.

From this resolution, the PP suggested a comprehensive plan to expand the inclusive approach of ICT for the disabled by cooperating with external agencies and organizations, and consider the disabled performance of work in ITU³.

Recently, interest in guarantee of web accessibility is increasing as a passage of communication in acquiring knowledge and information, and in order to manage leisure culture activity.

Until the early 2000s, the intensified digital divide between the population who own computers and the population who do not own computers due to social, economical and geographical characteristics became an important issue⁴⁻⁷.

Although on April 11, 2008 the “Disability Discrimination Act” was enforced to achieve the effect of the Web Accessibility Improvement, domestic mobile access environment still appeared to be insufficient⁸.

However, in the case of the physically disabled, if they can efficiently utilize the the information communicating device, gaining communication and obtaining information, and personalized aid will be possible. Especially with the employed disabled persons, this information communicating device will provide a positive effect on their life satisfaction by using this device by communicating with other employees and managing regular leisure culture life.

According to earlier research on telecommunications auxiliary equipment, there was a very large impact on the social participation of people with disabilities, and depends on how the disabled can quickly access information effectively, to search, and to take advantage of utilizing it to give a range of employment rate and occupations⁹.

Those who are physically disabled have absolutely higher employee level than any other disabled persons. However, the lack of study about customized applications and effort about development of assisting devices to help adapt to their job.

In this study, the ICT equipment used physical external feature to evaluate any satisfaction on satisfaction with

current life on the day of disabled workers to investigate whether the relationship.

2. Methods

2.1 Study

This study served to aim at those who are physically disabled workers who are currently working to see how effective the ICT device is on their satisfactory and stress levels of work and the satisfaction of their life, this study especially, in order to focus on the comparison of satisfaction of stress and work, survey research from the Ministry of Health and Welfare in 2014 was used.

The general characteristics of the participants are similar to Table 1.

2.2 Research Tools and Data Processing

The data was analyzed using the SPSS 21.0 for the treatment of materials.

The technical statistics was used to determine frequency analysis of the general characteristics of the subjects.

The t-test was performed to verify a difference between satisfaction of work and life when using the ICT devices, then this was analyzed by regression analysis to determine the effects of work satisfaction on life satisfaction.

3. Results

3.1 Job Satisfaction

A survey report from 2014 of disabled persons consisted of Likert’s 5 point scale for job satisfaction (1=very satisfied, 5=very dissatisfied), meaning the higher the score is, the higher the dissatisfaction with work.

Table 1. The general characteristics of participants

variable	type	frequency	percent
Disability types	physical disability	3,451	62.6
	brain lesion	65.8	11.9
	visual impairment	665	12.1
	deafness	680	12.3
	language disorder	51	0.9
	facial disability	10	0.2
	total	5,515	100

The analysis revealed using the ICT equipment was statistically significant because the analysis produced high satisfaction with smart phones, computers and internet users. However, those using regular cell phones showed low satisfaction with work because of the popularity of smartphones.

Differences in job satisfaction are similar to Table 2.

3.2 Stress Differences of Daily Life

A survey report from 2014 of disabled persons consisted of Likert's 5 point scale for stress experience (1=very often stressful, 5=not very stressful), meaning the higher the score is, lower the stress levels.

The analysis revealed using the ICT equipment was statistically significant because the analysis produced high stress levels with smart phones, computers and internet users. This is most likely because the ICT equipment lacks customizable features for disabled workers and can be a discomfort.

Stress differences of daily life are similar to Table 3.

3.3 Satisfaction of Leisure Culture Scale

A survey report from 2014 of disabled persons consisted of Likert's 4-point scale for satisfaction of the leisure culture (1=very satisfied, 4= very dissatisfied), meaning the higher the score is, the higher dissatisfaction of current leisure culture. The utilization of the ICT device analyzed other leisure culture satisfaction.

Therefore, in the case of smartphone apps, using messenger features like the variety of media content and culture in addition to leisure trends can emerge as an important item in life and tends to be consistent with the trend.

