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Factors Influencing Digital Skill Competencies among Persons with Disabilities in Malaysia

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ABSTRACT

Malaysia has about half a million persons with disabilities registered with the Department of Social Welfare. This study, therefore, explores the factors influencing digital skill competencies (technical competency, cognitive competency, and personal competency) among persons with disabilities. The factors explored are intensity of Internet usage, perception of the Internet, benefits of the Internet, and usage of the electronic devices. This study employs a quantitative research design using the survey method where a questionnaire is used as the research instrument. A total of 1200 persons with disabilities participated in the study. The impairment is either visual, hearing, speech, learning, physical or mental. Some of the findings of the study show that the majority (84.1%) of the respondents of the study use the Internet. All factors correlate positively with the digital skill competencies. The best predictor is the perceived benefits of the Internet. Suggestions are put forth to the relevant authorities toward having a digital inclusion policy for persons with disabilities so that they can remain competitive in the employment market.

Keywords: Digital skill competencies, Internet, learning theory, Malaysia, persons with disabilities.

BACKGROUND OF THE STUDY

Digital technologies break the traditional barriers to communication, interaction and access to information for persons with disabilities (Raja, 2016). Information and Communication Technology (ICT) help to change the inclusion of persons with disabilities into the mainstream community interaction and communication across the borders. The overview of the opportunities presented by the Internet and ICT for full participation of persons with disabilities has been highlighted in the World Report on Bridging the Disability Divide through the Digital Technologies. Through the Internet, persons with disabilities are able to participate and compete for education, employment, e-governance and civic participation, financial inclusion and disaster management.

Industry 4.0 refers to the production/manufacturing-based industry digitalization transformation, driven by connected technologies, for which it is timely that the digital skill competencies among persons with disabilities are evaluated so as to assess and gauge the capabilities of this special group of users to keep abreast with the development of the contemporary technologies at hand. Hence, the Internet is the in-thing as the information should be accessible to all. Hashim and Wok (2014) find that persons with disabilities perform well at the work place and are comparable with their co-workers as they tend to be committed and loyal to their organization. As such, if they have the extra assets such as having the digital skill competencies (technical, cognitive and personal competencies), their opportunity to excel in the labor market is bright and their future lives are secured as they are motivated to work. At the same time, they are usually satisfied with their job besides being fully involved in their organizational work.

The benefits of Industry 4.0 are many fold; among them is the development of new skills and talents globally which suit persons with disabilities well. However, they have to learn the digital skill competencies to be at par with their co-workers and counterparts in other organizations. Malaysia has taken the initiative in asking the Ministry of International Trade and Industry (MITI), Ministry of Science, Technology and Environment (MOSTI) and Ministry of Higher Education (MOHE) to spearhead the digital development.

Specifically, the Malaysian Communications and Multimedia Commission (MCMC) agency is in charge of the digital infrastructure and its eco-system. This study is fortunate to be funded by MCMC. Not only does Industry 4.0 reduce wastage and large storage space but it also provides better monitoring and maintenance of machinery besides providing improved security and safety. Therefore, persons with disabilities are also taken care of without having to fear of losing the benefits installed for them. The Internet can provide persons with disabilities networks of computers, scanners and other devices useable for everyone including persons with disabilities in collecting and disseminating information both at home and in the workplace. In order to be competitive, persons with disabilities need to be equipped with the digital skill competencies. Digital skills and talents are assets to be acquired by persons with disabilities. Rubin (2018) reports that Apple Watch, as a device for information, is being improved to cater for the needs of persons with disabilities. In addition, iPhone has many new features which have the potential to change the lives of the disabled persons for the better, helping them to do more for themselves independently and even save time in completing their tasks. Apple's creation of inverted colors on its iPhone screen is especially made for the visually impaired persons. Other technological companies are also trying to build their accessibility options, for the inclusion of persons with disabilities.

Like many countries in the world, Malaysia has done its part to take care of persons with disabilities well (MITI, 2018). To facilitate inclusion, most of the studies state that government initiative, in terms of policy, law and regulations, is a good intervention to tackling issues of digital divide among disabled people. Policy, law and regulations are among the initiatives provided by the Malaysian Government to help disabled people. For example, The National Welfare Policy 1990 aims to create a caring culture while creating mutual help, equal opportunities, stabilization and a secure life among the people. In addition, the National Social Policy 2003 focuses on the disabled people's rights of equalization in many aspects of society lifestyle. This policy emphasizes 15 areas: social development, human resource, participation, research development, housing, children and women disability and accessibility, advocacy, health, rehabilitation, education, employment, personal safety, social protection and support services. The proper policies and laws are important to break the barriers of accessibility to ICT.

