

Towards an accessible e-training platform for the ageing well of people with Cerebral Palsy and their caregivers: the case of CP-Ageing project

Identifying the Needs for the Accessibility of Adults with Cerebral Palsy (ACP) and their Supports to online training materials, including Assistive Technologies (ATs) to Enhance their ageing well.

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ABSTRACT

Cerebral Palsy (CP) has been defined as ‘a group of permanent disorders of the development of movement and posture causing activity limitation, that are attributed to nonprogressive disturbances that occurred in the developing fetal or infant brain’. Although manifesting itself in infancy, CP is a lifelong condition. As adolescents with CP gradually exhibit a progressive decline in strength and functional reserve through adult life, aging in this population is an emerging issue. The focus of healthcare has moved from survival to understanding how to support these young people to make the transition to adulthood and be independent, successful, contributing adults in society.[1][1] At EU level, a few projects have been implemented in the field of CP, but no one is -focusing on the ageing well of Adults with CP and their specific problems. To this end, CP-Ageing project aims at supporting the ageing well concept of persons with CP and their caregivers by implementing a training program including best practices and strategies for improving cognitive and physical health as well as social life. To enable significant outreach, training materials including assistive technologies, will be available through an accessible e-Training platform. This paper addresses the identification and analysis of problems of accessibility and usability in web access to public web applications by adults with CP, proposing a list of recommendations for the development of CP-Ageing e-Training platform as well as for other technological

projects which aim to introduce web technologies targeting similar population.

CCS CONCEPTS

• **Human-centered computing** → Accessibility; Accessibility technologies; Accessibility; Accessibility systems and tools; Accessibility; Accessibility design and evaluation methods.

KEYWORDS

cerebral palsy, ageing well, e-training, assistive technologies

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1 INTRODUCTION

Cerebral palsy (CP) is the most common cause of physical disability in childhood [1]. It arises from damage or malformation of the developing brain and is the most common pediatric-onset physical disability. The etiology of CP leads to neurological and neuromuscular alterations, which prevent optimal fulfillment of motor function capacity and mechanical loading [2]. The motor disorders of CP are often accompanied by disturbances of sensation, perception, cognition, communication and behavior, epilepsy, and secondary musculoskeletal problems [3]. It is a construct rather than a specific condition and occurs in about 2 to 3 per 1000 children [4], affecting more than 17 million people in the world [5].

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Table 1: Identified problems of adults with CP that create barriers in their accessibility and usability in access to public web applications.

Identified problems of adults with CP
General physical and cognitive decline [10]
Neurological and neuromuscular alterations [2], progressive neurological problems [6]
Physical disability [1], accompanied with difficulty in walking or stiff muscles and an increased risk of falls and musculoskeletal complications
Decline in strength and functional reserve, prevention of optimal fulfillment of motor function capacity and mechanical loading [2]
Motor disorders [3], accompanied by disturbances of sensation, perception, cognition, communication and behavior, epilepsy, and secondary musculoskeletal problems [3], affecting movement and posture
Functional decline in several areas of functioning including mobility and deterioration in physical activity [4]
Physical aging (e.g. decreased endurance, flexibility, strength, or balance) [6], accompanied by loss of autonomy and social inclusion[11]
High prevalence of comorbid and secondary conditions like pain [4] and side effects due to medications or surgeries

Although CP itself is not a progressive disease, its clinical manifestation may change over time as the brain matures [3], and the possibility of functional decline between the ages of 25 and 40 years could not be ruled out. The reason for even modest decreases in skill is not clear and may be related to lack of environmental modifications, lack of access to or participation in exercise or activity programs, pain, aging (e.g. decreased endurance, flexibility, strength, or balance), other medical conditions, or progressive neurological problems (e.g. cervical spine stenosis, radiculopathy) [6]. The health-related problems in adults with CP have a negative impact on physical and social function [7]. They have a high prevalence of comorbid and secondary conditions like pain, manifesting decline in several areas of functioning including mobility [4]. Although CP is considered a neurologic syndrome caused by a nonprogressive brain injury or malformation, its hallmark features represent a highly progressive phenotype of “early aging” [8].

Adults with CP have many questions about how the aging process applies to their lives [9]. Does any aspect of CP make them more at risk for secondary or tertiary conditions or to develop them earlier in life? Can professionals offer guidance to minimize risks? How can research provide better recommendations and suggestions that will enable the adult with CP to enjoy a long and healthy life? Besides body structure/function, activities, and participation, what environmental and personal factors facilitate or hinder adults with CP striving to achieve their life goals?

