

Original Research Article**Technology Utilization and Physical Engagement Among Children with Disabilities in Nepal****Yadav Prasad Acharya**

Central Department of Education, Tribhuvan University

Email: yadav.acharya@cded.tu.edu.np

ORCID: 0009-0000-8137-5979

Abstract

This study aims to explore how the utilization of modern technology by children with disabilities may lead to sedentary behaviors. This study is informed by the interpretive paradigm. An explorative qualitative research design was adopted to approach the phenomenon. This study has covered three different disability groups: visual impairment, hearing impairment, and physical disability. In order to cover these groups, three integrated schools were purposively selected for the study. Altogether, 22 participants—head teachers, teachers, students, parents, and members of Disabled People Organization— were purposively selected. In-depth interview guidelines and key informant interview guidelines were used as data collection tools. The obtained data were analyzed and interpreted thematically by using multiple facts and critical views. Children with disabilities were found to be interested in participating in various kinds of physical activities. Children are increasingly attracted to the newest forms of technology. With the exponential development of smartphones and tablets, the use of technology devices has become unavoidable and is now viewed as an integral part of life. Digital technology was found to be one of the main causes of physical inactivity among children with disabilities. The entire group of stakeholders is advised to increase outdoor activities to promote physical fitness and health of children with disabilities.

Keywords: *Digitization, disability, impairment, physical education, special needs, technology,*

Introduction

Physical education and disability are inseparable disciplines in academic discourse (Goodwin & Watkinson, 2000). Now, technology has come between these two disciplines, which has bridged them on the one hand and also fueled the expansion of the gap on the other. Several assistive technologies are developed to help persons with disabilities improve their abilities to function or perform some type of activity (Hemmingsson et al., 2009; Parette, 1997). A child can gain a lot of advantages from using assistive technology, such as improved academic performance, increased participation in activities and recreation, a more active social life, improved communication, an increased capacity for expressing emotion, increased self-confidence, and increased independence and self-sufficiency (National Education Association 2015; Edyburn, 2004; Fuhrer et al., 2003). Assistive technology includes text-to-speech software, tech matrix, low-tech handouts, drat builder, assistive listening systems, sip and puff systems, and others (National Education Association, 2015; Edyburn, 2004). These technologies, without a doubt, play an important role in assisting children with disabilities in making their lives easier. With the exponential development of modern technology, several apps such as Facebook, TikTok, Twitter, Instagram, and so on. have been developed, and children with disabilities have also started using these apps, promoting a sedentary lifestyle (Clemente, 2017).

Various studies, such as Martin Ginis et al. (2021), Clemente (2017), Barr and Shields (2011) have shown that, compared to general students, children with disabilities tend to participate in quieter and less diverse leisure activities. In line with this, students with disabilities prefer to spend their free time with their family members and tend to engage in social activities less frequently (Martin Ginis et al, 2021). In contrast, general students engage in social activities with friends and love to play with their peers (Goodwin & Watkinson, 2000). With the addition of digital technology, children with disabilities tend to engage with digital devices alone (Clemente, 2017). The concern here is about the barriers that students with disabilities encounter in participating in inclusive physical activities with other children and how technology is exacerbating these issues. Studies, such as Columna et al. (2020) and Ullenhag et al. (2014)) suggest that it is important to look into inclusion barriers and participation patterns to encourage children with disabilities to engage in recreational activities.

There is a correlation between the use of technology and physical inactivity (Alotaibi et al., 2020). Overuse of computers, TV, video games, tablets, cellphones, and other electronic devices was identified as the cause of less physical activity (Gao, & Lee, 2019; Kenney & Gortmaker, 2017). A popular exploratory, Mcdugall and Duncan (2008), shows that those who use technology frequently lead sedentary lives and are less active. With the advent of the World Wide Web (www) in 1989, digitization started spreading quickly all over the world. There are so many technologies such as artificial intelligence, genetics, engineering, bio-engineering, biotechnology, information technology, nanotechnology, etc. that have been developed so far. Most things are digitized (Snowden, 2019) in this age. The age of the 21st century is known as the post-industrial/digital/post-humanist era (Snowden, 2019; Briaditti, 2013).

