Innovations

E-skills Levels, Needs, and Challenges of Persons with Disabilities: A Case of Calbayog City, Samar, Philippines

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Abstract: *Persons with disabilities (PWDs), one of the most vulnerable groups in our society, are among those who have been negatively impacted by the rising of digitalization whose relevance has been further emphasized due to the most recent pandemic. It is important that we check on them to see how they are faring in these times where e-skills are required even more especially at work. This study aimed to describe the PWD working population in Calbayog City, Samar, Philippines and determine their present e-skills level, the e-skills they need, and the challenges that prevent them from acquiring such skills. Utilizing the survey data, this work employed descriptive research methodology and quantitative approach to analyze the e-skills level of the respondents, their needed e-skills, and the hindrances they encountered. The results revealed that: a) majority of the respondents were unemployed and that many of them were in the middle adulthood or older adulthood to retirement age; b) the PWDs do need help in acquiring e-skills and that majority of them are willing to learn them; and c) lack of financial resources, insufficient personalization of learning style, and discriminatory behavior and stereotype are the three major factors that hinder them from learning e-skills. This study offers a solid baseline information to the local government unit and other stakeholders that they can use as basis for crafting e-skills interventions and other similar activities that target the reduction of digital divide among PWDs, their total inclusion in the society, and the upliftment of their lives.*

Keywords: *E-skill, Persons with disabilities, Descriptive research, Working population, Baseline information*

1. Introduction

The demands of the time and game-changing events like the most recent pandemic back in 2020 have emphasized digitalization even more in people's lives. From the simple tasks of everyday life to tasks performed at work, information technology (IT) appears to be almost a staple in human activities. Some people can accept and adapt quickly to IT while there are those who remain highly cautious about it. But what about the persons with disabilities (PWDs) who are among the most vulnerable group in our society? How are they faring through this time where e-skills or IT skills are required even more at work? According to Atasoy et al. (2021), job erosion is a huge global issue, particularly because of the COVID-19 pandemic. Historically underrepresented groups in the work economy are the most

affected like the minorities (e.g., PWDs), the elderly, and women. The rising digitalization has given more fuel to the still pressing social issues of low income and unemployment. Those with the necessary e-skills or IT skills, however, may have an advantage in the digital economy. Malik et al. (2024) supported that by declaring that digital literacy and IT skills are vital for PWDs both in pursuing lifelong learning and increasing employability. On the other hand, they pointed out that there is still a persistent digital divide among the PWD community due to the insufficiency of accessible learning initiatives or tools especially crafted for them. Hence, they recommended to study the needs of PWDs and support their inclusion in the digital and technological progress. Similarly, Iftimoaei&Achiţei (2023) emphasized that there is a scarcity in formal training programs for PWDs regarding digital skills and that such skills are crucial in empowering them to join in tech-based careers, including virtual or online work. Also, they pointed out the need for specialized training interventions. According to Sunnexdesk (2017), to help PWDs obtain jobs, the Philippine Business for Social Progress (PBSP) and Accenture collaborated on a program. This program was executed by Virtualahan, a social enterprise that fosters fair, sustainable, and impactful career and removes impediments in employment for PWDs. It equips PWDs with digital skills allowing them to become virtual assistants or online service providers in the outsourcing industry. Jalandoni (2021), a PWD and a product of Virtualahan, demonstrated that the skills he gained through the program helped him attain emotional fulfillment. It also gave his family financial security. Despite this, Džananović& Bajraktarević (2022) claimed that a lot of PWDs do not realize how information and communication technologies (ICTs) can support them in surmounting challenges and enhancing their social and economic participation and integration. Thus, they asserted that training is crucial for PWDs so they can utilize ICTs and enabling tools effectively and reap the benefits. Additionally, they also claimed that other stakeholders like the educators and service providers must also be trained to assist the PWDs in successfully using ICTs. As in the work of Cardoso-Pereira et al. (2023), they recommended that instructors must be trained on crafting accessible materials and applying teaching techniques appropriate for PWDs. Including the PWDs as well in the design of the training program itself is necessary in making sure that their specific needs are met.

According to the World Health Organization's (WHO) estimate ratio of 10%, as of 2010, 9.2 million Filipinos were classified as PWDs. Meanwhile, based on the most recent data coming from the National Council on Disability Affairs (NCDA), there are 1,906,323 registered PWDs in the Philippines as of December 2024 (National Council on Disability Affairs Office, n.d.). In Calbayog City, Samar, located in the Eastern Visayas region of the country, there are 3,362 PWDs in total (Persons with Disabilities Affairs Office, 2024).

It is a known fact that securing a job for PWDs is not that easy due to various reasons. According to the Philippine Statistics Authority & Department of Health (2019), work is one of the most affected daily life areas of a PWD. Based on their most recent national disability prevalence survey, which was in 2016, it was found that 34% of the PWDs with severe disabilities and 13% of the PWDs with moderate disabilities find applying for and getting a job extremely difficult or problematic. Meanwhile, 11% of the PWDs with severe disabilities find it extremely difficult to get things done at work. O'Reilly (2003) stated that the obstacles that hinder PWDs from taking part equally in the world of work include: a) negative attitudes caused by lack of knowledge, preconceptions, myths, fear of the unknown, and insufficient information about disabilities; b) unfair access to education and

employment; c) inaccessible buildings, communications, and transportations; d) insufficient access to information, support services, technology, and assistive tools; and several others. Many of these claims of O'Reilly can be seen in the 2016 national disability prevalence survey, especially under the environmental factors section that defines the contributing elements to the lived experience of persons with disability. Such elements may correspond to needs, inequalities, and barriers (Philippine Statistics Authority & Department of Health, 2019). In response to the challenges or hindrances presented, the government had put in place laws that promote and protect the rights and interests of PWDs. The Magna Carta for Disabled People, for instance, which is also known as Republic Act (RA) No. 7277, declares the rights and benefits that are granted to PWDs that allow them "to attain a more meaningful, productive and satisfying life." The employment clauses in this RA have been modified through RA No. 10524, titled "An Act Extending the Jobs Reserved for Persons with Disability," to improve the employability of PWDs. Moreover, there is also RA No. 10754 or "An Act Expanding the Benefits and Privileges of Persons with Disability" that includes provisions for educational assistance to PWDs (Technical Education and Skills Development Authority, 2020). Lastly, the rights of people with cancer or rare disease are declared under RAs 11215 and 10747, respectively(National Council on Disability Affairs, 2021).