To better manage CP symptoms, improve preventive care, and plan for social and work roles, adults with CP need reliable information on age-related changes in both functioning and quality of life [9]. Additionally, they may require or choose to use assistive technology for mobility, for help to perform tasks as dressing, eating, writing, driving, as well as for improving their communication performance [9].

There have been several strategies proposed for enhancing the ageing well of adults with CP, such as preventing and dealing with the cognitive decline, through cognitive stimulation and specialized activities focusing on the dimensions affected by dementia [10], as well as the use of Assistive Technologies (ATs) for dealing with physical, intellectual and social barriers, according to the WHO World Report on Disability (2011) [11]. In this regard, there has

been a growing interest during the last decades in employing Information and Communication Technologies (ICT) to help and support patients, including adults with CP, in everyday activities. ICT can also play a key role in the patients’ treatment, stimulation, and rehabilitation. This is the underlying idea for the development of Serious Games (SG), which are digital applications specialized for purposes other than entertaining, such as training and educating, informing, communicating, marketing, leading societal/ideological impact on specific subjects, or enhancing user’s aptitudes or cognitive/physical functions [10].

Nonetheless, as recent studies show, people with disabilities still face several problems when using the web and there are yet issues without a clear solution [12]. The variability of problems for users with CP, as summed up in Table 1, is a challenge in the development of digital resources, with consequences in the development of corresponding hardware and software [13]. The identification of navigation barriers for users with CP and how some dynamic components, widely used nowadays, can directly influence their online activities [12]. However, this information has never been integrated and focused on a project specifically applied to the ageing process of adults with CP.

CP-AGEING consist such a project, launched for increasing the competences (attitudes, knowledge, skills) of Adults with CP and their Supports on how to enhance their ageing well. Specific objectives of CP-AGEING comprise creating and transferring guidelines and tools on how to prevent and deal with the physical and cognitive decline and for keeping and/or strengthening autonomy and social inclusion, including the selection and exploitation of Assistive Technologies (ATs). One of the expected outcomes of the project is the development of an accessible e-training platform, developed with specific requirements for allowing the cognitive accessibility of adults with CP. This platform is going to support the implementation of online sessions, where adults with CP and relatives will be able to complete training activities in domiciliary environments, while their trainers will be able to get in contact with them and monitor the activities. Additionally, it will provide accessibility to all the resources through an online environment, ready to be used at any time and place, promoting the self-management of the effects of ageing in adults with CP, as part of their daily life. Trainees of adults with CP will be also able to find links to existing online

Assistive Technologies (like Apps or Serious Games) in a structured way, depending on the need to be covered. During the CP-Ageing project the above e-training platform will be validated through four multinational pilot actions.

In this context, this research work, aims to identify the needs and problems regarding the web accessibility of adults with CP, to gather and prioritize the existed recommendations and guidelines. To do so, both literature search and a survey among experts are conducted (see section METHODS) and main findings are summarized (see sections RESULTS and CONCLUSION).

2 METHODS

2.1 Scoping Review Method

Google Scholar, PubMed and IEEE Xplore were searched for articles concerning web accessibility for persons with CP. The articles were published before December 7, 2020. A combination of search terms was used (“cerebral palsy” OR “web accessibility”) AND (“accessible websites” OR “accessible platforms” OR “accessibility tools” OR “guidelines” OR “tools”). Articles were included if they were (1) in English, (2) proposing some form of guideline towards development

of an accessible platform for persons with CP, (3) including feedback from experts and users.

Google search engine was also used to search for guidelines presented by experienced web developers. Articles were included after taking into consideration the author’s experience in the field of web development and especially in the development and assessment of accessible platforms for persons with special needs.

2.2 Online Survey

To enrich and filter the findings stemming from online resources, an online survey was conducted, including experts from the field of CP care, with the purpose of gathering insights and identifying the most important segments of the guidelines extracted in the scoping review.

