

Digital literacy initiative for Person with disability in Fiji

The promising use of digital technologies by persons with disabilities (PWDs) for education, employment, social and economic integration in the society is evident. As such, digital skills for the successful utilisation of digital technologies to support, societal inclusion is necessary. This study highlights a case study conducted with a sample of PWDs to evaluate their digital literacy status in Fiji using a digital literacy scale. Furthermore, a digital literacy remediation tool was used to improve the understanding of digital literacy and the digital literacy skills of the selected sample in Fiji. The results reveal that the participants were very low to low digitally literate. The digital literacy remediation was not attempted by any of the participants indicating lack of confidence in attempting technology driven modules. Although the remediation tool was tailored to include the PWDs, there are recommendations from the participants on its further improvements. The digital literacy scale and the digital literacy remediation tool fostered effective learning of digital skills for the persons with disabilities thus paving a way for promoting equity and inclusion in the digital society.

Keywords: digital literacy, PWDs, disability, digital literacy scale

Introduction

The 21st-century is permeated with many digital technologies that people use for their daily tasks; however, some people are excluded. The exclusion is a result of accessibility, usage issues or lack of relevant skills to use the digital technology to desired effects. Concerned stakeholders are working on strategies to create a digital inclusion for all especially for the persons with disability (PWDs). According to Park (2020), a disabled person is one who has a problem in body function or structure, an activity limitation, has a difficulty in executing a task or action; with a participation restriction. Statistics show that as of 2021, there are 1 billion disabled people in the world (Okeena, 2021). The impairments range from blindness and visual, deafness and hearing, to intellectual disability and physical disability. A total of 13.7% persons in Fiji live with one or more disability (Statistics, 2018). Apart from facing constant discrimination and stigma, the disabled community generally lack access to mainstream resources such as access to health services due to barriers in using physical facilities. Students with disabilities face challenges in inclusion into educational facilities particularly during pandemics if their support devices are not inclusive to address their different learning needs. In such cases, they are less likely to return to school due to lack of provisions for inclusion (Cowley, 2020).

Fiji's National Employment Policy 2018 recommends a reservation of 2% of the workforce for inclusion of PWDs (Ministry for Employment, 2019). Training and education providers in Fiji such as APTC (Coalition, 2017) and NTPC (Ravindra, 2018) have held several training sessions and workshop for PWDs in efforts to create employability skills and opportunities for the PWDs. However, organisations face challenges in conforming to National Employment Policy 2018 requirement primarily due to the lack of educational and skills-based merits, which form crucial deliverables of the job descriptions. This stems from the early life exclusion of PWDs from educational facilities. To create inclusions, many countries are developing interventions, workshops and trainings to assist the PWDs to continue with their education and employment. While the development interventions were relatively assisting the PWDs, the unprecedented event of Covid-19 caused severe levels of stress, frustration and inequalities. Since the use of digital technologies became apparent, the PWDs were also required to acquire relevant digital skills to adequately function in the post Covid society.

This research evaluates the role of a unique and noble digital literacy tool developed in the South Pacific by Reddy et al. (2021a) to assist the PWDs in Fiji to improve their digital literacy skills. The tool will be used to evaluate the digital literacy of the PWDs in Fiji and further improve their digital literacy skills so that the cohort can be an integral part of the employment sector thus creating inclusion in both educational facilities and the workforce. The digital literacy tool uses six dimensions of digital literacy to evaluate digital literacy competencies and further improves digital literacy of individuals using online intervention modules based on the same six dimensions. This research is unique and its contributions are as follows:

- i. baseline study that evaluates digital literacy of the PWDs, hence adding the status of digital literacy competencies of the PWDs in Fiji.
- ii. introduces a new methodology to measure digital competencies of the PWDs.

Literature Review

The era of innovative digital tools has extended the traditional norm of literacy from basic reading and writing to the inclusion of digital tools for digital literacy. Digital Literacy, according to The American Library Association's digital-literacy task force, is the ability to use information and communication technologies (ICT) to find, evaluate, create, and communicate information, requiring both cognitive and technical skills (Heitin, 2016). Digital literacy is a crucial component of an individual's professional and personal life and is essential in ensuring that citizens are included in national, societal, as well as personal progress. The past two years have been mostly consumed in creating strategies to work in the post covid era. Digital literacy has greatly assisted in enabling students and the workforce in continuation of their work through remote learning and remote work, respectively. However, in the Pacific Island region, digital literacy has been primarily limited to the urban areas, and the concept of competency in digital literacy is still in its evolution. Therefore, a Pacific centric solution was designed in efforts to measure digital literacy as well as remediate gaps in competencies pertaining to digital literacy (Reddy et al., 2020). This was achieved through international benchmarking of a universal framework designed by Covello (2010) and focusses on six key matrices for measurement which were media, information, technology, computer, visual, and communication literacy (Reddy et al., 2021).