Despite the established laws, digital divide among the PWD community is still observed. This suggests the need for more and continued interventions. And while the cited works do agree that IT does play a significant role in the social and economic upliftment of the PWDs and therefore providing them with e-skills or IT skills is necessary, it has been observed that there is a need to understand the context of a specific community before implementing any digital skills training for that community as it may affect the success of the intervention. This study was built upon this foundation. Examining the circumstances and specific needs of PWDs in a particular community is critical in creating impactful IT skilling programs and projects because it ensures the intervention to be relevant and responsive to the unique needs of the target community.

Generally, this study sought to identify the e-skills of the persons with disabilities within the working age in Calbayog City, Samar, Philippines. More specifically, it aimed to:

1. Describe the PWD working population in Calbayog City, Samar;
2. Identify their various e-skills with respect to the disability they have;
3. Identify the e-skills they need to become more employable or better at their job; and
4. Identify the factors that hinder them from learning e-skills.

The findings gathered through this study would serve as the baseline information that can be used by the local government unit (LGU) or other agencies (e.g., higher education institutions) in creating responsive, localized interventions that answer the specific issues and requirements of the PWDs in Calbayog City, Samar in terms of e-skills acquisition. This work is an initial step in boosting their career advancement and uplifting their overall quality of living. As for its other contributions, the discovered gaps in IT skills of PWDs cover various possible disability categories thereby providing more insights. Additionally, its findings can influence the advocacy efforts, academic programs, and the city governance. Moreover, its results can be applied in making comparative analysis to emphasize trends or variations across different regions in terms of e-skills level and

needed e-skills among PWDs. Finally, this work contributes to practical solutions that can have real-world impact.

The rest of this work is organized as follows: Section 2 provides the literatures reviewed related to the study, Section 3 explains the methodology conducted, Section 4 tackles on the result and discussion, and Section 5 highlights the conclusion and recommendation.

2. Literature Review

This review centers on shedding light on the following themes: disability, e-skills or IT skills, and the factors that hinder PWDs from learning e-skills or IT skills.

2.1. Disability

According to the Philippine Statistics Authority & Department of Health (2019), disability is the outcome when a person with health limitations interacts with his/her physical, social, and political environment. This is better explained by the U.S. Centers for Disease Control and Prevention (2024) or CDC by stating that any physical or mental condition (impairment) that creates challenges or makes it difficult for a human to do certain tasks (activity limitation) and engage fully in the society (participation restrictions) is called disability. This definition highlights the three dimensions of disability identified by the WHO. CDC categorized disabilities in terms of vision, movement, thinking, remembering, learning, communicating, hearing, mental health, and social relationship. In the Philippines, according to An Act Expanding the Benefits and Privileges of Persons with Disability (2016), PWDs are those people who experience lasting physical, mental, intellectual, or sensory challenges that limit them from fully and equally engaging in the society when confronted with hindrances. The NCDA grouped disabilities into two, i.e., apparent disability and non-apparent disability. Under apparent disability are conditions affecting physical movements or functions like total blindness, limb amputation, difficulty in walking and other similar conditions. On the other hand, non-apparent disability includes conditions such as deaf/hard of hearing disability, intellectual disability, learning disability, mental disability, psychosocial disability, non-apparent visual disability, non-apparent speech and language impairment, non-apparent cancer, and non-apparent rare disease (National Council on Disability Affairs, 2021).

The various definitions for disability that have been presented are consistent with one another. The definition from CDC, however, has added dimensions to it that served as a way of categorizing various disabilities. In terms of classification, with CDC, they identified 9 types of disability. And with NCDA, they identified 10 types that come from both apparent disability category with one type (i.e., physical disability) and non-apparent disability category with nine types. The types of disabilities identified by both CDC and NCDA overlap and are almost identical.

2.2. E-skills

Soobramoney&Heukelman (2019) defined e-skills, a term that is often used in South Africa and Europe, as one's ability to use ICT to participate skillfully in a knowledge environment where ICT is a critical prerequisite to progress in the tasks of social organization, corporate entity, and government. According to them, e-skills are grouped into four, namely: a) technology operation skills, which are a person's basic abilities to utilize hardware and software to operate ICT; b) fundamental e-skills, which include the knowledge and skills

required to utilize ICT effectively in searching, evaluating, and using of information for activities related to work, study, and daily life; c) information analysis and knowledge sharing skills, which require the utilization of ICT to participate in critical information analysis, argumentation, and discourse to produce meaningful knowledge and present information innovatively; and d) strategic e-skills, which require the use of ICT with a focus on critical thinking, innovation, and creativity, as well as facilitation in the production and presentation of knowledge. Meanwhile, as cited by Pretorius & Biljon (2010), the European Council for Standardization described e-skills as the abilities required for an individual to utilize ICT systems and devices effectively either in a personal setting or a business setting. This definition is similar to the previous one presented earlier but this one has given emphasis on the use of ICT on a personal level as well. In terms of categorization of e-skills, Pretorius & Biljon (2010) identified the following: a) ICT practitioner skills, which are capabilities needed for research, ICT system development, design, strategic planning, management, production, consultancy, marketing, sales, integration, installation, administration, management, support, and maintenance; b) ICT user skills, which cover capabilities needed for an individual to utilize ICT systems and devices effectively to support their occupation. Generally, these skills align with digital literacy; and c) e-business skills, which are capabilities necessary to leverage ICT, specifically the Internet, to ensure that the company performs more effectively and efficiently, to explore potential business ideas, and to enhance organizational systems and practices.

The categorization of e-skills by Soobramoney&Heukelman has more dimensions compared to that of Pretorius & Biljon. It focused on the various applications of IT that were grouped accordingly. Additionally, the categories they identified somewhat represent an ascending hierarchy of IT skills that begin with fundamental e-skills and end with strategic e-skills. Also, it did not focus on any particular type of entity. With Pretorius & Biljon, their categorization somewhat focused on the entity that uses IT and on what they use it for. Hence, we had ICT skills for practitioners, for users, and for corporate entities.