Modern technology, including smartphones, tablets, computers, and other digital devices, has become an integral part of daily life for children worldwide. The integration of modern technology into daily life has brought about numerous conveniences and opportunities for learning and entertainment. However, its excessive and inappropriate use, particularly among children with disabilities, has raised concerns about its potential contribution to a sedentary lifestyle and related health issues. Children with disabilities need to be healthy and happy for their fullest development and to lead excellent lives. Modern technologies have the potential to significantly enhance the quality of their lives. However, it is crucial to understand how using new technology and engaging in physical activity affect their health. As children with disabilities are less likely to engage in physical activity, it is essential to make them engage in physical exercise to enhance their physical well-being and promote their overall health. Very little research has been done in this area globally. So far as I know, not a single research project has been done in Nepal in this area. The amount of knowledge that has already been explored can greatly benefit from the findings of this study. Moreover, the results of this particular study are crucial for addressing the urgent needs of children with disabilities in Nepal, assessing the influence of technology on their lives, and formulating fact-based suggestions for enhancing their general well-being and educational opportunities. This study aims to explore how the utilization of modern technology by children with disabilities may lead to sedentary behaviors. Thus, the specific objective of this study was to investigate the extent of technology utilization among children with disabilities and its effects on their (un)healthy behavior.

Methods and Materials

In academic research, methods and materials are crucial to show a detailed description of the particular research that was conducted and what tools were applied to collect data. This section includes the research design, research area and participants, tools for data collection, the data analysis process, and ethical considerations.

Research Design

This study is informed by the interpretive paradigm as the interpretations of participants have been explored and valued (Creswell & Creswell, 2017). An explorative qualitative research design is applied in this study. This study has relied on primary data collected from participants; however, some secondary data have also been used to review the previous works and discuss the findings.

Research Area and Participants

There are 23 integrated schools in operation in our country covering various kinds of disabilities (Ministry of Education, Science and Technology, 2021). This study has covered three different disability groups: visual impairment, hearing impairment, and physical disability. In order to cover these groups, three integrated schools—School 1 (S1), Palpa (school for the visual impairment), School 2 (S2), Doti (school for the hearing impairment), and School 3 (S3) Kathmandu (for physical disabilities) were purposively selected for the study. The reason for selecting these three districts and schools is to cover three types of disability groups and represent different geographical regions. Specifically, I aimed to encompass the Kathmandu valley, hilly terrain (Doti), and the inner Terai region (Palpa, near Butwal). In this study, our focus was on the lower secondary level, where students with disabilities typically transition from resource classes to general classes. In the selected schools, we identified a total of 7 students with visual impairments, 4 with hearing impairments, and 6 with physical disabilities in the lower secondary level (grades 6–8). From each of these categories, I purposively selected 3 students, based on their willingness to participate in interviews. Moreover, 1 head teacher, and 2 teachers from each sampled school were purposively selected as the research participants. In addition, two parents (1 from S1 and 1 from S3) were selected based on their availability near the schools. However, I was unable to find parents in S2. So, altogether, 20 participants (9 female and 11 male) were selected for first-hand information.

Tools for Data Collection

Data collection tools are methods used to engage with participants to produce knowledge in academic research. Specific tools help researchers gather or produce the required data in a systematic manner while conducting the research. In this study, I have used an in-depth interview (IDI) and key informant interview (KII) methods to collect the in-depth information.

In-depth interviews (IDI) were conducted with teachers, parents, and students separately. Since students with hearing impairments could not speak, I sought support from a translator of sign language. The Key Informant Interview (KII) method was also applied to collect the necessary data from the head teachers and people from DPOs. Some open-ended questions were

made to facilitate IDIs and KIIs. A pilot test was conducted with students who have visual impairments and the teachers from the same school, using a sample of open-ended questions. After receiving feedback from the pilot test, I made slight modifications and updates to the questions. I also ensured that there was ample room for additional follow-up questions.