Mohd. Uzir Mahidin, Head of Statistics Malaysia, reported that Malaysians spend so much money on buying mobile phones and tablets, worth of RM10.01 billion and RM1.05 billion (Mahidin, 2018), respectively. Persons with disabilities are also included.

Problem Statement

There is lesser number of children with disabilities who complete their compulsory education than those without disabilities (The United Nations International Children's Emergency Fund [UNICEF], 2013). So, to a certain extent, they are at the losing end when it comes to employment which is rather competitive with the influx of those with a higher level of education, beyond the basic degree. The employment rates for persons with disabilities are much less than those without disabilities and they face a stiff competition against those without disabilities and with a higher level of educational achievement (Mizunoya & Mitra, 2012). This may result in wage disparity between persons without disabilities and those with disabilities (Longhi, Nicoletti, & Platt, 2012).

The importance of technology in the empowerment of persons with disabilities has been highlighted (National Council on Disability, 1993; Raja, 2016). There should not be the exclusion and the marginalization of persons with disabilities because it violates the human rights issue as well as the economic issue for any country. All concerned should not undermine the rights and dignity of persons with disabilities. ICT is increasingly enabling persons with disabilities to gain access to lifelong education, skill development and eventually employment (Broad Commission for Digital, 2013). Therefore, the digital skill competencies are very much needed by persons with disabilities to enable their inclusion and full participation in the community.

The digital technologies enable persons with disabilities to receive information; though hopefully, the content is specially formatted to meet their needs. However, the advancements in technology are insufficient to bridge the gaps in the socioeconomics of persons with the disabilities. They must learn digital skills and be competent at it in order to be a part of the ecosystem (Samant, Matter, & Harniss, 2012). With digital skill competencies, persons with disabilities should be able to contribute to the nation in addition to being able to survive comfortably, and if possible, to not being too dependent on others. Therefore, this study tries to assess the factors influencing the digital skill competencies so that action can be taken to remedy problems faced by persons with disabilities. This can help enable them to contribute to their family, community and finally to the nation. So, the question is what are the factors that contribute toward explaining the digital competencies that can enable them to be part of the ecosystem?

Objectives of the Study

The objectives of the study are:

1. To determine the level of digital skill competencies including specific technological competency, cognitive competency and personal competency;
2. To determine the relationships between digital skill competencies (technological, cognitive and personal competencies) with selected factors (intensity of the Internet usage, perception of the Internet, benefits of the Internet, and usage of the electronic devices influencing); and
3. To determine the best predictor for digital skill competencies (technological, cognitive and personal competencies) among persons with disabilities.

Significance of the Study

This study hopes to contribute to the body of knowledge by studying the state-of-the-art of the ICT in the nation that can help persons with disabilities and to see if there is any need to reckon the attention given by the relevant authorities in Malaysia, specifically, the Malaysian Communication and Multimedia Commission (MCMC) in looking into the fates and needs of persons with disabilities as MCMC is responsible for the monitoring of digital technology for the nation. In addition, the type of competencies (technological, cognitive and personal competencies) can be identified and encouraged accordingly; with the hope that there are concerned bodies/agencies to embark on developing new and interesting digital technology that suits the needs of persons with disabilities so they can benefit from the new software to facilitate their usage of the Internet for the betterment of their future lives.

This study attempts to help prepare persons with disabilities to face the world of work with confidence when the factors influencing digital skill competencies are tapped and identified, putting emphasis on the factors identified to equip persons with disabilities well to face any technological challenge. This is important so that they have the right talents and are well prepared to face the working environment. Persons with disabilities will then become the right human capital for the market either in the service or manufacturing companies. Hence, they can work in the Small and Medium Enterprises (SMEs) which are abundant in Malaysia, provided these companies are equipped with contemporary technologies at hand. When persons with disabilities are committed and loyal, and have digital skill competencies, they will be able to help the SMEs produce quality products that are sustainable and can be marketed globally. This will enable the SMEs to remain current, relevant and competitive, updating themselves from time to time.

LITERATURE REVIEW
Digital Skill Competencies

Digital competency is broadly defined as the confident, critical and creative use of ICT to achieve goals related to work, employability, learning, leisure, inclusion and/or participation in society (Ferrari, 2013).

In this study, digital skill competencies consist of three dimensions: technical competency, cognitive competency, and personal competency. Basically, the digital skill competencies are very much related to the Internet skills. Competency is having the skill and the ability (Sivanoli, 2018). This is because a competency acquired is more than just knowledge and skills; it includes

abilities and behaviors that are fundamental to using any skill competency. Competency has two categories: behavioral and functional. Behavioral competency is related to life where a person should be able to manage his/her life well in relation to others such as communication, teamwork, and problem solving while functional competency is related to technical competency which involves roles, functions and processes within an organization. Hence, persons with disabilities should be competent enough in their life and at work.