Lang &Triantoro (2022) referred to e-skills as digital skills, which are gradually changing capabilities required to use a software or a digital device. This definition is much broader, simpler and lesser in scope compared to the previous ones. As for the categories, they classified digital skills into two, namely: a) general digital skills, which include fundamental capacities for using the internet, online services, social media, and communication; and b) special digital skills, which include advanced skills required for technical occupations like coding, cybersecurity, and data analytics, to name a few. This classification is rather simpler compared to the previous ones but provides lesser depth and dimension. As for Yamin & Ishak (2016), they simply defined e-skills as ICT-related skills, which are the ability to successfully utilize ICT devices and applications for personal, social, and business purposes. This definition is highly similar to the ones given and cited by Soobramoney and Heukelman, and Pretorius and Biljon, respectively. As for the categorization, they classified e-skills almost in the same way as Pretorius and Biljon and they are: a) ICT user skills; b) ICT practitioner skills; and c) e-leadership skills, which are capabilities needed by leaders in an organization to take advantage of ICT in attaining the organizational goals and objectives. The third category introduced by Yamin and Ishak, i.e., e-leaderships skills, is highly similar to the strategic e-skills category of Soobramoney and Heukelman.

There is an observable variation and overlap in the presented categories of e-skills. Examining them further, we can say that the categorization done by Soobramoney and Heukelman is arguably the most encompassing and therefore the one that provides more depth and wider range of e-skills.

Gunupudi et al. (2024) emphasized the necessity to discover the foundational digital skills of PWDs by stating that it is crucial in creating learning interventions. Dobrowolska et al. (2024) also supported this by stating that foundational competencies of PWDs should be evaluated in order to craft specialized learning pathways. Similarly, this study identified the present e-skills level of PWDs in Calbayog City on various specific e-skills to get the knowledge on their capabilities and know which competencies they need help with. Moreover, in the study of Tymoshchuk et al. (2022), the importance of determining the digital skills of people with intellectual and developmental disability (IDD) was stressed by highlighting that having digital competency is imperative for their integration in the academe, work force, and other facets of life. In this work, not only IDD was considered but also all the rest of the types of disability identified by the PDAO of Calbayog City, Samar. Furthermore, Cashmore & Crosta (2022) argued that there is a need to determine the gap and respond to the digital divide among PWDs. More specifically, they stated that training interventions should be guided by the demand of the PWDs and that such interventions be tailor-made for them. They added that providing them with e-skills and soft skills as well will boost their career opportunity. In this study, the e-skills that are of interest and importance to the PWDs were also gathered, understanding that willingness is a key ingredient in successfully learning any skill. Learning of their current e-skills plus discovering which e-skills they are interested in, provide good bases as to which e-skills they should be trained with.

2.3. Factors that hinder PWDs from learning e-skills

Omar et al. (2022) found out that digital skills and ICT skills are the top two skills PWDs need to secure work after graduation besides interpersonal skills, marketing skills, practical skills, and writing skills. PWDs, however, are faced with several pressing challenges in learning e-skills. Generally, in terms of education, according to the Ontario Human Rights Commission (n.d.), the primary hindrances to learning for PWDs are lack of funds, discriminatory behavior and generalizations, barriers to physical access, insufficiency in individualized approach, procedure of accommodation, and poor grievance management process. More specifically, in terms of acquiring e-skills, according to Duplaga (2017), the following are the factors that hinder PWDs from learning them: a) age – the older the PWD, the lower the interest in learning digital skills; b) education – the lower the educational level, the lower the internet and e-skills utilization; c) income – the lower the income, the harder the access to digital devices and learning interventions; d) access to assistive technologies – insufficiency of low-cost assistive tools; and e) urban vs. rural divide – PWDs in rural localities have limited access to IT resources compared to those in urban areas. These factors identified by Duplaga reflect the e-skills learning barriers encountered by PWDs in a community setting. On the other hand, those factors specified by the Ontario Human Rights Commission reflect a set of factors confined within the context of education or academe. Moreover, as for the work of Thomas (2024), these are the hindering factors he identified in the context also of educational institutions: a) high cost – most students cannot access assistive tools as they are usually expensive; b) inadequate infrastructure – lack of accessible hardware and software in schools; c) lack of teacher training – underutilization is the result when educators have no sufficient training

on the use of ICT tools in teaching; d) social stigma – when utilizing assistive tools, students encounter social challenges and emotional opposition; and e) technical challenges – assistive tools' limited functionality due to compatibility issues with the school's platforms. Furthermore, in a more generalized setting, here are what Osman & Diah (2017) identified: a) financial constraints – expensive training sessions and ICT tools; b) accessibility issues – lack of ICT infrastructure in schools and rural areas; c) lack of awareness – PWDs have not enough knowledge on how ICT can benefit them; d) inadequate support systems – insufficient ICT training support from the government and the society; and e) education gaps – insufficient specialized tools and trained teachers in schools to effectively teach PWDs ICT. Finally, Quarless (2017) stated that: a) insufficient knowledge of the available technologies and their use; b) insufficient training on how they are used; and c) insufficient funds to afford technology and specialized support tool that may be required are some of the barriers in learning e-skills.

In summary, some of the hindering factors presented overlap one another, and some are mentioned repeatedly (e.g., lack of fund, high cost) proving that these are part of the persisting issues. Meanwhile, there are also those unique ones identified that are just as important such as: barriers to physical access, insufficiency in individualized approach, procedure of accommodation, poor grievance management process, age, educational attainment, technical challenges, and inadequate support systems. This study aimed to determine which factors hinder the PWDs from acquiring e-skills.

3. Methodology

This study used a descriptive research methodology and a quantitative approach, with a focus on Calbayog City, Samar, Philippines as the locale. The target respondents were PWDs of working age, i.e., 15 – 64 years old (Philippine Statistics Authority, 2023). Data on the population (i.e., 3,362) was obtained from the PDAO of the city. Krejcie and Morgan's formula was used to calculate the necessary sample size including a finite population adjustment, a 95% confidence level, and a 5% margin of error. 114 PWDs were found to be prospective responders through this procedure. Respondents were subsequently chosen using simple random sampling, which included both employed and unemployed PWDs. However, those who do not live in Calbayog City were not allowed to participate in the survey.

The profile of the respondents was examined using descriptive and frequency analysis. As for determining the respondents' e-skills level and their required e-skills, frequency and percentage distributions as well as median analysis were utilized. Additionally, cross-tabulation was used to determine the respondents' e-skills level with respect to the disability category. Moreover, multiple response analysis was applied to rank the obstacles that hinder the PWDs' e-skills acquisition.

The questionnaire used was submitted first to experts for content validation. Then, its reliability was determined through pilot testing in the municipality of Sta. Margarita, Samar and Cronbach's alpha value. Statistical Packages for Social Sciences 29 (SPSS 29) was utilized for the reliability testing. The questionnaire was revised in accordance with the test results. Both printed and online versions of the instrument were created. The online version was in English while the printed one had two versions, i.e., Filipino and English. Finally, the data gathered were treated and analyzed using SPSS 29.