Data Analysis

The IDI and KII were the main sources for data analysis; all were recorded with voice recording device. All the records were transcribed in Nepali language. The transcription was then thoroughly reviewed. I made use of the fundamentals of classifying, coding, and presenting qualitative data (Creswell & Creswell, 2017). Before codes were devised, the transcription was constantly read over. In the initial step, the code's name was given using the participants' original phrases (Leavy, 2014). After the code was created, it was thoroughly examined in the narratives in order to integrate similar codes into sub-themes and themes. The thematic analysis was developed after a detailed review of the transcripts, codes, and themes (Byrne & Humble, 2007). The results were contrasted and compared to those of earlier investigations.

Ethical Considerations

The core ethical principles of beneficence, justice, and respect for participants were upheld throughout the research process (National Ethics Advisory Committee, 2019). Prior to the interview, participants' written consent was obtained. I have kept the individuals' private identities a secret.

Results

This section deals with the results found in the field study and discusses the results based on previous studies. Moreover, some theoretical understandings have also underpinned the discussions. The nature and background of the participants were different; however, the unit of analysis was the same. So, the experiences and perspectives of the participants have been mixed in general and separated (where applicable) in particular. Through data analysis, three broad themes emerged. These themes were the participation of children with disabilities in physical activities, the use of digital devices by children with disabilities, and technology as a factor in decreasing participation in physical activities among children with disabilities.

Participation of Children with Disabilities (CWD) in Physical Activities

The wellness of children with disabilities depends on their participation in a variety of physical activities. Under this theme, I have tried to explore the present status of participation in physical activities among CWDs. Participation interest of children in physical activities may vary depending on the nature of disabilities and available resources. In the case of hearing impairment, it was found that students were involved in various games and sports such as volleyball, running events, shot-put throws, javelin throws, Kabaddi, etc. Students with hearing impairments were found to be physically stronger compared to students with other disabilities. They participate in sports competitions with students without disabilities. The head teacher says,

Students with hearing impairments are extra talented in games and sports; they always get the first or second positions in sports competitions such as running, throwing, and jumping events organized by the schools and other organizations (Head Teacher from S2, Male).

On the question of why this happens? He further says;

Children with hearing impairments are physically strong themselves. Moreover, they do not hear, so they can pay full attention to the target. Concentration plays a crucial role in competitive activities (Teacher 1 from S2, male).

S2 organizes sports weeks periodically for all children, including CWDs. Sports activities were not found to be organized separately for students with hearing impairments in this school, though it was an integrated school. As reported by the teacher 2 (S2, female), in inclusive competitions too, students with hearing impairments perform better in comparison with students without disabilities.

All the participants (students with hearing impairments) shared a common feeling that they enjoy playing with the same group because they do not trust students without disabilities. There is a prevalent misunderstanding among children with disabilities that they could be cheated by students without disabilities in the competition. In this regard, a teacher says,

Children with hearing impairments tend to play games and sports most of the time with the same group of children but no other students because they have grown up separately. Inclusion is necessary from the very beginning to develop social traits among children with and without disabilities (Teacher 2 from S2, female).

Interest and learning capacity are different among CWDs. Some students are interested in mathematics; some are interested in English, but most children with disabilities were found not to be interested in the existing course provided. Students with hearing impairments can be players in the future if they get a proper environment at home and at school. However, this research found that schools are not so disabled-friendly in terms of physical activities to motivate them to practice games and sports.