A total of thirteen (13) experts participated in the online survey. The participants are considered experts in the field having an abundance of experience with persons with CP and their needs. Participants are highly specialized in Active Ageing for persons with physical and intellectual disabilities as well as in working in the fields of physical, cognitive, and social status of persons with CP. Among the participants, there is an abundance of experience

Table 2: Questions of the online survey, their brief explanation and their answers

Question	Explanation Provided	Answer options
How important do you think voice commands for navigation are, on a scale from 1-5?	With this tool, the user can navigate through the platform by speaking to it and giving voice commands using Speech-To-Text technology. [14]	A scale from 1-5, 1 being the least important and 5 the most.
How important do you think voice over commentary is, on a scale from 1-5?	With this tool, all text is converted to audio and read to the user upon request using Text-To-Speech technology. The tool is particularly important for people with visual impairment. [15]	A scale from 1-5, 1 being the least important and 5 the most.
How highly do you regard the overall visual clarity of the platform on a scale from 1-5?	Visual clarity refers to how accessible and comprehensive the informational load of a given webpage is. [16]	A scale from 1-5, 1 being regarded the least and 5 extremely highly.
How highly do you regard features that let the user adjust visual clarity to their preference on a scale from 1-5?	Such features could be tools for resizable text, cursor, adjustable contrast, font etc.	A scale from 1-5, 1 being regarded the least and 5 extremely highly.
What would you value the most in the expense of the other? Descriptive instructions or avoidance of information overload?	Descriptive instructions over every function of the website could help so that the user does not get disoriented. Overloading the webpage with too much information could confuse or annoy the user.	Binary choice between descriptive instructions or avoidance of information overload.
‘All functionality available by mouse should be available by the keyboard.’ Do you agree with the statement?	The statement suggests that the user should be able to use the keyboard for all actions that are usually performed by the mouse, i.e., clicking on buttons, navigating through the page etc.	One (1) selection out of multiple choices (5): i) Strongly disagree, ii) Disagree, iii) Neutral, iv) Agree, v) Strongly Agree
How often would a Virtual Mouse feature controlled by the keyboard be useful?	This feature could work by simulating the movement of the mouse using the keyboard arrow keys to move the cursor. The cursor could move in fixed steps to account for the difficulty persons with CP face when performing precise movements. [17]	One (1) selection out of multiple choices (4): i) All the time, ii) Sometimes, iii) Rarely, iv) In extreme cases

in the application of cognitive stimulation strategies for persons with cognitive decline, including Serious Games. Finally, the participants have plenty of experience in the development of e-Training Platforms developed with accessibility criteria for persons with physical and intellectual disabilities and are considered experts in the application of Assistive Technologies for such.

The questions were selected mainly based on the literature and were expressed in a generic way to include most key aspects of the guidelines found in the literature. The questions concerning voice commands for navigation and voice over commentary were selected based on early insights from experts and their previous experiences as the literature around these features was scarce. This scarcity could be attributed in part to the Assistive Technologies persons with CP may be using on their side for Speech-To-Text functions and Text-To-Speech alike.

Table 2 contains a list of the questions included in the survey accompanied by a brief explanation of the question and the context surrounding it. Next to the explanations, a list of the answer options for each question is provided. The answers consisted mostly of scales, binary choices, and multiple choices as the survey's purpose, as mentioned above, was mainly to identify the most important aspects of the identified literature.

3 RESULTS

3.1 Scoping Review Results

The search resulted to a total of nine (9) articles, including W3C standards [18], out of which a set of guidelines was extracted. In general, an accessible platform for persons with CP should be following these guidelines:

3.2 Experts' Opinion

The results shown in Figure 1, Figure 2, Figure 3 and Figure 4, assisted in ranking the gravity of each segment of the guidelines as well as clarifying the importance of some features not mentioned thoroughly in the literature. Such features include the voice-over commentary throughout a website, where it was made clear that it would enhance user experience, and the voice commands as a navigation feature, where experts argued whether such a feature should be given a high implementation priority.