4. Result and Discussion

The results and findings presented are organized in accordance with the set objectives.

4.1. Description of the PWD Population Through the Sample Data

Table 1 shows that majority of the PWDs in Calbayog City were in their middle adulthood age or older adulthood to retirement age constituting 36.84% and 32.46% of the respondents, respectively. Figure 1 visualizes the different age groups. In terms sex that is visualized in Figure 2 and civil status that is visualized in Figure 3, 52.63% of the respondents were females and 52.63% were single. In terms of disability, 45.61% of the respondents fall under the physical disability followed by deafness at 17.54%, visual disability at 12.28%, and rare diseases at 10.53%. Figure 4 visualizes the respondents' disabilities. It should be noted that there were 10 types of disability identified by the PDAO but only 9 types appeared in the survey result, excluding mental disability. On the other hand, 30.70% of the PWDs were able to get a degree in college and 23.68% were able to get to college while a few of them were master's or doctorate degree holders. Figure 5 shows the visualization of the respondents' highest educational level. Finally, the majority or 50.88% of the PWDs were not employed while 32.16% of them were government employees. Figure 6 shows a visualization of the respondents' employment type.

Table 1. Profile of PWDs in Calbayog City, Samar, Philippines

PROFILE VARIABLES	f	%
AGE		
Young Adulthood Age (15 to 24 years old)	35	30.70
Middle Adulthood Age (25 to 44 years old)	42	36.84
Older Adulthood to Average Retirement Age (45 to 64 years old)	37	32.46
SEX		
Male	57	47.37
Female	60	52.63
CIVIL STATUS		
Single	60	52.63
Married	45	39.47
Separated	7	6.14
Widowed	2	1.75
IMPAIRMENT		
Cancer	4	3.51
Deafness	20	17.54
Intellectual Disability	3	2.63
Learning Disability	3	2.63
Physical Disability	52	45.61
Psychosocial Disability	1	0.88
Rare Diseases	12	10.53
Speech Impairment	5	4.39
Visual Disability	14	12.28
HIGHEST EDUCATIONAL ATTAINMENT		
No Formal Education	1	0.88
Elementary Level	9	7.89
Elementary Graduate	5	4.39
High School Level	18	15.79
High School Graduate	8	7.02
Vocational Education	1	0.88
College Level	27	23.68
College Graduate	35	30.70
Master's Level	2	1.75
Master's Degree Holder	5	4.39
Doctorate Degree Holder	3	2.63
EMPLOYMENT TYPE		
Government Employee	37	32.46
Private Employee	7	6.14
Freelancer	5	4.39