Students with visual impairments were also found to be interested in games and sports. Teachers 1 and 2 (S1) reported that the school organizes special sports and games for students with visual impairments. Basically, rope-race, soft-ball throw, standing broad jump, and cricket were included in the competitions. Students shared their feelings that they enjoy such events a lot because they are managed specifically for students like them. Nonetheless, they do not practice these games regularly but occasionally when the school organizes the events. A student shares,

I love playing cricket a lot, but more than that, I prefer singing.” His mother further says, “I have bought a piano for him at home. He sings songs and plays the piano. Since he has a visual problem, I do not let him play cricket or other games. I am afraid of injuries due to playing games with force (Student 1, from S1, male).

Children with physical disabilities were also found to be active in playing various kinds of games and sports. They preferred basketball, cricket, and wheelchair-running to play. According

to the head teacher, the school organizes special sports competitions periodically as per the preferences of the children. There was a basketball court. Students reported that they come and play basketball frequently. Teachers perceive that some games are so risky for children with disabilities. A teacher says,

Our students enjoy playing cricket too, but we do not let them play it because the ball is so hard. Once, while they were playing cricket, the ball thrown by one boy hit the head of the next boy. After that, we stopped them playing cricket (Teacher2 from S3, female).

Use of Digital Devices by Children with Disabilities

This study found that all the sampled students with disabilities used digital devices. There was a hostel facility in S1 and S2 schools. Both hostels had Television facilities. The teacher 2 of S2 reported that "students with hearing impairments spend most of their leisure time watching television." All the sampled teachers and parents reported that children are increasingly attracted to the newest forms of technology. With the exponential development of smartphones and tablets, the use of technology devices has become unavoidable and is now viewed as an integral part of life. Children with disabilities are not an exception to this situation. The COVID-19 pandemic has contributed to massively expanding the use of technology among students. The present study found that children with disabilities commonly use digital devices such as TV, smartphones, tablets, computers, and laptops. Teachers and parents reported that students with disabilities indulge in digital games, cartoons, and YouTube. A parent (says

We have to go out for work, he has to sit home alone, without a mobile, how can he sit alone at home? So, most of his time is spent listening to songs, and playing games (sound based) on Mobile (Parent from S1, female).

What do students learn from the digital platform? Answering this question, a student with visual impairment says,

We learn many things from YouTube, like how to sing songs and how to speak fluently and boldly in front of others. I cannot be a player in the future as I am blind, so I want to be a DJ and run radio programs. That's why I learn the skills of running programs on the radio through YouTube (Student 2 from S1, male).

The study found that the increase in time spent on computer games led to rapid advancements in communication technologies and the growing use of handheld devices for game play. Physically disabled children were found to be highly engaged in computer games. A parent of physically disabled children says,

My mobile is always in his (her son's) hands. He is physically disabled but not mentally disabled. Physically disabled children's minds are sharp. Digital technologies are mind friendly. These technologies are disability-friendly. Therefore, physically disabled children tend to be engaged with digital devices (Parent from S3, female).

Teachers also encourage CWD to use technology, aiming to keep them updated. A teacher says, "We encourage them to learn technology, as this era is the era of technology" But

indulging in Facebook and TikTok has become a great challenge in the present context (Teacher1 from S3, male)"

Technology as a Factor in Decreasing Participation in Physical Activities Among Children with Disabilities

Digital technology is one of the primary causes of physical inactivity, as all participants in this study agreed. If we give them the option between games and digital devices, they select the latter rather than the former, the head teacher at Doti reported. All the participants (teachers, parents) agreed that more than 90% of children with disabilities are creative and think differently. Although digital technology has improved their abilities to use their minds, but they are becoming less active physically. A Teacher claims;

While children with hearing impairments struggle to write sentences correctly, they excel at using modern technologies like computers and smartphones. They pick up word processing, drawing, painting, hardware, etc. quickly. They instruct us on how to use Facebook, Messenger, YouTube, etc. (Teacher 2, from S2, female).

When we use these gadgets without exercising our bodies, it results in a sedentary lifestyle. A teacher and head teacher stated respectively;

Children with hearing impairments were quite physically fit ten and twelve years ago, but they are no longer as powerful as they used to be. TV and digital technologies, in my opinion, might be to blame. They clearly spend most of their time in the TV room, watching movies (Teacher 1, from S1, male).