In this technological age, the knowledge and skills of Internet usage is essential for everyone to be able to keep abreast with current developments and contemporary information and news; persons with disabilities are no exceptions. They, too, have to learn and acquire the skills so that they are not left behind. This is because technology is necessary for us to live well now and in the future. Hence, the disabled must learn the skills to be at par with others without disabilities. Web site competencies depend solely on the disabled person concerned (Jaeger & Xie, 2009). Jaeger and Xie emphasize the importance for the Web sites to have specific requirement for persons with disabilities such as to be user-friendly with comprehensible text and information presented simply, using visual-based media, and the easy web navigator. The three most widely known guidelines are: (1) Section 508, (2) National Institute on Aging (NIA) and (3) World Wide Consortium's Web Accessibility Initiative (WAI) (Adam & Kreps, 2006; Croll, 2009; Jaeger & Xie, 2009). Section 508 and NIA focus on the U.S federal government agencies while WAI stresses on private center (Jaeger & Xie, 2009). NIA, which is tended for the elderly, are also suitable for people with disabilities.

Online Web sites should be created by developers and designers only to lessen the burden of those with disabilities whenever they wish to use it since developers know best what is suitable and what is not. Nowadays, there are a multiple number of organizations that strive to make their websites and products more user-friendly for people with disabilities. Linux and Windows try to improve their support of accessibility to make it more convenient for them to try and use the Internet (Williams, Jamali, & Nicholas, 2005).

Digital Skill Competencies and Intensity of Internet Usage

With exposure to Internet usage, there is a tendency that the users will be skillful. Correa (2015), however, indicates that digital skills do not predict Facebook usage. The websites found in the Internet have been the source of information for most students in search of knowledge; school children with disabilities are no exception. They use the websites in search of knowledge and information that relate to their studies. Hussin and Rasul (2013) indicate that new technologies, especially the websites,
have given positive implication to their learning and eventually contribute to a smooth education process.

Digital Skill Competencies and Perception of the Internet

A positive perception of the Internet tends to influence the digital competencies for there is a tendency that the users will repeatedly use the Internet. Ultimately, they will become skillful in using the Internet. Svensson and Baelo (2015) focus on the digital competence as one of the eight key competencies defined by the European Commission (2006). They find that student teachers have a positive perception of their digital competency for their future profession as teachers. Persons with disabilities, too, should be competent in the digital technology for their future employability and marketability to have a better life.

Digital Skill Competencies and Benefits of the Internet

Moisey and Keere (2007) highlight that since the Internet has become a part of everyday life, people who are unable to make use of it are at a serious disadvantage. Persons with disabilities should take advantage of learning on how to use the Internet skillfully. They will certainly stand to gain from having the skills. Such benefits among others are using the Internet as a platform in forging new relationships with others (Jaeger & Xie, 2009; Croll, 2009) and maintaining present and old relationships. Many persons with disabilities feel free to write and to voice out their opinions on certain issues that relate to them and their community; and they tend to experience the inclusion as being part of the community at large. Persons with disabilities will be able to find additional moral support over the Internet and this will help them overcome alienation and isolation as some of them do feel inferior when socializing with persons without disabilities. This will eventually help to boost their self-esteem and ultimately their quality of life (Moisey & Keere, 2007).

According to Sourbati (2012), persons with disabilities are more likely to depend on others, for instance, for government services and welfare support. Instead of doing so, they can use the Internet to start living independently. There are a multiple number of Web sites that can provide them with such services as home delivery, online banking and shopping. These services can teach them on how to manage their day-to-day activities.

Digital Skill Competencies and Usage of the Electronic Devices

Not everyone has the same disability hence each one faces a different problem when it comes to internet usage (Areej & Maha, 2010). People with disabilities sometimes need to purchase a multiple number of external devices to help them. Nisbet and Poon (1998) indicate that some have problems in using the standard keyboard and mouse. To overcome this, they will need special aids. Computers with touch screen, voice recognition, and refreshable Braille screen display and screen reader software are the solutions to this problem, however, it can prove to be costly and not everyone can afford it (Jaeger & Xie, 2009; Williams et al., 2006).

Web sites such as YouTube functions almost entirely on audio and video; thus, people with hearing and visual disabilities will not be able to fully gain access to it (Croll, 2009). Screen reader helps when a visually impaired person wants to use the Internet. However, when it comes to video, it will not be

able to offer much assistance. A similar situation occurs among auditory impaired people. They would have problems when it comes to written words (Croll, 2009; Han, Kim, Park, Kim, & Ha, 2009). Hence, participating in video chats and reading captions on videos can prove to be challenging for them (Jaegar & Xie, 2009).