PROFILE VARIABLES	f	%
Self-Employed	7	6.14
Not Employed	58	50.88

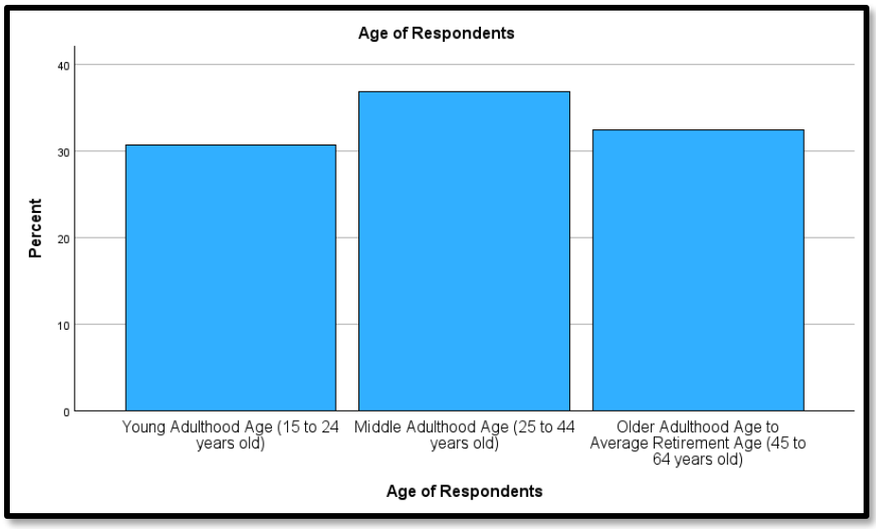

Figure 1: Age of respondents

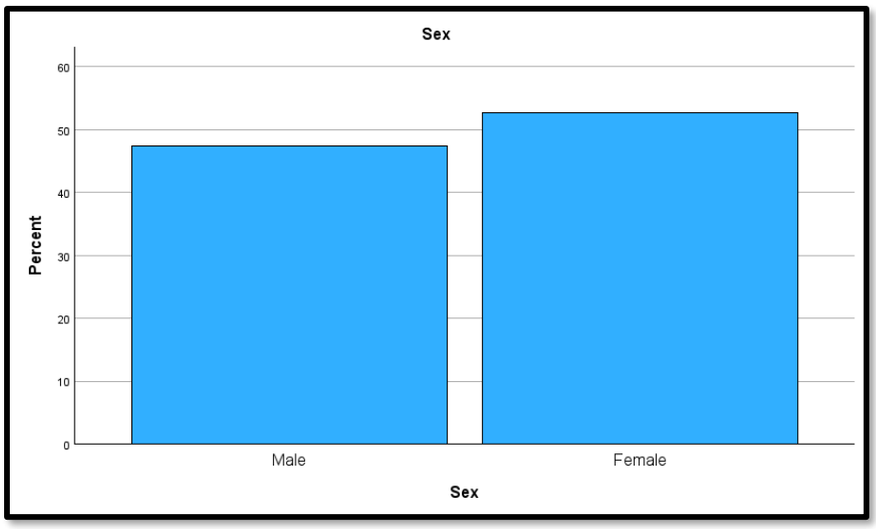

Figure 2: Sex of respondents

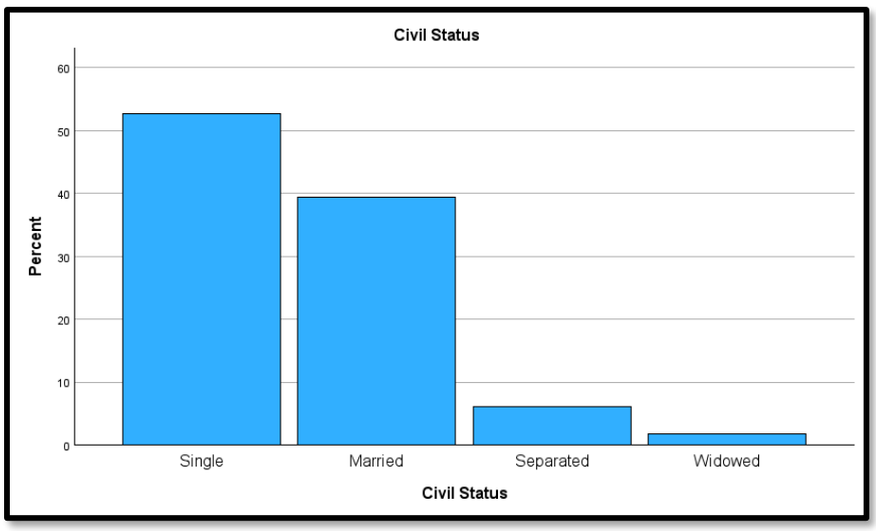

Figure 3: Civil status of respondents

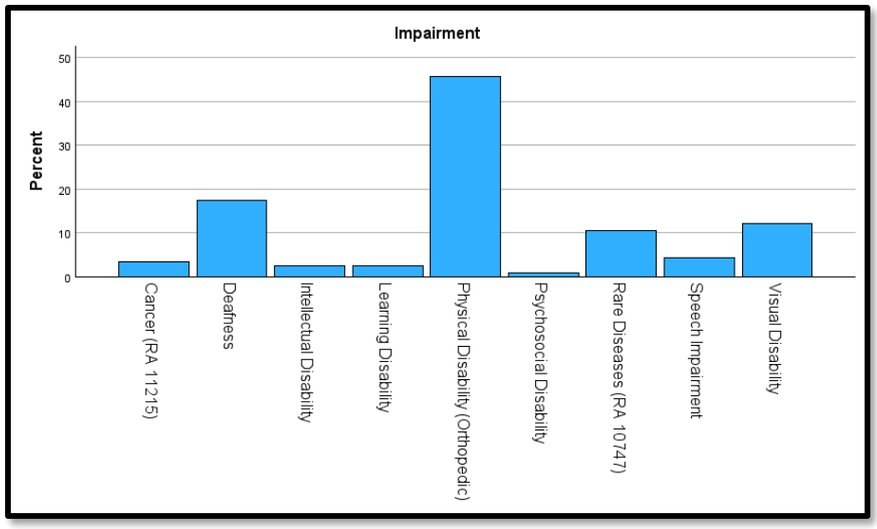

Figure 4: Disability of the respondents

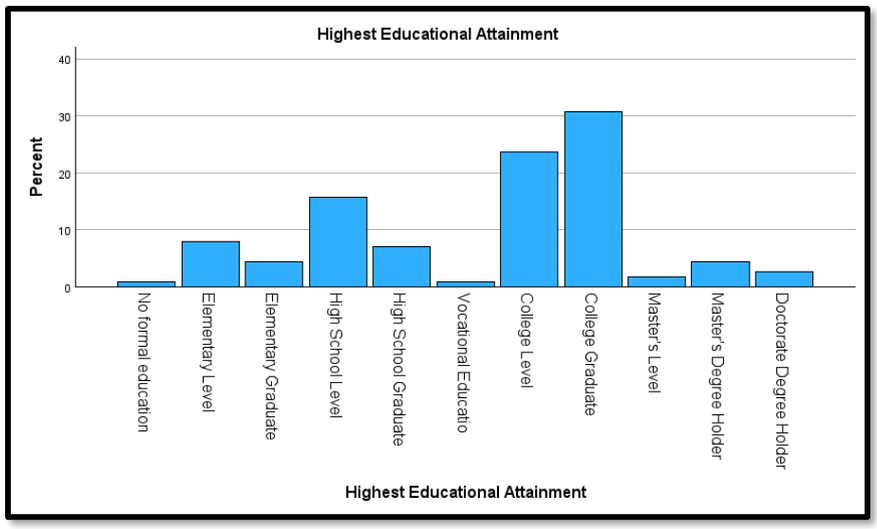

Figure 5: Highest educational attainment of the respondents

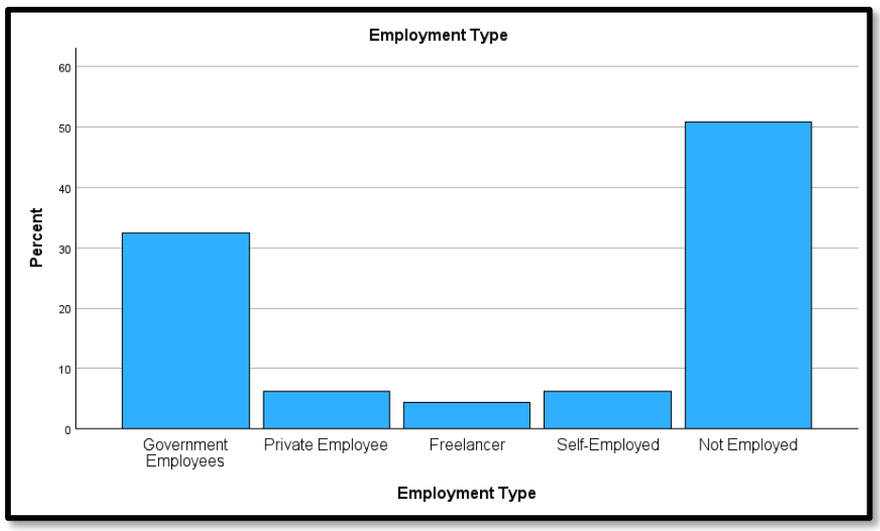

Figure 6: Employment type of the respondents

4.2. The Various E-Skills of PWDs with Respect to Their Disability

The 4 e-skill categories by Soobramoney&Heukelman (2019) were used as the basis for identifying the e-skills of the PWDs. For each category, 8 specific e-skills were identified, which can be seen in Section 4.3.

Table 2 shows that the leading rating under the 1st category is very poor and almost half of the responders (53/114) rated themselves as poor or very poor. Additionally, majority of the PWDs under the following types have average to excellent ratings: cancer at 75% (3/4), visual disability at 71.43% (10/14), deafness at 60% (12/20), and rare disease at 58.33% (7/12). Meanwhile, majority of PWDs under the following types have poor to very poor ratings: speech impairment at 80% (4/5), intellectual disability and learning disability at 66.67% (2/3), and physical disability at 51.92% (27/52).