Regarding the first question at Figure 1, 46% of the participants felt strongly towards the implementation of navigation through voice commands while 23% oppose the importance of such a feature. The gap is wider for a voice-over commentary feature, as shown in Figure 1, where the vast majority of the participants (69%) value highly the feature. The percentage of participants that viewed the

Table 3: Scoping Review Results: Guidelines for Accessibility

WCAG Principle [19]	Guidelines
Perceivability	Text alternatives and descriptions should be ensured for all images in the platform because persons with CP often have difficulties keeping the attention on the screen [20] [21].
Robustness	Visual effects such as background color, contrast, themes should be configurable as well as text size and font [20] [21].
Operability	Flashing content should be ideally avoided entirely or only used in a way that does not cause known risks. Also, animations and moving content can cause discomfort and physical reactions [22] as CP commonly accompanies epilepsy [23].
Understandability	Descriptive instructions, error messages, and suggestions for correction should be included to avoid potential confusion [22].
Understandability	Avoid information overload by using headers, short paragraphs, bulleted lists etc. [24][25].
Operability	Interaction reduction should be considered so that all functionality can be performed with a single button or a single click of the mouse [26].
Operability	All functionality available by mouse should be available by keyboard as well. This could help people using alternative keyboards such as keyboards with ergonomic layouts, switch devices or on-screen keyboards and it could also help people using voice recognition to operate any web application [22].
Operability	Buttons should be large enough and ample space between links should be left to ensure ease of selection [27].
Operability	In some rare cases where the tab key is not adequate for navigation, a virtual mouse is documented to have been developed. to assist the user with navigation. [17].