How can children with disabilities be physically fit without engaging in physical activities? We are observing that there is a significant reduction in engagement in physical activities among children with disabilities. It is because of technology that it sifted them from physical exercise to idle life (Head teacher from S2, male).

This study found that parents of children with disabilities urge their children to use technology because they wish to keep them abreast of current developments and help them develop independence. A parent (S1) argues;

I wish my son to be excellent in digital technology. As he is blind, he cannot move easily and needs our support. If he becomes perfect at computers, he can earn money without physical mobility (Parent S1, female).

Nonetheless, parents seemed worried about the addiction to technology. Overuse of digital technology leads to the development of technological addiction over time. She further says,

My son cannot remain silent for a single minute without his mobile. A kind of addiction is seen in him. When he wakes up, he seeks his mobile phone, so physical exercise is virtually halted. He spends most of the time with his friends, who are also visually impaired. They always play games on mobile and listen to audio. He has become fat gradually. I am really afraid for his wellbeing (Parent from S1, female).

All the participants (teachers and parents) agreed that the use of technology and inactivity are quite closely associated. They emphasized this point again and again, saying that children with disabilities who use technology have a higher chance of becoming obese. They stated that it has also been linked to a higher risk of metabolic issues, as well as physical and psychological difficulties, in youngsters who are technology-reliant. In this pretext, a teacher (S3, male) reveals, *"We started taking classes online because of the COVID-19 pandemic. On the one hand, taking classes online allowed students to master technology, but on the other, it kept them sedentary."* All the participants (parents, teachers, and DPO members) agreed that due to the excessive use of screen-based technology, signs of restlessness, obesity, lethargy, and low stamina among children with impairments are vividly seen.

Discussion

The majority of studies have revealed that students with disabilities typically participate in leisure activities as opposed to competitive ones (Goodwin & Watkinson, 2000; Ullenhag et al., 2014;). The present study also supports these findings in the case of children with visual impairments and physically disabled students. However, this study found that children with hearing impairments tend to be engaged in competitive physical activities too. Imms (2008) found that participation in formal and informal leisure activities supports children's development of functional social skills. This study also uncovered the fact that those students who have been participating in team games have acquired social skills. The head teacher (S2, male) says *"students with hearing impairments were reluctant to work together with general students. After organizing inclusive sports competitions and other recreational activities together, they learned social skills, and now they prefer working with general students"*.

From these facts, we can claim that physical activity provides opportunities to learn and develop social skills. It can also provide CWDs with a sense of belonging; and promote long-term mental and physical health. It is also a matter of fact that CWDs face 'restrictions to participation' (Gurkan & Kocak, 2020); in physical activities due to the lack of disabled-friendly school environments and the oversensitivity of parents.

It is estimated that more than 96% of households in Nepal have mobile services (Nepal, Telecom, 2021). More than 87% of Nepali people are using mobile data or broadband internet services (Acharya, 2021). It is likely to reach 100 percent soon. A survey conducted by Manmohan Memorial Institute in 2018 shows that 46% of adolescents are addicted to the internet (Manmohan Memorial Institute, 2018). The present study also supports these previous findings, as children with disabilities also have access to any kind of digital device. Children with disabilities are increasingly attracted to the newest forms of technology.

Several studies, such as Lissak (2018) and Connell et al. (2015) have investigated the relationship between ownership of devices and screen time consumption among children. For example, Alturki et al (2016) conducted a multicenter, cross-sectional study in Riyadh, Saudi Arabia on 1023 children between 9–12 years of age to investigate the relationship between ownership and duration spent on various electronic screen devices. They found a significant relationship between device ownership and screen time (Alotaibi et al., 2020). These previous findings are quite similar to the present findings, as children with disabilities who own their

devices were found to be more likely to spend more time using technology. With these facts, it can be claimed that ownership of a device leads to easy access to digital games and applications.