Table 2. Technology Operations Skills of PWDs

Disability	Very Poor	Below Average/ Poor	Average	Above Average	Excellent	Total
Cancer	1	0	3	0	0	4
Deafness	2	6	8	4	0	20
Intellectual Disability	1	1	1	0	0	3
Learning Disability	1	1	0	1	0	3
Physical Disability	18	9	7	14	4	52
Psychosocial Disability	0	0	1	0	0	1
Rare Diseases	4	1	2	5	0	12
Speech Impairment	4	0	1	0	0	5
Visual Disability	3	1	4	3	3	14
Total	34	19	27	27	7	114

Table 3 shows that the leading rating under the 2nd category is above average, and majority of the responders (81/114) rated themselves from average to excellent. Specifically, majority of the PWDs under the following types have average to excellent ratings: cancer at 100% (4), psychosocial disability at 100% (1/1), visual disability at 92.86% (13/14), deafness at 75% (15/20), rare disease at 75% (9/12), learning disability at 66.67% (2/3), and physical disability at 65.38% (34/52). Meanwhile, majority of PWDs under the following types have poor to very poor ratings: intellectual disability at 66.67% (2/3) and speech impairment at 60% (3/5).

Table 3. Fundamental E-Skills of PWDs

Disability	Very Poor	Below Average/ Poor	Average	Above Average	Excellent	Total
Cancer	0	0	2	1	1	4
Deafness	0	5	6	7	2	20
Intellectual Disability	2	0	0	1	0	3
Learning Disability	0	1	1	1	0	3
Physical Disability	13	5	8	19	7	52
Psychosocial Disability	0	0	0	0	1	1
Rare Diseases	2	1	3	4	2	12
Speech Impairment	3	0	1	1	0	5
Visual Disability	1	0	4	4	5	14
Total	21	12	25	38	18	114

Table 4 shows that the leading rating under the 3rd category is above average and majority of the responders (70/114) rated themselves from average to excellent. Specifically, majority of the PWDs under the following types have average to excellent ratings: psychosocial disability at 100% (1/1), visual disability at 78.57% (11/14), cancer at 75%

(3/4), rare disease at 66.67% (8/12), and physical disability at 65.38% (34/52). Meanwhile, majority of PWDs under the following types have poor to very poor ratings: intellectual disability at 66.67% (2/3), learning disability at 66.67% (2/3), speech impairment at 60% (3/5), and deafness at 55% (11/20).

Table 4. Information Analysis and Knowledge-Sharing Skills of PWDs

Disability	Very Poor	Below Average/ Poor	Average	Above Average	Excellent	Total
Cancer	0	1	2	0	1	4
Deafness	1	10	1	5	3	20
Intellectual Disability	2	0	1	0	0	3
Learning Disability	0	2	0	1	0	3
Physical Disability	14	4	13	15	6	52
Psychosocial Disability	0	0	0	1	0	1
Rare Diseases	2	2	6	1	1	12
Speech Impairment	3	0	1	1	0	5
Visual Disability	2	1	3	4	4	14
Total	24	20	27	28	15	114

Table 5 shows that the leading rating under the 4th category is average, and majority of the responders (66/114) rated themselves from average to excellent. Specifically, majority of the PWDs under the following types have average to excellent ratings: psychosocial disability at 100% (1/1), visual disability at 78.57% (11/14), cancer at 75% (3/4), and physical disability at 61.54% (32/52). Moreover, 50% of PWDs under rare disease rated themselves as poor to very poor and the other 50% as average to excellent. Finally, majority of PWDs under the following types have poor to very poor ratings: both intellectual disability and learning disability at 66.67% (2/3), speech impairment at 60% (3/5), and deafness at 55% (11/20).

Table 5. Strategic E-Skills of PWDs

Disability	Very Poor	Below Average/ Poor	Average	Above Average	Excellent	Total
Cancer	0	1	1	2	0	4
Deafness	5	6	6	2	1	20
Intellectual Disability	2	0	0	1	0	3
Learning Disability	1	1	0	1	0	3
Physical Disability	12	8	19	9	4	52
Psychosocial Disability	0	0	0	1	0	1
Rare Diseases	3	3	4	2	0	12
Speech Impairment	3	0	1	1	0	5
Visual Disability	2	1	2	6	3	14
Total	28	20	33	25	8	114

4.3. E-skills Needed by PWDs

Table 6 shows that 87.5% (7/8) of the technology operations skills are needed by the PWDs in Calbayog City, Samar. The need to learn computer programming, however, is deemed as not needed. Additionally, the top 3 needed category 1 e-skills are as follows: 1) Using productivity software; 2) Using an operating system; and 3) Installing, configuring, maintaining, and troubleshooting computer hardware.

Table 7 shows that 100% (8/8) of the fundamental e-skills are needed by the PWDs in Calbayog City, Samar. Additionally, the top 3 needed category 2 e-skills are as follows: 1) Using search engines to find relevant information on the internet; 2) Using email, chat,

social media platforms, and collaboration tools; and 3) Organizing, storing, & retrieving digital files & documents effectively.

Table 8 shows that 100% (8/8) of the information analysis and knowledge-sharing skills are needed by the PWDs in Calbayog City, Samar. Additionally, the top 3 needed category 3 e-skills are as follows: 1) Understanding data analysis concepts; 2) Doing research using search engines, online databases, academic journals, and other digital resources; and 3) Interpreting data and drawing insights to support arguments & conclusions.

Table 6. Technology Operations Skills Needed by PWDs

Technology Operations Skills	Yes		No		Mode
	f	%	f	%	
Needs to learn how to use an operating system (OS) of a computer (e.g., Windows, macOS, Linux)	76	66.67	38	33.33	1
Needs to learn how to install, configure, maintain, & troubleshoot computer hardware (e.g., desktop, laptop, server, printer, scanner)	70	61.40	44	38.60	1
Needs to learn how to setup, maintain, & troubleshoot networks (e.g., LAN, Wi-Fi), configure routers, switches	68	59.65	46	40.35	1
Needs to learn how to install, configure, update, & troubleshoot software (e.g., OS, productivity tools like MS Office, other application software)	62	54.39	52	45.61	1
Needs to learn how to do basic IT security (e.g., setup firewall, use antivirus software, manage password, encrypt data)	60	52.63	54	47.37	1
Needs to learn how to do system administration (e.g., manage user accounts, access control, file systems, local storage, data backup & recovery)	67	58.77	47	41.23	1
Needs to learn how to use productivity software (e.g., MS Word, MS Excel, MS PowerPoint, Google Docs, Google Sheets, Google Slides)	78	68.42	36	31.58	1
Needs to learn how to make basic computer programs using a programming language (e.g., Python, C#, Java)	53	46.49	61	53.51	2