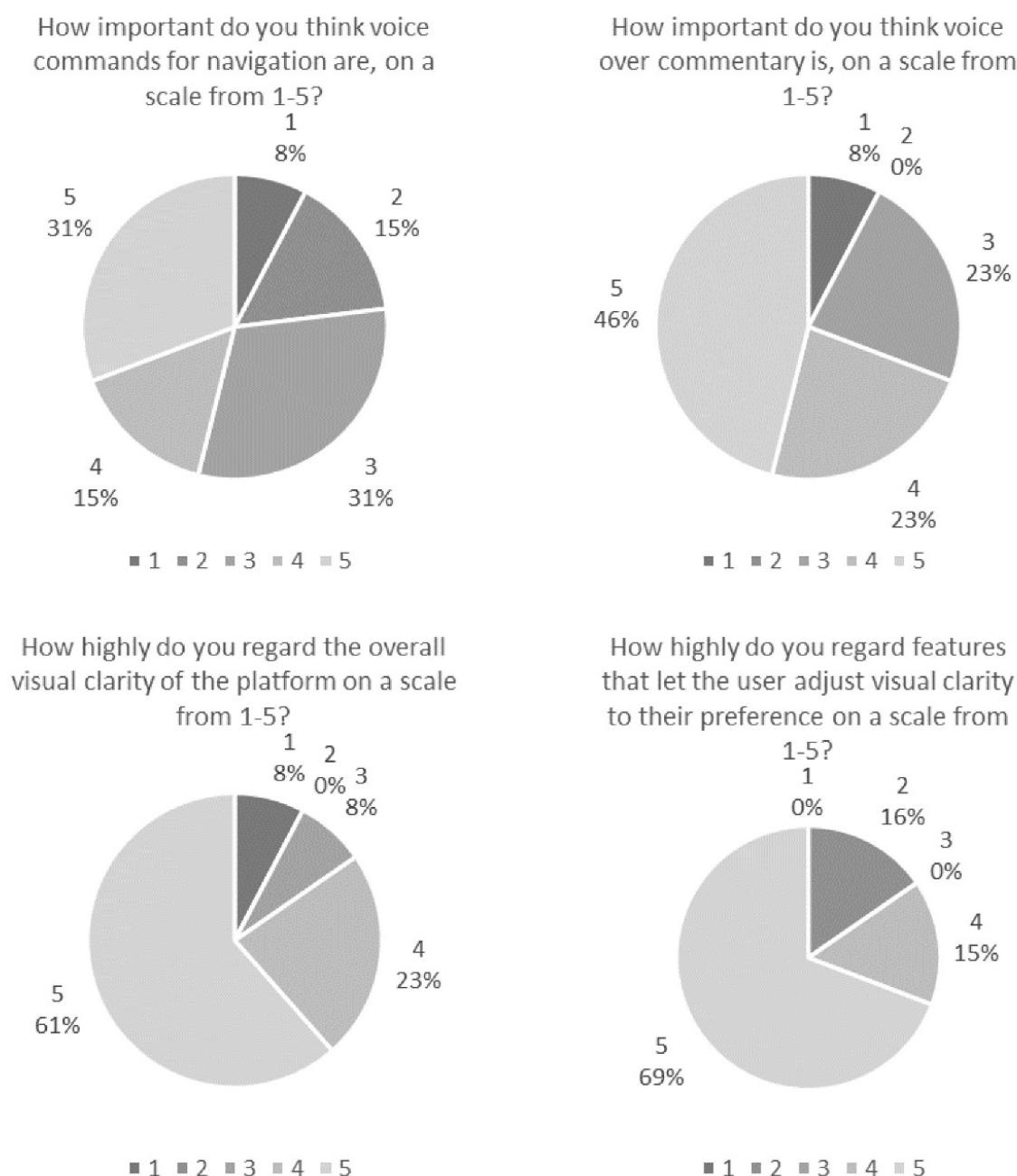


Figure 1: Experts' opinions on voice technology and visual clarity adjustment features

features neutrally is notable being 31% and 23% respectively for the two features. Through the responses in the third and fourth question in Figure 1, it was established that the main priority for development should be the overall visual clarity of the website, as 84% of the participants regarded overall visual clarity highly. Letting the user adjust visual clarity to their preference was highly valued by the participants as evident by the exact same majority (84%). This dominance extends to the next question in Figure 2 where

the majority of the experts (92%) preferred avoiding information overload even if it comes to the expense of not having descriptive instructions.

Meanwhile, participants seem to agree to an extent (61%), as shown in Figure 3, that priority should be given to making all website functionality available by keyboard, although, there is strong neutrality towards the feature (31%).

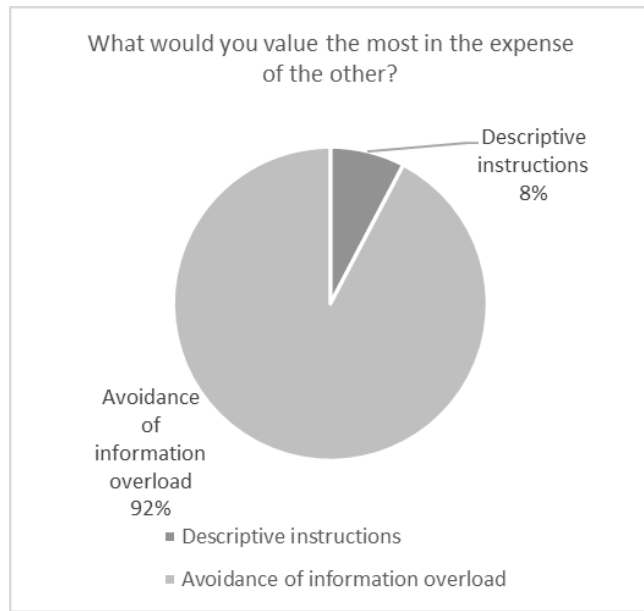


Figure 2: Experts' preference on the availability of textual description vs avoidance of information overload

Finally, there was dispute among the use cases of a Virtual Mouse feature, as shown in Figure 4, which is to be expected as the research from which the concept was retrieved mentions the rarity of its usage [17]. Overall, 39% of the participants felt that the feature would be useful sometimes, but 46% felt that the feature would only be used rarely or only in extreme cases.

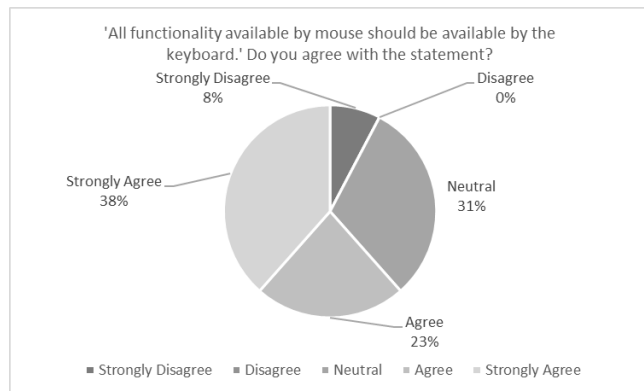


Figure 3: Experts' opinion on keyboard-enabled navigation of a web application

4 DISCUSSION

During the development of accessible online platforms, it is important to take under consideration the guidelines found in the literature and mainly focus on the overall visual clarity as well as the tools that enable the user to adjust it to their own preference as illustrated in the survey. That does not imply neglecting other parts