Table 2. Differences in job satisfaction

variable	Item	average	Standard Deviation	t	p
Mobile Phone	use	3.13	1.041	-4.271	.000**
	unused	3.32	1.055		
Smartphone	use	3.35	1.057	5.756	.000**
	unused	3.10	1.032		
computer	use	3.41	1.062	7.092	.000**
	unused	3.10	1.025		
Internet	use	3.40	1.057	7.052	.000**
	unused	3.09	1.029		

*p<0.05, **p<0.01

Table 3. Stress differences of daily life

variable	Item	average	Standard Deviation	t	p
Mobile Phone	use	3.58	1.044	-1.764	.078
	unused	3.63	1.080		
Smartphone	use	3.67	1.034	3.661	.000**
	unused	3.57	1.075		
computer	use	3.66	1.017	2.440	.015**
	unused	3.58	1.078		
Internet	use	3.66	1.011	2.405	.016**
	unused	3.58	1.081		

*p<0.05, **p<0.01

Difference of leisure culture satisfaction are similar to Table 4.

3.4 Current Life Satisfaction

A survey report from 2014 of disabled persons consisted of Likert's 4-point scale for satisfaction of current life (1=very satisfied, 5= very dissatisfied), meaning the higher the score is, higher the dissatisfaction of current life.

The analysis revealed using the ICT equipment was statistically significant because the analysis produced high satisfaction with smart phones, computers and internet users.

However, those using regular cell phones showed low satisfaction with work because of the popularity of smartphones.

The differences in current life satisfaction are similar to Table 5.

3.5 Work and Current Life Satisfaction of Physically Disabled People affected by using ICT Device

A Multiple Regression Analysis was performed to determine the use of ICT on the physically disabled workers on their satisfaction of their life depending on their satisfactory level at work.

There is statistical meaning because the F value was 52.71 (p<0.001). The R² value was 12.4%, a normal range, therefore, there is an explanation ability. The value of Variation Inflation Factors(VIF), falls between 1 to infinity, therefore the values between 1 to 10 are not containing

Table 4. Difference of leisure culture satisfaction

variable	Item	average	Standard Deviation	t	p
Mobile Phone	use	2.31	.772	.913	.362
	unused	2.29	.889		
Smartphone	use	2.49	.805	12.816	.000**
	unused	2.20	.832		
computer	use	2.58	.799	16.445	.000**
	unused	2.19	.822		
Internet	use	2.57	.793	16.514	.000**
	unused	2.19	.824		

*p<0.05, **p<0.01

Table 5. The differences in current life satisfaction

variable	Item	average	Standard Deviation	t	p
Mobile Phone	use	2.56	.721	-.496	.620
	unused	2.57	.837		
Smartphone	use	2.75	.728	13.566	.000**
	unused	2.47	.792		
computer	use	2.80	.717	14.920	.000**
	unused	2.47	.787		
Internet	use	2.80	.714	14.999	.000**
	unused	2.47	.788		

*p<0.05, **p<0.01

the multiple siege issue. The VIF was less than 10, therefore there is no multiple siege issue.

The result from the Durbin-Watson was close to 2, therefore was no autocorrelation, the independent conditions of residual were satisfied.

Therefore, there was further variable. The significant level was 0.05 (95%). If the value was higher than 0.05, it is not statistically significant, and if it was lower it is statistically significant.

When the gender is considered, the value of B was -0.0120. According to the test statistics, the T-value was -.04.028, and significant probability was 0.0000, therefore it is statistically significant, and it gives a positive effect. Following, the standardized value of Beta was -.083, therefore more women had lower satisfaction of life than men with 0.083 (8.3%).

Overviewing the average monthly income, the value of B was 0.000. By reviewing the test statistic, the t-value was 3.570 and the significant probability was 0.000, therefore the value is significant and has a positive effect. Thus, the standardized value of Beta was 0.072, and the increase on monthly income by 1 degree increased the satisfaction of life by 7.2%.

Furthermore, by looking over the highest level of education obtained, the B value was 0.044. By reviewing the test statistic, the t-value was 3.979 and the significant probability was 0.000, meaning the data was significant and had positive effect. Therefore, by examining the beta value 0.0102, the increase of level of education by 1 degree increased the satisfaction of life by 0.102 (10.2%). The value of B was 0.179 by evaluating the satisfaction of work. By assessing the test statistic, the t-value was 14.320 and significant probability was 0.000, the data is significant and had a positive effect. Following, the standardized beta value was 0.287 and the increase of satisfaction of work by 1 degree increased the satisfaction of life by 0.287 (28.7%).