Legend:
1 – Yes
2 – No

Table 7. Fundamental E-Skills Needed by PWDs

Fundamental E-Skills	Yes		No		Mode
	f	%	f	%	
Needs to understand computer hardware, software, & operating system	74	64.91	40	35.09	1
Needs to understand data privacy, intellectual property, copyright laws, ethical use of digital content, ethical & responsible behavior in online communities, cyberbullying, & online harassment	77	67.54	37	32.46	1
Needs to know safe online practices, including protecting personal information, avoiding scams, & identifying phishing attempts	81	71.05	33	28.95	1
Needs to learn how to organize, store, & retrieve digital files & documents effectively	85	74.56	29	25.44	1
Needs to learn how to use search engines to find relevant information on the internet	92	80.70	22	19.30	1
Needs to learn how to navigate websites, follow hyperlinks, & use web-based tools & applications	78	68.42	36	31.58	1
Needs to learn how to analyze information for its validity, relevance, & objectivity; identify fake news, misinformation, & propaganda; & distinguish between fact & opinion	77	67.54	37	32.46	1
Needs to learn how to use email, chat (e.g., Messenger, Viber, Telegram), social media platforms, & collaboration tools (e.g., Zoom, Google Meet, Skype) for communication & collaboration	89	78.07	25	21.93	1

Legend:
1 – Yes
2 – No

Table 9 shows that 100% (8/8) of the strategic e-skills are needed by the PWDs in Calbayog City, Samar. Additionally, the top 3 needed category 4 e-skills are as follows: 1) Identifying technological solutions to real-world problems and challenges; 2) Using technology to monitor trends, forecast future scenarios, and develop innovative solutions; and 3) Identifying business opportunities, taking calculated risks, & creating value using ICT-based solutions.

Table 8. Information Analysis and Knowledge-Sharing Skills Needed by PWDs

Information Analysis and Knowledge-Sharing Skills	Yes		No		Mode
	f	%	f	%	
Needs to understand data analysis concepts (e.g., descriptive statistics, inferential statistics)	83	72.81	31	27.19	1
Needs to learn how to analyze information from various sources to identify key points, trends, & relationships	79	69.30	35	30.70	1
Needs to learn how to use spreadsheet (e.g., MS Excel) or other data analysis tools (e.g., SPSS) to organize & analyze data sets	78	68.42	36	31.58	1
Needs to learn how to interpret data & draw insights to support arguments & conclusions	81	71.06	33	28.95	1
Needs to learn how to do research using search engines, online databases, academic journals, & other digital resources	82	71.93	32	28.07	1
Needs to learn how to use software for creating presentations (e.g., MS PowerPoint), reports, & infographics	76	66.67	38	33.33	1
Needs to learn how to use multimedia (i.e., audio, video) tools to enhance presentation	74	64.91	40	35.09	1
Needs to learn how to do data visualization using any relevant information technology (e.g., Matplotlib)	72	63.16	42	36.84	1

Legend:

1 – Yes
2 – No

Table 9. Strategic E-SkillsNeeded by PWDs

Strategic E-Skills	Yes		No		Mode
	f	%	f	%	
Needs to learn how to identify technological solutions to real-world problems & challenges	86	75.44	28	24.56	1
Needs to learn how to identify business opportunities, take calculated risks, & create value using ICT-based solutions	81	71.05	33	28.95	1
Needs to learn how to use data analytics tools & techniques to synthesize information from various sources, identify patterns, draw insightful conclusions, & inform strategic decisions	76	66.67	38	33.33	1
Needs to learn how to use technology to monitor trends, forecast future scenarios, & develop innovative solutions	82	71.93	32	28.07	1
Needs to learn how to use technology tools (e.g., mind-mapping software) to facilitate creative brainstorming & generate innovative ideas	74	64.91	40	35.09	1
Needs to learn how to devise or use a knowledge management technology to effectively capture, organize, & share knowledge within the organization or community	79	69.30	35	30.70	1
Needs to learn how to devise or use a project management software to plan, organize, & track knowledge-based projects effectively	78	68.42	36	31.58	1
Needs to learn how to envision & anticipate future scenarios, trends, & disruptions in the digital age, informing strategic decision-making & planning	78	68.42	36	31.58	1

Legend:

1 – Yes
2 – No

4.4. Challenges Limiting PWDs' Opportunities to Learn E-skills

Table 10 shows the factors that hinder PWDs from acquiring e-skills that are arranged from the most voted to the least voted. The researchers employed multiple response analysis to rank the factors, and they have found that the top 3 reasons that hinder PWDs in Calbayog City from learning e-skills are: 1) inadequate funding; 2) lack of individualization; and 3) negative attitude and stereotypes.

Table 10. Factors Hindering PWDs from Learning E-Skills

Factors Hindering the Respondents from Learning E-Skills[a]	Responses		% of Cases
	f	%	
1. Inadequate funding (lack of financial resources)	69	20.5%	62.2%
2. Lack of individualization (learning style not personalized enough to meet the unique needs of a PWD)	59	17.5%	53.2%
3. Negative attitudes and stereotypes (negative assumptions or beliefs about the ability of a PWD to learn and succeed in e-skills or IT fields)	56	16.6%	50.5%
4. Accommodation process (difficulty in requesting or receiving support services to overcome learning barriers)	52	15.4%	46.8%
5. Physical inability (physical impairment makes it difficult or impossible to interact with technology)	40	11.9%	36.0%
6. Ineffective dispute resolution mechanisms (difficulty in addressing complaints on accessibility issues in e-skills learning)	40	11.9%	36.0%
7. Others	21	6.2%	18.9%
Total	**337**	**100.0%**	**303.6%**

a. Dichotomy group tabulated at value 1.

4.5. Discussion

Majority of the PWD respondents were unemployed and this indicates the need for an intervention. Their lack of financial stability implies a high level of digital divide that could only worsen their situation. Majority of them as well were in the middle adulthood or older adulthood to retirement age, which means that some of them may no longer be that interested in learning e-skills for according to Duplaga (2017), the older a PWD gets, the more his/her interest in learning e-skills declines. This should not discourage, however, any advocacy efforts to promote e-skills among PWDs for according to Džananović& Bajraktarević (2022), because many PWDs are unaware of how ICT can help in their socio-economic status, we just need to train them, educate them about it so they can eventually take the advantages associated with having e-skills. These findings highlight the urgent need for a sound digital literacy drive among PWDs to increase their awareness and appreciation of ICT and its capacity to empower them.