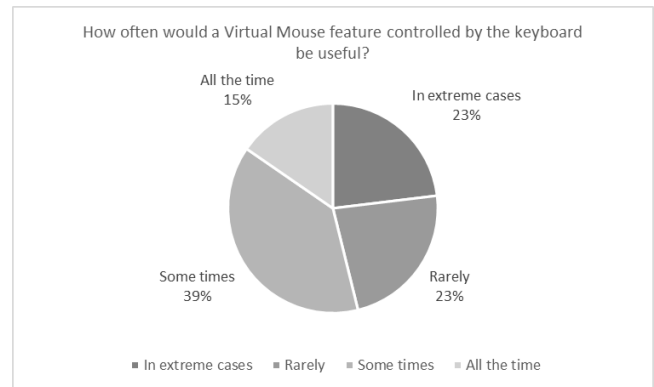


Figure 4: Experts' opinion on virtual mouse feature to facilitate web application navigation

of the guidelines, in the contrary, it was established that emphasis should be given to the overall functionality of the platform and to provide the necessary options and tools to the user to support the entirety of the functionality in the platform.

Meanwhile, the lack of voice-over commentary and navigation through voice commands tools in the literature strongly contradicts the survey results where experts argue the importance of such tools. Such a discrepancy could be explained bearing in mind that persons with CP tend to already use tools that provide them with such functionality.

While avoidance of information overload seems to be valued more than having descriptive instructions by the experts, it is significant to note that in the case of CP-Ageing project the end-users will be tutored thoroughly on how to use the platform. However, this may not be the case in similar platforms which explains the importance of descriptive instructions in the literature.

5 CONCLUSION

The variability of problems for adult users with CP is a challenge in the development of web resources. These resources, if well-designed, tend to contribute to the social inclusion of persons with special needs and using the web as a communication tool [13].

Preliminary findings documented in this research work aim to support the design and development of an accessible e-Training platform including training materials, training activities, serious games, tools for enhancing the e-learning experience of Adults with Cerebral Palsy and their supports, as well as drive future developments in the field of assistive technologies and platforms addressing the accessibility needs of this specific population. Future extension of this work includes the active involvement of Adults with CP and of their supports both in the co-design as well as the real-world evaluation of training materials as well as the e-Training platform, to ensure that the resulted online platform will suit the specific needs of the target population.