The issues faced by persons with disabilities are prevalent in most aspects of their lives. PWDs face anxieties due to social stigma which greatly inhibit their ability to foster personal relationships (Hunt et al., 2016). These early social issues leave their fragments in most aspects of PDWs lives, therefore add to their exclusion in other avenues and facets of their professional and personal lives. While PWDs are encouraged to gain an education for themselves, it is noted that they are not always represented in all sectors of education. This is particularly evident for PWD representation in science related subjects. A study conducted in USA states that while one fifth or 19% of the US population has at least 1 disability, only a mere 2.7% of medical students have disclosed having disabilities (Meeks et al., 2018). This indicates that they either have less interest, or lack of inclusion access to STEM related subject areas and career paths.

Individuals with Disabilities Education Improvement Act (IDEIA) mandates the need for providing inclusive education in US schools. Due to the limitations in accessing mainstream and assisted forms of education, PWDs stand a lesser chance of getting employment compared to those who do not have disability.

According to Bureau of Labor Statistics, PWDs are twice as likely to be employed compared to persons without disabilities (Hernandez, 2020). While being employed has proved to significantly impact positive mental health for PWDs, it is also important to note that finding employment has long been a challenge for them. A study aimed to measure the relationship between psychosocial job quality and mental health of PWDs states that PWDs suffer declining mental health upon leaving their jobs, when compared to persons without disabilities (Milner et al., 2015). Inclusive education was originally aimed to assist children at early schooling; however, as the success of inclusive education at primary level increased, the need for implementing inclusion in higher education evolved with subsequent policies and strategies to ensure that the students learn successfully (Morina, 2017).

However, in Fiji, inclusive education, though recognised as a constitutional right, remains largely a challenge due to lack of resources such as qualified teachers, lack of medical diagnosis, assistive technologies, and early intervention of inclusive strategies (Cowley A., 2020). According to a study conducted in Fiji, majority of the participants believe that persons with communication disability are employable, while one fifth of the participants think that they are not employable. This stems from cultural beliefs and norms which suggest supernatural causes of disabilities without any scientific basis (Hopf et al., 2017). Belief systems, particularly in rural and traditional settings have tremendous impact on people, and thus influence the thought processes which form the fabric of the society. Health interventions such as awareness programs aimed at communities can not only help families and friends of the PWDs to understand disabilities, but also promote the rights of PWDs, while harnessing an environment for additional support towards inclusion of PWDs.

PWDs greatly suffer from the global digital divide, which worsens in times of crisis. The digital divide exists in all regions of the world; however, it further marginalises PWDs. Studies indicate that PWDs who have full access to the internet access a diverse range of services and have utilised the internet to build and present their own content (Duplaga, 2017). Being part of the digital spaces creates several opportunities for PWDs in inclusive education, access of citizen centric online platforms and generally contributes positively to the wellbeing and

health related behaviours of the PWDs (Szulc, 2019). Such benefits call for a firmative action towards provisions for inclusion.

The field of ICT offers a wide range of opportunities for persons with disabilities. According to the World Development Report on the Digital Dividends, the use of ICT promotes education and literacy, creates opportunities for employment and income generation, allows the use of e-governance through civic participation, creates financial inclusion, and helps with better disaster management (ref of World Development Report on the Digital Dividends). The World Wide Web Foundation is committed to creating strategies, standard and resources to make the internet more accessible to people with disabilities (ref). Though the global frameworks and standard for inclusions suggested by the World Wide Web Consortium (W3C) are being a dapted successfully around the world, there are some known widespread challenges in accessible use of ICT in many parts of the world, particularly the developing and underdeveloped economies. The challenges include the lack of enabling legal and regulatory frameworks that support inclusion, the lack of stakeholder awareness knowledge, capacity, and engagement, as well as the issues around cost and affordability of the ICT provisions such as internet and gadgets (Breen et al., 2022; Sharma et al., 2019; Reddy et al., 2016; Raja, 2016). The report also suggests that there is a dire need of enabling factors to strengthen the ecosystem of accessibility though thorough analysis and improvement of legislation and policies, as well as intensive technical trainings and community awareness.