In terms of the e-skills level of the respondents, the study found that nearly half, i.e., 46% (53/114) of them need help (i.e., poor, very poor) in terms of technology operations skills. Additionally, a good number of respondents rated themselves only as average for this category. If we would include it in the result, then it would be that around 70% (80/114) or majority of the respondents may need help on this e-skill. By including the average rating as well, we acknowledge that although the e-skill level this rating implies may be acceptable, improvement is still necessary if what we are targeting is their employability. As for strategic e-skills, around 42% (48/114) of the respondents need help on this e-skill. If we would also include those who rated themselves only as average for this category, then around 81% (71/114) or majority of the respondents may need help on this e-skill. As for information analysis and knowledge-sharing skills, around 38% (44/114) or 1/3 of the respondents need help on this e-skill. If we would also include those who rated themselves only as average for this category, then around 62% (71/114) or majority of the respondents may need help on this e-skill. And finally, for fundamental e-skills, only around 29%

(33/114) of the respondents need help on this e-skill, which suggests that most of them have a good grasp of it. If we would also include those who rated themselves only as average for this category, then a little over than the majority or around 51% (58/114) of the respondents may need help on this e-skill. With this information, we now know which e-skills training program or project for PWDs to prioritize and spend our resources on. These findings respond to Gunupudi et al. (2024) who emphasized the imperativeness of discovering the foundational digital skills of PWDs as it is crucial in planning and creating learning interventions for PWDs, which was supported also by Dobrowolska et al. (2024).

As for the e-skills needed as expressed by the respondents, the study found that all 4 categories of e-skills are needed by them, which indicates a wide variety of interests they have on e-skills. This also suggests that providing training on any of the 4 e-skill categories would be relevant to them but the specific e-skills to teach under any category must be based upon those specific e-skills that topped the respondents' interest as it reflects which e-skills they need more. By doing so, we can expect better participation from them during actual skills training knowing that the intervention being conducted is a response to their expressed need. Formally identifying the e-skills needed by the PWDs is a response to the advice of Cashmore & Crosta (2022), which states that skilling interventions must be guided by the demands of the PWDs and that such interventions must be tailor-made for them.

As regards the factors that prevent PWDs from acquiring e-skills, the study found that lack of financial resources is the main element that hinders PWDs from learning e-skills. As shown in Figure 6, most of the respondents were unemployed, which implies their inability to afford themselves of proper education or even ICT tools that should somehow help them reduce the digital divide they are in. The second major hindrance is insufficient personalization of learning style that meets the unique needs of PWDs. This is why Cardoso-Pereira et al. (2023) recommended that educators or trainers must be equipped with knowledge not only in creating accessible materials but also in teaching methodologies that can be applied in effectively transferring learning to PWDs. Answering this factor may require the use of ICT assistive devices that are usually pricey and therefore could not be availed in large numbers by institutions providing the interventions with limited funds (Osman & Diah, 2017). The third major hindrance is the negative attitudes and beliefs about the abilities of PWDs. This implies that there is a stigma as Thomas (2024) would call it. PWDs are not seen equally by other people. They believe that they could not do what a normal person could do. Hence, PWDs feel inferior and therefore they experience low self-esteem. This shows that impactful information drive towards eradicating the stigma surrounding PWDs' ability to contribute to society is imperative. The remaining hindrances identified imply the need for enhancing the support services when it comes to overcoming learning barriers (Osman & Diah, 2017), the need for assistive technologies that would reduce the gap between the PWDs and the use of ICT (Thomas, 2024 & Duplaga, 2017), and the need for strengthening complaints resolution when it comes to accessibility issues in e-skills training.

To provide a more comprehensive and profound understanding of the factors limiting PWDs from successfully acquiring e-skills, other researchers may consider exploring on the following hindrances that were given little emphasis in this study: barriers to physical access, age, educational attainment, and technical challenges.

Overall, this work provides a solid foundation on the e-skills levels, needs, and challenges of the PWDs in Calbayog City, Samar, which can be used by the local government and other institutions even in other regions to craft e-skills interventions and other similar activities that target the reduction of digital divide among PWDs, their total inclusion in the society, and the upliftment of their lives.

5. Conclusion and Recommendation

This section summarizes the key findings and their significance. It also proposes steps on how such findings should be acted upon.

5.1. Conclusion

This study intended to describe the PWD working population in Calbayog City, Samar, and determine their present e-skills level, the e-skills they need, and the challenges that prevent them from acquiring such skills. The findings show that majority of the PWDs were unemployed and that many of them were in the middle adulthood or older adulthood to retirement age. These results imply the need for an impactful and sustainable digital literacy and e-skills training programs that would invoke their appreciation of ICT, which should eventually translate into the upliftment of their overall wellbeing. The results also reveal that the PWDs do need help in acquiring e-skills and that majority are willing to learn them. However, they are confronted with significant challenges such as lack of financial resources, insufficient personalization of learning style, and discriminatory behavior and stereotype, to name a few. These suggest that Calbayog City has a long way to go in narrowing the gap between ICT and the PWDs as a way of improving their lives. This also implies that many resources must be spent to address and overcome these pressing challenges.

5.2. Recommendation

Based on the findings, the study recommends the following:

1. The local government unit, educational institutions, and other agencies should collaborate on impactful and lasting programs and projects that educate PWDs of the power of ICT in the improvement of their socio-economic status and overall wellbeing.
2. The local government unit, educational institutions, and other agencies should collaborate on crafting responsive, impactful, lasting, and free e-skills training programs and projects for PWDs, including stakeholders involved in equipping PWDs with digital or ICT skills.
3. The local government unit, business sector, and other agencies should collaborate on creating sustainable livelihood programs and projects that not only provide ICT-related career opportunities for PWDs but also give them a work environment that sees and nurtures their potential and practices fairness.
4. The local government unit, business sector, educational institutions, and other stakeholders should conduct impactful education drives regularly to eradicate the negative stereotypes and stigma surrounding the capability of PWDs in contributing to the society in general, and in participating in the world of work in particular.
5. The local government unit and other government agencies should allocate funds for implementing programs and projects that target the upliftment of lives of the PWDs and the strengthening of their social inclusion through ICT.

6. The local government unit and educational institutions or other agencies should help one another in allocating budget for assistive technologies to make learning more inclusive, and for making their establishments PWD-friendly by reducing or eliminating physical barriers.
7. Future researchers should explore on the following factors that hinder PWDs from learning e-skills to get a more profound understanding of such limitations: barriers to physical access, age, educational attainment, and technical challenges.

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