According to Table 6, participants that were males, had higher monthly income, and had higher level of education had statically affected their satisfaction of life, the satisfaction of work also had statically affected the satisfaction of life.

Therefore, if the physically disabled workers who used the ICT devices had an increase in satisfaction of work, then their satisfaction of life increased.

3.6 The Effect of Satisfaction of Work on Satisfaction Leisure Cultural Life of the Physically Disabled Workers who Utilize the ICT Device.

In order to determine the satisfaction of leisure culture life due to the satisfaction of work of the physically disabled workers, a Multiple Regression Analysis was performed. The results are shown below.

By comparing the ages, the B value was 0.004. By reviewing the statistic test, the t-value was 2.623 and the significant probability, (p-value) was 0.009, therefore it is significant and had a positive affect. The standardized beta value was 0.065, if the age increases by 1 degree, the satisfaction of life also increases by 0.065 (6.5%).

By comparing the monthly income, the B value was 0.000. According to the statistic test the t-value was 2.296 and the p-value was 0.022, therefore the data was

significant and had a positive effect. The standardized Beta value was 0.046, if the average monthly income increases by 1 degree, the satisfaction of life also increases by 4.6%.

Next, by comparing the highest level of education obtained, the B value was 0.081. By reviewing the statistic test, the t-value was 6.234 and the significant probability, (p-value) was 0.000, therefore it is significant and had a positive affect. The value of beta was 0.160, if the level of education obtained increases by 1 degree, the satisfaction of leisure culture life also increases by 0.160 (16%).

By reviewing the satisfaction of work, the B value was 0.215. According to the statistic test, the t-value was 14.548 and the significant probability, (p-value) was 0.000, therefore it is significant and had a positive affect. The standardized beta value was 0.293, if the satisfaction of work increases by 1 degree, the satisfaction of leisure culture life also increases by 0.293 (29.3%).

According to Table 7, participants that were males, had higher monthly income, and had higher level of education

had statically affected their satisfaction of leisure culture life, the satisfaction of work also had statically affected the satisfaction of leisure culture life.

Therefore, if the physically disabled workers who used the ICT devices had an increase in satisfaction of work, then their satisfaction of leisure culture life increased.

4. Discussion

This study analyzed the data from a 2014 Survey of the 5,515 targeted people who are physically disabled to determine the difference between the satisfaction of work and satisfaction of everyday life due to availability of the ICT equipment.

The analysis from the physically impaired workers who take advantage of the ICT device for work satisfaction and life satisfaction showed there was statistical significance, and increase in work satisfaction is a positive role to life satisfaction.

In addition, the satisfaction of work by utilizing the ICT devices also positively affects the satisfaction of leisure culture life, therefore, the use of ICT device overall has a positive effect on increasing the quality of life.

However, those who use cellphones within the ICT device had an overall lower satisfaction of life and work compared to those who used smartphones. Indeed, smartphones are the most used ICT device in modern life and it tends to replace the function of computers and internet, which are communication and the approach of information. Furthermore, the development of various smartphone apps helps to manage the leisure culture life. Therefore, smartphones are one of the most frankly used ICT device.

However, according to the 2014 survey research of the disabled, the distribution rate of regular cellphones was 44.7%, but 38.6% for smartphones. In this regard, the percentage of using social network service which takes an essential role in digital participation and relationship building was 44.9%. This data was 30.1%p lower than the national percentage of 77.0%, which is a large gap of information.

The percentage of computer users of the disabled was 70.4 % which increased 1.0%p compared to the past year, but that percentage was still lower than the overall percentage of national computer users of 80.6% which was 6.6 % higher.

However, the disabled users of computers are increasing, and the gap between the national percentage of

Table 6. Impact on job and life satisfaction

division	B	β	t	p	VIF
constant	2.038		16.708	.000	
gender	-.120	-.083	-4.028	.000**	1.098
age	.002	.031	1.267	.205	1.559
Monthly income	.000	.072	3.570	.000**	1.049
Final Education	.044	.102	3.979	.000**	1.695
Disability	.000	-.001	-.059	.953	1.001
Job satisfaction	.179	.287	14.230	.000**	1.041
F=52.717, R ² =.124					

*p<0.05, **p<0.01

Table 7. Job satisfaction and its impact on life satisfaction

division	B	β	t	p	VIF
constant	1.157		8.048	.000	
gender	-.017	-.010	-.477	.633	1.098
age	.004	.065	2.623	.009*	1.559
Monthly income	.000	.046	2.296	.022*	1.049
Final Education	.081	.160	6.234	.000**	1.695
Disability	-.001	-.001	-.076	.940	1.001
Job satisfaction	.215	.293	14.548	.000**	1.041
F=53.662, R ² =.125					

*p<0.05, **p<0.01

computer users and the percentage of the disabled users of computers tend to decrease¹⁰.