Symbols and forms which are difficult and inconsistent can pose a hardship to these people (Adam & Kreps, 2006; Croll, 2009). To make it even more difficult, one language can sometimes be more problematic than others. Arabic, for instance, poses more hardship than English due to its writing systems (Areej & Maha, 2010). Online chats and live stream will place a great pressure on them as they are expected to keep up with the fast-paced conversation.

Learning Theory

Basically, there are many types of learning theories depending on their learning outcomes. A learning theory describes how learners absorb, process and retain their knowledge during learning. Cognitive, emotional, and environmental influences, as well as prior experience, all play a part in how understanding, or a world view, is acquired or changed and knowledge and skills retained (Ormrod, 2012). The Transformation learning theory focuses on the often-necessary change required in a learner's preconceptions and world view. In most cases, learning needs concentration, repetition and practices to remember and to excel. The liking for the topic, too, places an important part in the learning theory. This ultimately results in the competencies. Technological software and hardware definitely require knowledge, attitude and the behavioral aspects in order to excel. This goes to the digital skill competencies, too. Online games for learning are very important and can create some form of motivation for persons with disabilities (Michael & Chen, 2006). This will make them curious and be fascinated with the action and the movement associated with the online games.

these companies are equipped with contemporary technologies at hand. When persons with disabilities are committed and loyal, and have digital skill competencies, they will be able to help the SMEs produce quality products that are sustainable and can be marketed globally. This will enable the SMEs to remain current, relevant and competitive, updating themselves from time to time.
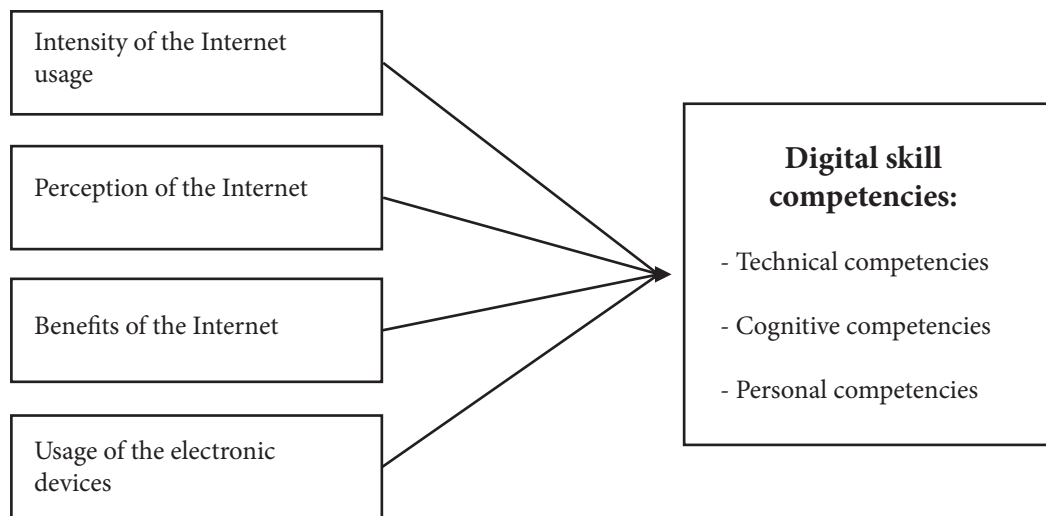

Figure 1. Conceptual framework for explaining the relationships
between factors influencing digital skill competencies.

HYPOTHESES OF THE STUDY

The hypotheses of the study are classified into general hypothesis (GH) and specific hypothesis (SH). Both are summarized as follows:

GH1: There is a positive relationship between the overall digital skill competencies with intensity of Internet usage.

SH1.1: There is a positive relationship between technical competency and intensity of Internet usage.

SH1.2: There is a positive relationship between cognitive competency and intensity of Internet usage.

SH1.3: There is a positive relationship between personal competency and intensity of Interne usage.

GH2: There is a positive relationship between the overall digital skill competencies with perception of the Internet.

SH2.1: There is a positive relationship between technical competency and perception of the Internet.

SH2.2: There is a positive relationship between cognitive competency and perception of the Internet.

SH2.3: There is a positive relationship between personal competency and perception of the Internet.

GH3: There is a positive relationship between the overall digital skill competencies with benefits of the Internet.

SH3.1: There is a positive relationship between technical competency and benefits of the Internet.

SH3.2: There is a positive relationship between cognitive competency and benefits of the Internet.

SH3.3: There is a positive relationship between personal competency and benefits of the Internet.

GH4: There is a positive relationship between the overall digital skill competencies with usage of the electronic devices.