Methodology

This research study utilized a survey methodology approach. A total of 47 randomly selected persons with disability participated in the survey. The age range of the participants were from 17 years to 54 years and the type of disabilities differed from one participant to the other. Some participants attempted the self-evaluated digital literacy questionnaire online while others were interviewed in person due to their lack of digital skills. The data was collected and analysed using descriptive and inferential statistics. The Chi-Square test was used to evaluate impact of variables such as education, age and gender on the digital literacy status of the participants. The Chi-Square test is a good measure to evaluate the impact of one variable on the other variable (Kent State University , 2022).

Description of digital literacy framework and digital literacy tool

The authors carried out an extensive literature review to understand the evolution of digital literacy and the reasoning behind the different dimensions associated to digital literacy by different scholars. Prior work done on digital literacy showed factors such as economic background, ICT infrastructure, the rate of digital innovations and their assimilation into the society, affected the definitions and dimensions of digital literacy (Breen et al., 2022; Hall & Cherrez, 2022; Morgan et al., 2022; Dhika et al., 2021; Reddy et al., 2020). Researchers used their preferred dimensions to design and develop their own digital literacy frameworks, models and digital literacy measuring instruments (Pinto et al., 2020; Ustundag et al., 2017; Perdana et al., 2016; Dios et al., 2016; Martin & Grudzieck, 2015; Commonwealth of Learning, 2012; Lin, 2011; Halim, 2020). However, to the best of the authors' knowledge the existing frameworks, models and scales had digital skills gap, the reader is referred to the extensive literature review in the work of (Reddy et al., 2021; Reddy et al., 2020). To embrace the required digital skills of the 21st-century, Covello's (2010) framework was adopted. The framework measured digital literacy using six dimensions and the authors perceived that these six dimensions critically evaluated all the essential digital skills of the 21st century. However, the definition of digital literacy and six dimensions were revised to suit the digital skills for the digital era. Furthermore, each of the six dimensions- media literacy, communication literacy, information literacy, visual literacy, computer literacy and technology literacy were populated with items. Each item represented skills and total number of items for each dimension represented competencies. Hence, a total of 60 items were selected from literature (Arneson & Offerdahi, 2018; Dincer, 2018; Holladay, 2018; Thompson, 2018; Coklar et al., 2017; Jin & Ming, 2017; Sas et al., 2017; Sorgo et al., 2017; Covello, 2010). The newly proposed digital literacy framework was designed, and validated using Exploratory Factor Analysis.

Using the validated digital literacy framework, a digital literacy tool was developed, which consisted of a digital literacy tool (DLS) and a digital literacy intervention program (DLIP). The digital literacy scale (DLS) measures digital literacy competency of individuals by evaluating competency of each dimension. The questions were self-evaluating and were allotted points from 1-5 – “strongly disagree to strongly agree”. A class interval method was used to develop the levels in the DLS. There are six levels in the DLS that describe the digital literacy levels as follows: (0-10) points – level 1, (11-20) points as level 2, (21-30) points as level 3, (31-40) points as level 4, (41-

50) points as level 5 and (51-60) points as level 6. The details are given in the paper titled “[Contextualized game-based intervention for digital literacy for the Pacific Islands](#)” (Reddy et al., 2021). The DLS was validated using the Exploratory Factor Analysis as well. Furthermore, to improve the digital literacy skills of individuals a contextualized game-based intervention (DLIP) was developed. The DLIP consists of six modules; each module has two sections- (1) theory and (2) game-based quiz. At the end of each module, the user would receive a badge and once all the modules are completed, a digital certificate would be awarded to the user. More details on DLIP can be sourced from the aforementioned paper.

Results

Part A – Descriptive Statistics

Figure 1 shows the demographics of the sample surveyed. From the sample, 74.5 % were females and 25.5% were males. Majority of the sample were below the age of 40 years (85.1%). All the participants had access to a computing device or owned a computing device. The most popular apps amongst the sample were Facebook (74.5%) and YouTube (51.1%). Few of the participants also used Viber (21.2%) and Google (21.2%). The use of social media was common amongst the participants. Some interesting results from the data were:

- i. 17.0% of the participants were certificate and diploma level graduates
- ii. 6.0% of the participants were involved in creative writings
- iii. 21.2% were employed or had worked somewhere in the past