Therefore, the increasing distribution of smartphones will help disabled to improve personal relationships, and increase the employee rate of disabled people by releasing various desires, and guaranteeing access of information and the community through social networks. It has been shown to complement the structural limitations due to disability.

In reality, automatic speech recognition (ASR) benefits human beings in many useful applications. ASR system can perform well for both pathological and normal speakers. Thus, ASR system will be useful in promoting the development of communicative speech impaired^{11,12}.

Nevertheless, research to date has been limited mainly to sensory disabilities such as visual and hearing impairments.

Furthermore, there is a lack of studies about mobile environment related to information access and communication formed in mainstream web accessibility. However, since the information access rights of the disabled which is the basis of community participation and self-realization is based on mainstreaming, if the information access rights of disabled were not promised, it will limit the community participation of the disabled people.

Furthermore, the widespread use of smartphones for disabled people and further development of various applications for smartphone is necessary from the aid of government. From this aid, it will expand the role of customized device for daily life and economic activities for the disabled.

However, the limitation of this study was not able to distinguish the differences between the period of use and specific feature for ICT device and did not reflect the influence factor by the type of job due to the characters of panel data.

In addition, it is necessary to divide and compare the characteristics of those who are disabled externally divided into the group of the sensory impaired and physically impaired.

Therefore, it is necessary to compare and subdivide disabilities. The limitation of utilizing the device is especially different for the physically disabled and audial and visually disabled, Therefore, further research must overcome this limitation of different characteristics of the

disabilities, and a subdivided analysis of disabilities is required.

5. References

1. Korea Institute for Health and Social Affairs. Disabled Survey. Department of Health and Human Services: Seoul. Available from: www.eldis.org/go/home&id=4661&type=Organisation&more=yes, Date accessed: 2014.
2. Ministry of Employment and Labor. Statistical disabilities. Korea Employment Agency Employment Institute: Seoul, Available from: <https://www.dol.gov/odep/>, Date accessed: 2014.
3. Park MJ. Information and Communication Broadcasting Policy. Korea Information Society Development Institute. 2013; 25(12):56–62.
4. Bolt D, Crawford R. Digital divide. Computers and our children's future. New York, NY: TV Books LLC. 2000; 207 pp.
5. Compaine BM. The digital divide. Facing a crisis or creating a myth. MIT Press Sourcebooks: Cambridge, MA. 2001; 6–9.
6. Norris P. Digital Divide. Civic engagement, information poverty, and the Internet worldwide. Cambridge University Press: New York, 2001.
7. Solomon G, Allen N, Resta P. Toward digital equity: Bridging the divide in education. Boston, MA: Allyn & Bacon/Longman. 2003.
8. Web development laboratories. Mobile web/app Improving accessibility from the fusion research environment. Korea Information Society Agency: Seoul. Available from: <https://www.w3.org/WAI/RD/2012/mobile/note/ED-mobile>, Date accessed: 2014.
9. Li GM. Information for the disabled communication line equipment needs situation and outlook. Journal of Special Education Theory and Practice. 2007; 8(4):427–59.
10. Korea Information Society Agency. Survey information gap between people with disabilities. Creation of Future Science · Korea Information Society Agency; Seoul. Available from: https://en.wikipedia.org/wiki/Digital_divide. Date accessed: 2014.
11. Saenz-Lechon L, Godino-Llorente G. Automatic Speech Recognition of Pathological Voice. 2015; 8(32):120–8.
12. Mohammed A, Mansour M, Ghulam M, Mohammed Z, Tamer A, Mesallam M, Khalid H, Malki M, Mohamed F, Mekhtiche MA, Mohamed B. Automatic Speech Recognition of Pathological Voice. 2015; 8(12):12–28.