SH4.1: There is a positive relationship between technical competency and usage of the electronic devices.

SH4.2: There is a positive relationship between cognitive competency and usage of the electronic devices.

SH4.3: There is a positive relationship between personal competency and usage of the electronic devices.

METHODOLOGY
Research Design

This study employs the quantitative research design using the survey method with questionnaire as the research instrument for data collection. As of 2014, there are 531,962

persons with disabilities (Department of Social Welfare Statistics Report (2014). The bulk of them are of Malay (324,668), Chinese (106,523) and Indian (55.453) ethnicities. The rest are Peninsular Malaysia, Sabah, and Sarawak Natives (40,314) and others (5,004). According to types of disabilities, the highest number belongs to those with learning disabilities (188,911), physical disabilities (174,795), hearing disabilities (62,153), visual disabilities (50,827), mental disabilities (24,263), speech disabilities (3,988) and others (27,025). A stratified random sampling procedure is used to select the sample of children aged 10 – 17 years old and adults of 18 years and above. The children are selected from schools of each state and the lists of names are obtained from the Ministry of Education with its consent while the adults are taken from the list of registered members with the Ministry of Social Welfare of each state. A total of 395 children and 805 adults with disabilities participated in the study. Out of a total of 1200 respondents, only 84.1% use the Internet (n=1009).

Research Instrument and Measurement

Two sets of questionnaires are developed to cater to the children and the adults with the disabilities tailored to their respective needs, especially pertaining to their demographic characteristics. Hence, they have to answer the questions regarding (a) the Internet usage (user and non-user; only the users were asked for frequency of usage, time spent and the importance of the usage); (b) motives of the Internet usage (educational/intellectual motives, sources of information, business motives, e-commerce motive, entertainment motive, religious motive, political motive, personal and social motives; (c) benefits of the Internet usage in facilitating their daily lives (educational/intellectual, business, entertainment, religious, political, personal, social and information/news); (d) challenges and barriers (e.g. cyberbullying); (e) satisfaction in using the Internet (service quality, product information, customer service, billing, charges, and delighting consumers); (f) digital skill competencies (technical competency, cognitive competency, and personal competency). Only satisfaction in using the Internet are measured using a 4-point Likert scale, where 1=strongly disagree, 2=disagree, 3=agree and 4=strongly agree.

Digital skill competencies act as the dependent variable of the study and it comprises three dimensions: technical competency, cognitive competency and personal competency. Technical competency comprises 21 items while cognitive competency consists of 9 items and personal competency consists of 8 items. The total number of items for the overall digital competencies, therefore, is 38 items. An example of technical competency is "I know how to perform a search on the Internet using the search engine", while an example of the items for cognitive competence is "I know how to consider whether the information that I encounter on the Internet is true or false" and personal competency is that "I have the ability to express my ideas, thoughts, and feelings to people whom I interact with online". Each item is measured using a dichotomous scale of 1 is for "yes" and 0 is for "no". Intensity of the Internet usage is the cross product of length of time (hour) spent on the Internet per day and the frequency of using the Internet. Frequency is measured on a 4-point Likert-like scale, where 1=seldom (1-2 days), 2=sometimes (3-4 days), 3=often (5-6 days) and 4=always (7 days).

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Perception on the Internet usage consists of 9 items measured as a dichotomous variable of 1 for "yes" and 0 for "no". The examples of perception items are "Internet eases my everyday life", "Internet increases my social horizon for living a socially interactive life, and "Internet increases my self-confidence".

Benefits of the Internet consist of 8 dimensions, with 3 items per dimension; measured using a dichotomous scale of 1 is for "yes" and 0 for "no". The dimensions are educational/intellectual, business, entertainment, religious, political, personal, social, and information/news. An example of the educational/intellectual items is "Internet has increased my general knowledge"; for business: "Internet has improved my marketing"; for entertainment: "Internet has helped improve my access to watching online videos/movies/drama series"; for religious: "Internet has provided me with religious materials"; for politics: "Internet has increased my exposure on political issues"; for personal: "Internet has increased my knowledge on personal well-being"; for social: "Internet has expanded my networking"; and for information/news: "I obtain information from the Internet". The last factor for predicting digital skill competencies is usage of the electronic devices. It consists of 9 items measured using a dichotomous scale of 1 is for "yes" and 0 for "no". An example of the items is that "I am using the hardware electronic device: Smartphone". The percentage for each factor is calculated by multiplying the mean value by 100 and is divided by its respective number of items.

Validity and Reliability

Validity describes a measure that accurately reflects the concept it is intended to measure. In this study, face validity is used to ensure the quality of an indicator that makes it seem a reasonable measure of the variables used. Validity is obtained from getting the MCMC expert opinion and from a Director of the Unit for the Disabled Persons at a higher learning institution. Verification of the questionnaires is done and approved by MCMC after several sittings; only then would the variables be used in the study.