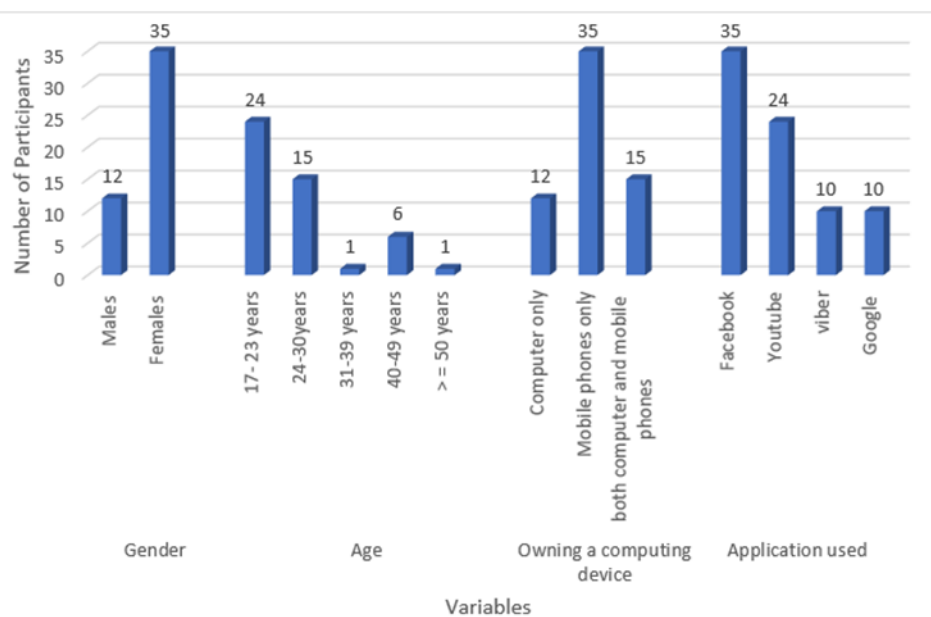


Figure 1: Demographics of the sample.

Figure 2 presents the digital literacy status of the participants. Majority of the participants had very low level to very low levels of digital literacy, 59.5% were at level 2 while 14.9% were at level 3. A total of 8.5% of the participants were average digitally literate while 17.02% had high to very high level of digital literacy.

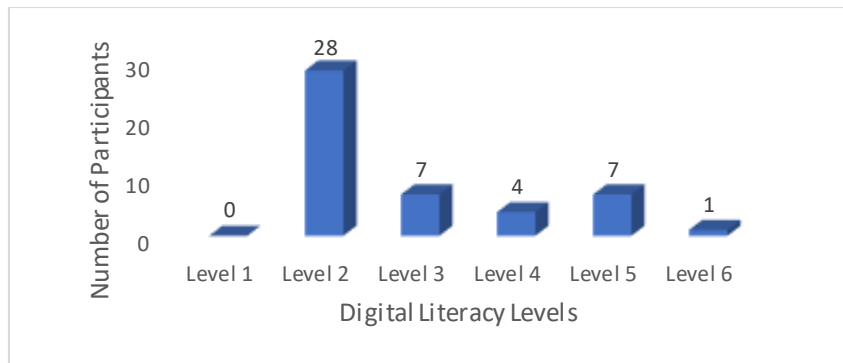


Figure 2: Digital Literacy status of the participants.

To describe the literacy scores for each component; the authors calibrated the scores out of 10 as following to indicate the level of literacy of the participant for each component: “1-4” as low literacy, “5-7”- a average literacy and “8-10” as high literacy. Figure 3 shows the literacy levels for each component. It can be seen that for all components majority of the participants had low level of literacy- more than 50% of the participants. Almost 20-30% of the participants had either a average or high digital literacy levels for each literacy.

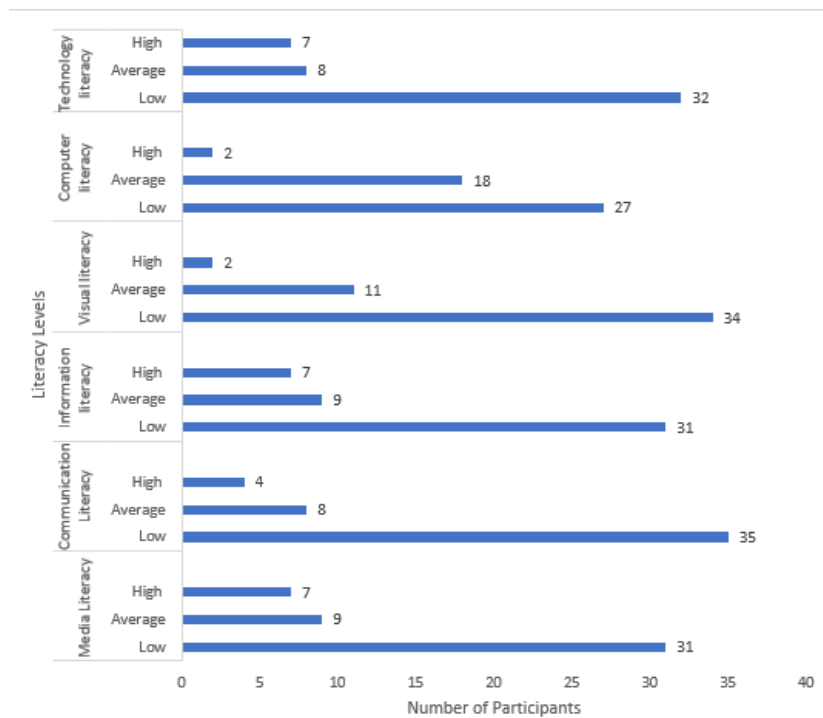


Figure 3: Literacy levels for each component.