Numerous studies, for example Lissak (2018) and Babadi-Akashe et al. (2015) have discovered a substantial correlation between increased levels of anxiety symptoms, sadness, hostility, and other behavioral issues and increased dependence on digital technology. The natural development of good social skills is hampered by children's decreased opportunities to engage and socialize with others. Because, using technology disrupts children's regular activities and eventually leads to decreased physical exercise (Oswald et al., 2020). The current study found a similar finding: that, in general, physically inactive children with disabilities who spend a lot of time watching TV and movies were physically less active.

It is a known fact that one of the indicators of inactivity is the use of technology by children with impairments. A 2019 study by Kenney and Gortmaker found a favorable correlation between a lack of physical activity and excessive usage of smartphones, tablets, computers, and videogames. Additionally, it was discovered that watching TV can reduce a child's time spent engaging in physical activity (Kenney & Gortmaker, 2017). The findings of this study indicate that children with disabilities experience a situation that is quite comparable to previous ones. Basically, it was discovered that children with disabilities in Nepal engaged in less physical activity and more TV time. Furthermore, children with impairments who use technology a lot tend to be less active and live more sedentary lifestyles.

Conclusion

Children with disabilities were found to be interested to participate in various kinds of physical activities. Depending on the nature of their disabilities, they were involved in various games and sports such as volleyball, running events, shot-put throws, javelin throws, and Kabaddi. Children with hearing impairments can perform better in inclusive sports competitions. In the case of children with visual impairments, the schools rarely organize competitions involving such students. Such students are excluded from physical activities, which may lead them to think that they are unable to participate in sports competitions. Children with physical disabilities seemed to be active participants in a variety of games and sports. They loved wheelchair running, cricket, and basketball. Most children with disabilities use some sort of digital technology. The newest technological advancements are attracting such children in greater numbers. Due to the exponential growth of smartphones and tablets, using technology gadgets has become both necessary and accepted as a vital aspect of daily life. Using these technological devices has become a factor in decreasing physical activity among children with disabilities. For children with disabilities, physical activities are vital, especially for those who tend to be less physically active and are more susceptible to complications from inactivity when coping with technological challenges.

Implications for Health Promotion

The findings of the study emphasize the necessity of educating parents, educators, and healthcare professionals on the possible harm to the health of children with disabilities caused

by overscheduling. The findings of the study also show that there is a direct relationship between overuse of technology and poor health. Promoting programs that offer accessible outdoor activities can assist children with disabilities in participating in physical activity, promoting their overall health.

Children with disabilities spend most of their time at school. As there is a residential facility in school, the Ministry of Education, Science, and Technology should encourage schools through policies for various sports and activity classes that enable children to participate in physical activity based on their preferred sports. The Local governments should also work on improving the outdoor areas of schools, as some are poorly equipped and not designed for sports activities for children with disabilities. There must be good coordination among the Ministry of Education, Science, and Technology, the Ministry of Health, Local governments, and DPOs to design and invest in more appropriate places for children with disabilities to practice their sports and to support the promotion of physical activity among children.

Collaboration between stakeholders is recommended to educate families about the side effects of technology overuse. In addition, more active video games should be designed by the software developers. It is highly recommended that parents be aware of the negative consequences of overusing technology, and they should be encouraged to apply their decisive role in controlling and limiting a child's screen time and access to the internet. These implications will help ultimately in health promotion efforts in Nepal that can work towards improving the overall well-being and quality of life for children with disabilities, fostering inclusivity, and reducing health disparities in this vulnerable population.

Acknowledgements

I would like to thank the Office of the Research Directorate, Office of the Rector, TU, for the financial support for the mini-research project. This article is part of the research.

Conflict of Interest

I declare that I have no competing interests.

Funding

The research presented in this article was conducted with the financial support of the Research Directorate, Office of the Rector, T. U. However, no specific funding is received for this publication.

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