Data Collection

For this paper, only data from the survey method of the quantitative research design are used as the primary data for data analysis. Two categories of persons with disabilities are identified: the children and adults with disabilities. In order to get the lists of schools having children with disabilities from all states; a permission letter is sought from the Ministry of Education by filling in the required online form. Similarly, for the adults, the Ministry of Social Welfare was contacted and permission was granted to carry out the research. Appointments were made with the respective schools for children (aged between 10-17 years old) and companies that have hired adults with disabilities throughout the nation (Peninsular Malaysia, Sabah and Sarawak). The data collection for the children was completed first despite the fact that the data collection for adults had started almost at the same time. The time taken for the data collection for the children was between August and October 2017 while for the adults, it was between September and December 2017.

Data Analysis

Both the descriptive and inferential statistics are used for the survey data analysis. Using the Statistical Package for Social Sciences (SPSS) Version 20.0, the following descriptive statistics: frequency, percentage, means, standard deviation, minimum and maximum are presented in the results to answer the research objectives. For the inferential statistics, correlation and simple multiple regression analysis are used to test the research hypotheses.

RESULTS

The majority of the respondents (84.1%) use the Internet from a total of 1200 persons with disabilities who participated in the total sample of the study. Therefore, only 1009 persons with disabilities are used to analyze the results for the study.

Demographic Characteristics of the Respondents

Results show that there are more males (64.0%) than females (36.0%) with disabilities in the study (Table 1). They are mainly teenagers (33.0%), followed by adolescents (32.2%) and young adults (21.5%) while the rest (13.3%) are mainly adults aged 41 and above. The average age is 25.218 (SD=12.360). Almost three-quarters of them are Malays (74.6%) while the rest (25.4%) are Chinese, Indians and other ethnicities. Many have acquired multiple languages proficiency: almost all of them speak Bahasa Melayu (98.8%) and the majority of them speak the English Language (87.0%) as well. Mandarin and Tamil are spoken by the Chinese and the Indians, respectively.

Table 1
Demographic Characteristics of the Respondents

Variable	Categories	Frequency	Percentage
Gender	Male	644	64.0
	Female	362	36.0
	Total	**1006**	**100.0**
Age (years old)	Teenagers (13-17)	333	33.0
	Adolescents (18-25)	325	32.2
	Young adults (26-40)	217	21.5
	Adults (41-55)	83	8.2
	Old adults (56 and above	21	5.1
M=25.218, SD=12.360, Min=13, Max=76	**Total**	**1009**	**100.0**
Language	Bahasa Melayu	997	98.8
	English	878	87.0
	Mandarin	236	23.4
	Tamil	150	14.9
*Multiple responses	**Total (N=1009)**	*	*

Types of Disabilities

Basically, the respondents have various types of disabilities. Table 2 presents the types of disabilities where about half the number of the respondents are facing learning disabilities (50.8%), followed closely by those with the visual impairment (31.7%). There are others with hearing impairment (19.9%), physical impairment (19.4%) and speech difficulties (16.7%).

Table 2
Types of Disabilities Among the Respondents

Types of Disabilities	Frequency	Percentage
Visually impaired	320	31.7
Hearing impaired	201	19.9
Speech difficulties	168	16.7
Learning difficulties	513	50.8
Physically impaired	196	19.4
Total (N=1009)	*	*

*Multiple disabilities

Internet Usage

The intensity of the Internet usage is the cross product of length of time (hour) spent on the Internet per day and the frequency of using the Internet which is measured on a 4-point Likert like scale, where 1= seldom (1-2 days), 2=sometimes (3-4 days), 4=often (5-6 days) and always (7 days). The mean for time spent on the Internet per day is 5.925 hours (SD=5.717) with a minimum of 1 and a maximum of 24 (Table 3). More than half of the number of respondents (55.3%) uses the Internet between 1-4 hours daily, followed by those with 5-8 hours on the Internet and the rest (21.0%) use it for more than 9 hours daily.

More than half of the number of respondents (58.6%) uses the Internet daily. Some of them often use it (13.0%), sometimes use it (16.8%) and seldom (11.6%). The intensity of the Internet usage varies from as low as 1 to as high as 96 with an average of 21.266 (SD=23.374).

Table 3
Time Spent on the Internet and Frequency of the Internet Usage.