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REFERENCES

- [1] M. Donkervoort, M. Roebroek, D. Wiegierink, H. van der Heijden-Maessen, H. Stam, and The Transition Research Group South, "Determinants of functioning of adolescents and young adults with cerebral palsy," *Disabil. Rehabil.*, vol. 29, no. 6, pp. 453–463, Jan. 2007, doi: 10.1080/09638280600836018.
- [2] D. G. Whitney, A. I. Alford, M. J. Devlin, M. S. Caird, E. A. Hurvitz, and M. D. Peterson, "Adults with Cerebral Palsy have Higher Prevalence of Fracture Compared with Adults Without Cerebral Palsy Independent of Osteoporosis and Cardiometabolic Diseases," *J. Bone Miner. Res.*, vol. 34, no. 7, pp. 1240–1247, Jul. 2019, doi: 10.1002/jbmr.3694.
- [3] M. Stavsky, O. Mor, S. A. Mastrolia, S. Greenbaum, N. G. Than, and O. Erez, "Cerebral palsy-trends in epidemiology and recent development in prenatal mechanisms of disease, treatment, and prevention," *Frontiers in Pediatrics*, vol. 5, Frontiers Media S.A., p. 1, 13-Feb-2017, doi: 10.3389/fped.2017.00021.
- [4] G. S. Liptak, "Health and well being of adults with cerebral palsy," *Curr. Opin. Neurol.*, vol. 21, no. 2, pp. 136–142, Apr. 2008, doi: 10.1097/WCO.0b013e3282f6a499.
- [5] A. Maestro-Gonzalez, M. C. Bilbao-Leon, D. Zuazua-Rico, J. M. Fernandez-Carreira, R. F. Baldonado-Cernuda, and M. P. Mosteiro-Diaz, "Quality of life as assessed by adults with cerebral palsy," *PLoS One*, vol. 13, no. 2, p. e0191960, Feb. 2018, doi: 10.1371/journal.pone.0191960.
- [6] M. A. TURK, "Health, mortality, and wellness issues in adults with cerebral palsy," *Dev. Med. Child Neurol.*, vol. 51, no. SUPPL. 4, pp. 24–29, Oct. 2009, doi: 10.1111/j.1469-8749.2009.03429.x.
- [7] A. Colver, "Outcomes for people with cerebral palsy: Life expectancy and quality of life," *Paediatrics and Child Health (United Kingdom)*, vol. 22, no. 9, Churchill Livingstone, pp. 384–387, 01-Sep-2012, doi: 10.1016/j.paed.2012.03.003.
- [8] D. G. Whitney, S. A. Warschausky, S. Ng, E. A. Hurvitz, N. S. Kamdar, and M. D. Peterson, "Prevalence of mental health disorders among adults with cerebral palsy," *Ann. Intern. Med.*, vol. 171, no. 5, pp. 328–333, Sep. 2019, doi: 10.7326/M18-3420.
- [9] P. Haak, M. Lenski, M. J. C. Hidecker, M. Li, and N. Paneth, "Cerebral palsy and aging," *Developmental Medicine and Child Neurology*, vol. 51, no. SUPPL. 4, NIH Public Access, pp. 16–23, 2009, doi: 10.1111/j.1469-8749.2009.03428.x.
- [10] P. H. Robert *et al.*, "Recommendations for the use of Serious Games in people with Alzheimer's Disease, related disorders and frailty," *Front. Aging Neurosci.*, vol. 6, no. MAR, p. 54, Mar. 2014, doi: 10.3389/fnagi.2014.00054.
- [11] WHO, "World Report on Disability - Summary," *World Rep. Disabil.* 2011, no. WHO/NMH/VIP/11.01, pp. 1–23, 2011.
- [12] L. S. Pereira and D. Archambault, "Understanding how people with cerebral palsy interact with the web 2.0," in *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 2016, vol. 9758, pp. 239–242, doi: 10.1007/978-3-319-41264-1_32.
- [13] A. O. Ferreira, S. B. L. Ferreira, and D. S. Da Silveira, "Accessibility for people with cerebral palsy: The use of blogs as an agent of social inclusion," in *Procedia Computer Science*, 2012, vol. 14, pp. 245–253, doi: 10.1016/j.procs.2012.10.028.
- [14] "Voice Browsing - W3C."
- [15] "Text to Speech | Web Accessibility Initiative (WAI) | W3C."
- [16] "Clear Layout and Design | Web Accessibility Initiative (WAI) | W3C."
- [17] H. Pokhariya, P. Kulkarni, V. Kantroo, and T. Jindal, "Navigo - Accessibility solutions for cerebral palsy affected," in *CIMCA 2006: International Conference on Computational Intelligence for Modelling, Control and Automation, Jointly with IAWTIC 2006: International Conference on Intelligent Agents Web Technologies* ..., 2006, p. 143, doi: 10.1109/CIMCA.2006.155.
- [18] "Home | Web Accessibility Initiative (WAI) | W3C."
- [19] "Web Content Accessibility Guidelines (WCAG) 2.0." [Online]. Available: <https://www.w3.org/TR/WCAG20/#conformance-reqs>. [Accessed: 13-Mar-2021].
- [20] "Design and Develop Overview | Web Accessibility Initiative (WAI) | W3C."
- [21] C. E. Saturno, A. R. G. Ramirez, M. J. Conte, M. Farhat, and E. C. Piucco, "An augmentative and alternative communication tool for children and adolescents with cerebral palsy," *Behav. Inf. Technol.*, vol. 34, no. 6, pp. 632–645, 2015, doi: 10.1080/0144929X.2015.1019567.
- [22] "Accessibility Fundamentals Overview | Web Accessibility Initiative (WAI) | W3C."
- [23] S. J. Wallace, "Epilepsy in cerebral palsy," *Dev. Med. Child Neurol.*, vol. 43, no. 10, p. 5.
- [24] "Website Accessibility Checklist (15 Things You Can Improve) | websitesetup.org."
- [25] M. J. M. & A. Welfle, *Writing is designing*. Rosenfeld.
- [26] P. Compañ-Rosique, R. Molina-Carmona, F. Gallego-Durán, R. Satorre-Cuerda, C. Villagrà-Arnedo, and F. Llorens-Largo, "A guide for making video games accessible to users with cerebral palsy," *Univers. Access Inf. Soc.*, vol. 18, no. 3, pp. 565–581, 2019, doi: 10.1007/s10209-019-00679-6.
- [27] "Motor Skill-Related Disabilities: Navigating and Designing Websites."