None of the participants attempted the digital literacy intervention program (DLIP). This indicates that because the intervention was technology-driven the PWDs did not have the confidence to continue to the intervention programme.

Part B – Inferential Statistics

For this section, a Chi-Square test was performed to evaluate if there were any significant difference in the responses of the participants. The variables- education level, age and gender were chosen. The results for all the three variables showed that there were more than 20% of the cells that had the “expected count less than 5” thus

violating the rule. As such the values for Pearson Chi-Square, Phi and Cramer's V cannot be used. The authors therefore used the Fisher's exact test, and the results were as follows:

- i. *Education Level and Digital Level Status-0.00*
- ii. *Age and Digital Level Status-0.08*
- iii. *Gender and Digital Level Status-0.864*

The sig- values for the three variables indicate that Age and Gender did not have any significant impact on the digital literacy status of the participants, where $p\text{-value} > 0.05$. However, the variable education level had a significant impact on the digital literacy level of the participants, where $p\text{-value} < 0.05$.

Discussion

With the ongoing impact of the pandemic, the disparity in the use of digital platforms and digital devices were prominently evident. Restrictions of movements, work from home, and learning from home garnered many challenges, especially for those who were digitally challenged (Cho & Kim, 2022; Park, 2020). However, the persons with disabilities were more vulnerable due to the pre-existing conditions compared to the people without disabilities. With many of the services transitioning to online platforms, digital literacy of the individuals with or without disabilities needed attention. This research paper intended to evaluate the digital literacy of the PWD's to reinforce social and economic inclusion.

The study results showed that 74.5% of the PWD's had very low to low digital literacy levels while 8.5% were average digitally literate and 17% were highly digitally literate. To the best of the authors knowledge, this is the first study conducted in the South Pacific and to some extent in the world that measured digital literacy of the PWDs using a digital literacy scale. Although there have been studies conducted on exploring digital access inequality and improving digital literacy of the persons with disability (Cho & Kim, 2022; Park, 2020), the results of this survey study are seen as baseline results on the status of digital literacy for the Fijian PWDs. The results also showed the literacy levels of the PWDs for different dimensions of literacy – media literacy, communication literacy, information literacy, visual literacy, computer literacy and technology literacy. The participants had low level of literacy in all the six dimensions of digital literacy. The results of the Fisher's exact test showed that education significantly affected the digital literacy status of the participants, therefore, education is a significant contributor to the digital literacy status of individuals. Also, none of the participants attempted the DLIP which indicated that relevant stakeholders need to take appropriate actions to improve digital literacy of the PWDs that can in turn also improve their confidence in using digital tools as well. Studies conducted in improving digital literacy, and reducing digital disparity and digital inclusion state that education plays an important role in facilitating proportionate and favorable use of digital platforms and digital tools and technologies (Cho & Kim, 2021; Gayel et al., 2021).

Conclusion

Digital literacy is a prominent challenge in this technology-enabled society even for the people without disabilities. There has always been disparities between persons with disabilities and people without disabilities in the access of the societal services. Digital literacy provides persons with disabilities (PWDs) to become independent and even competitive in the society with people without disabilities. This research focused on evaluating digital literacy of the PWDs in Fiji. The study showed that the PWDs had very low-to-low digital literacy skills. However, the PWDs who had certificate and diploma level qualifications tend to have higher digital literacy skills indicating that education plays a pivotal role in enhancing digital literacy skills of the PWDs. The lack of digital skills incapacitated the PWDs to attempt the digital literacy intervention program (DLIP).

The use of the newly designed and developed digital literacy scale (DLS) has proven to be effective in evaluating digital literacy status of individuals, in this case the PWDs. The DLS can be used by relevant stakeholders in the society to carry out similar evaluations of digital literacy so that targeted interventions can be placed to improve the digital literacy skills of the PWDs. Also, there needs to be workshops and training conducted for the PWDs particularly in the special schools in Fiji so that the notion of digital literacy is advocated well amongst the inclusive society.

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