Variable	Category	Frequency	Percentage
Time spent per day (hours)	1-4	539	55.3
	5-8	231	23.7
	9-12	118	12.1
Mean=5.925, SD=5.717, Min=1, Max=24	13 and above	87	8.9
	Total	**975**	**100.0**
Frequency of the Internet Usage per Week (days)	Seldom (1-2)	115	11.6
	Sometimes (3-4)	166	16.8
	Often (5-6)	129	13.0
	Always (7)	581	58.6
	Total	**991**	**100.0**

Factors Influencing Digital Skill Competencies

In order to compare across all independent variables and the dimensions of the digital skill competencies as the dependent variables, a percentage is calculated and presented (Table 4). It is found that among the digital skill competencies, persons with disabilities are more competent in term of personal competency (76.5%), followed by cognitive competency (70.2%) and finally the technical competency (65.2%). When aggregated together, their digital skill competencies

level is 66.4%, which can be considered as slightly competent. Persons with disabilities have a positive perception of the Internet (65.8%) and they acknowledge the benefits gained from using the Internet (59.8%). However, they are rather poor at using the electronic devices (31.2%) and they are low at the intensity of using the Internet.

Table 4
Descriptive Statistics of Factors Influencing Digital Skill Competencies

Variable	Dimension	N	Mean	SD	%	Minimum	Maximum
Digital skill competencies	**Overall**	989	25.218	9.583	66.4	1	38
	Technical competency	983	13.696	5.402	65.2	1	21
	Cognitive competency	932	6.321	2.364	70.2	1	9
	Personal competency	913	6.119	1.942	76.5	1	8
Intensity of Internet usage		961	21.266	23.374	22.2	1	96
Perception of the Internet		972	5.918	2.274	65.8	1	9
Benefits of the Internet		987	14.353	5.696	59.8	1	24
Usage of the electronic devices		829	2.497	1.586	31.2	1	8

Relationship between Digital Skill Competencies and Selected Factors Related to the Internet

All the factors that are thought to influence the digital skill competencies level and its dimensions are presented in Table 5. Results show that there are significant relationships between the overall digital skill competencies and intensity of the Internet usage (r=.240, p=.000), perception of the Internet (r=.381, p=.000), benefits of the Internet (r=.458, p=.000) and usage of the electronic devices (r=.312, p=.000). Their relationships are considered weak except for benefits of the Internet which are considered moderate. A similar trend exists for the technical dimensions where there are significant relationships for intensity of the Internet usage (r=.230, p=.000), perception of the Internet (r=.329, p=.000), benefits of the Internet (r=.445, p=.000) and the usage of electronic devices (r=.322, p=.000). As for the cognitive competency, the highest relationship is with perception of the Internet (r=.407, p=.000) followed by the benefits of the Internet (r=.368, p=.000) and usage of electronic devices (r=.249, p=.00) and finally with intensity of the Internet usage (r=.241, p=.000). All relationships between personal competency and the independent variables: intensity of the Internet usage (r=.190, p=.000), perception of the Internet (r=.287, p=.000), benefits of the Internet (r=.370, p=.000) and usage of electronic devices (r=.226, p=.000) are significant.

Table 5
Correlations Between Digital Skill Competencies with Factors Influencing It

Variables	Overall Digital Skill Competencies	Technical Competency	Cognitive Competency	Personal Competency
Intensity of Internet usage	r=.240, p=.000	r=.230, p=.000	r=.241, p=.000	r=.190, p=.000
Perception of the Internet				
Benefits of Internet	r=.381, p=.000	r=.329, p=.000	r=.407, p=.000	r=.287, p=.000
Usage of electronic devices				
	r=.458, p=.000	r=.445, p=.000	r=.368, p=.000	r=.370, p=.000
	r=.312, p=.000	r=.322, p=.000	r=.249, p=.000	r=.226, p=.000

Predictors for Digital Skill Competencies

Further analysis using the simple multiple regression is carried out to determine the best predictor for digital skill competencies as a whole and for its dimensions (technical, cognitive and personal competencies). Despite the fact that all factors influence digital skill competencies (Table 6), the best predictor goes to benefits of the Internet (Beta=.346, t=10.702, p=.000). Similar to the overall digital skill competencies, the best predictor for the technical competency is benefits of the Internet (Beta=.353, t=10.729, p=.000). On the contrary, to the digital skill competencies and the technical competency, the cognitive competency reveals that its best predictor is the perception (Beta=.286, t=8.342, p=.000). Personal competency is best predicted by benefits of the Internet (Beta=.290, t=7.997, p=.000). On the whole, benefits of the Internet are the best predictor for digital skill competencies, technical competency and personal competency while the best predictor for cognitive competency is perception of the Internet. In fact, all factors influence the digital skill competencies, technical competency, cognitive competency and personal competency.

Table 6
Multiple Regression Analysis for Factors Influencing the Digital Skill Competencies

Variable	Unstandardized Coefficients		Standardized Coefficient.	t	p
Overall digital skill competency	B	SE			
Constant	8.403	.972		8.642	.000
Intensity of the Internet usage	.039	.012	.103	3.318	.001
Perception of the Internet	.848	.129	.212	6.591	.000
Benefits of the Internet	.572	.053	.346	10.702	.000
Usage of the electronic devices	1.342	.169	.242	7.935	.000
F=94.890, df=4,739, p=.000; R=.583, R²=.339, R²= Adj.=.336					
Technical competency Constant	4.462	.572		7.802	.000
Intensity of the Internet usage	.021	.007	.097	3.084	.002
Perception of the Internet	.365	.075	.159	4.847	.000
Benefits of the Internet	.336	.031	.353	10.729	.000
Usage of the electronic devices	.831	.099	.261	8.406	.000
F=84.940, df=4,736, p=.000; R=.562, R²=.316 R²= Adj.=.312					
Cognitive competency					
Constant	2.194	.274		8.017	.000
Intensity of the Internet usage	.012	.003	.124	3.750	.000
Perception of the Internet	.298	.036	.286	8.342	.000
Benefits of the Internet	.101	.015	.232	6.727	.000
Usage of the electronic devices	.251	.046	.171	5.446	.000
F=67.871, df=4,713, p=.000; R=.525, R²=.276, R²= Adj.=.272					

Variable	Unstandardized Coefficients		Standardized Coefficient.	t	p
Overall digital skill competency	**B**	**SE**			
Personal competency					
Constant	3.109	.244		12.761	.000
Intensity of the Internet usage	.007	.003	.081	2.31	.021
Perception of the Internet	.136	.032	.155	4.292	.000
Benefits of the Internet	.107	.013	.290	7.997	.000
Usage of the electronic devices	.205	.041	.172	5.025	.000

F=45.485, df=4,701, p=.000; R=.454, R²=.206, R²= Adj.=.202

DISCUSSION AND CONCLUSION

It is found that the Internet is widely used by persons with disabilities regardless of their age and types of disabilities. Although they face several challenges, the users find a lot of benefits in using the Internet. The Internet has brought about a transformation to them in the areas of knowledge, work, life, and the means of social communication. In education, the Internet has become a means of learning and knowledge-sharing, as well as easy communication. In the area of work, the acquired skills to use the Internet have become part of the basic criteria to compete in the labor market. The Internet also contributes to facilitate the social communication (Osman, 2015). ICTs offer a great potential to support lifelong learning for all groups of students, including those who have special educational needs. The application of the Internet must enhance independence, integration, and equal opportunities for such people and in this way, it will facilitate their inclusion in the society as valued, respected, and contributing members.

It can be concluded that regardless of the types of disabilities, many of the persons with disabilities use the Internet and are competent in using the Internet for the digital skill competencies and its dimensions (technical, cognitive, and personal competencies) and all the factors influence their competencies. The best predictor is the benefits of using the Internet for digital competencies, technical and personal competency while perception influences the cognitive competency the most. Therefore, in order to be competent, the Internet must be used frequently, with a positive perception toward the Internet together with having the benefits of the Internet in mind while using the electronic devices to the fullest. Hence, the learning theory holds true for the study.

Above all, persons with disabilities will be updated with contemporary technologies and devices as most of them use the Smartphone smartphones and are in for the race in the employment market and for education purposes especially children with disabilities. Their potential is bright.

LIMITATIONS OF THE STUDY

The limitation faced during the data collection is that it is difficult to get the exact number required for each category of the disabled. This is because some centers only have disabled persons

with certain types of impairment and difficulty. Thus, in order to have enough respondents for each category, other government and NGO centers were later approached to compensate for the number required for the various categories of impairments.

Another concern is the language barrier. Some of the disabled persons cannot communicate and cannot understand the questions well. Even though, the questions are explained to them but they are unable to express their opinion especially those who are having learning disabilities (e.g., slow learner) and speech difficulties (e.g., stutter). In addition, when dealing with the disabled persons, care must be taken into consideration so that they are willing and happy to participate in the study. This is because some respondents sometimes have unstable emotions where their moods can change and swing within a short time.

SUGGESTIONS FOR FUTURE RESEARCH

It is suggested that other variables such as satisfaction with the Internet, motives of using the Internet, attitude toward the Internet, impact of using the Internet, perceived ease of use (PEOU) and perceived usefulness and be tested for Uses and Gratification Theory (U&GT) by Katz, Blumler and Gurevitch (1974), Theory of Planned Behavior (TPB) by Ajzen (1991), Theory of Reasoned Action (TRA) by Fishbein and Ajzen (1975) and the Technological Acceptance Model (TAM) model by Davis (1989) among others can used and tested.

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