

Digital Tool for Accessible Occupational Therapy Treatments for Cognitively Disabled Children

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Abstract: This research is aimed at shared decision-making in the treatment of children who are a significant part of the recipients of occupational therapy services. However, it appears that occupational clinics seeking to involve children with cognitive disabilities in decision-making lack the necessary tools to facilitate this process.

Objective: To address this deficiency, a digital tool in the form of accessible animation videos was developed, supporting the explanation of the therapeutic process tailored to the language and cognitive needs of children with cognitive disabilities.

Method: A qualitative study involving 10 occupational clinics working in various therapeutic settings, as well as 20 children with different functional levels, was conducted. In the first stage, interviews were conducted to examine the main areas of intervention of the clinics working with this population. Based on the interviews, accessible animation videos were created, aiming to explain the intervention areas in therapy to the children. After practical use of the tool with 20 children, a satisfaction questionnaire was administered to the participating children.

Results: The questionnaire findings revealed that the children were able to comprehend the therapeutic process and thus demonstrated higher motivation for collaboration.

Key words: information accessibility, digital tools, children with cognitive disabilities

1. Introduction

1.1 Information Accessibility

In recent years, there has been a shift in the perception of disability worldwide, has been done transitioning from a medical to a social model. According to this model, in order for children with cognitive disabilities to integrate into society, accessibility principles need to be implemented in all areas of life, particularly in the realm of information accessibility (Haegele & Hodge, 2016). Information accessibility allows children with cognitive disabilities to receive support in dealing with the challenges they face throughout the process of acquiring information in an independent and respectful manner (Greene, 2014).

Sutherland and Isherwood (2016) conducted a systematic review on the topic of written information accessibility for children with cognitive disabilities. Their review highlighted that early familiarity with symbols appearing in written information contributes to the ability of children with disabilities to understand the presented

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information. Pictures and illustrations also assist in comprehending the written information, but clear explanations need to be added alongside the visuals to ensure effective communication. Additionally, it was found that children with cognitive disabilities better understand content delivered in simple language. Information accessibility can be achieved through various means, with the emerging significant platform being the virtual space (utilizing the internet and videos) (Deursen & Helsper, 2018).

Children with cognitive disabilities are found to use the internet and videos for various purposes, mainly for leisure and communication with others (Lough & Fisher, 2016). However, using online services presents challenges in understanding instructions and searching for information. As a result, there is a need for alternative accessibility measures, visual support, and audio narration to enable this population to receive information in the virtual space in a manner tailored to their needs (Kydland et al., 2012).

1.2 Linguistic Accessibility

Children with cognitive disabilities struggle to understand information found on the internet, in newspapers, and in informational documents (Kydland et al., 2012). Therefore, there is a need for a variety of accessories that include the use of pictures, symbols, and simple language to assist them in receiving information in a tailored manner (Solarsh & Johnson, 2017). Linguistic accessibility is the process of adapting written or spoken information for children with cognitive disabilities, using linguistic and sensory aids. The accessibility process includes planning, execution, and control, with the execution phase focusing on linguistic simplification. According to Ozziell-Carl et al. (2011), the linguistic simplification process includes several aspects: (1) content - organizing the central ideas and omitting irrelevant information that does not directly contribute to understanding; (2) structure - adapting language for individuals with cognitive disabilities by using simple sentences and structures; (3) design - using visual aids that assist in understanding the written information.

Given the challenges in comprehension and information processing of children with cognitive disabilities and the principles of making information accessible to them, the use of digital tools that enable transcription, subtitles, audio descriptions, simplified language, and more for conveying information can have a significant impact (Davidson, 2015). Specifically, the literature emphasizes how videos can be accessible. In terms of software, a media player that allows clear play and pause options for individuals with disabilities needs to be utilized (Thompson, 2018).

Additionally, the software operating the video should allow font size adjustments and changing the color of subtitles at the bottom of the video to suit the individual's needs (Moreno et al., 2017). Additionally, videos intended for information transfer should include tags that provide adapted information about the video content. The use of these tags will assist children with disabilities in coping with information overload on the internet and easily finding the relevant information (Acosta et al., 2019). In terms of content, videos should include text transcription and audio descriptions of the situation (Weaver et al., 2010).

Currently, adaptations in videos for children with cognitive disabilities are only partially implemented, making it difficult for them to receive information. Therefore, the aim of this research is to identify the needs of children with cognitive disabilities regarding the best way to convey information to them and to examine how a digital tool based on accessible animated videos can support tailored explanations for children with cognitive disabilities in the field of occupational therapy intervention.

1.3 Children With Cognitive Disabilities

Children with cognitive disabilities face various challenges, such as impaired information processing,

memory difficulties, attention deficit, and delays in speech and language development (Shevell et al., 2005; Wehmeyer et al., 2008). In the field of communication, these children struggle with cognitive processes related to language use. They encounter difficulties in symbolization, comprehension of simple concepts, expressions, and more. In most cases, the vocabulary of children with cognitive disabilities is limited and primarily consists of concrete words (Barton-Hulsey et al., 2017). All of these factors affect their comprehension abilities, and in many instances, they demonstrate lower comprehension abilities than expected for their age (Wingerden et al., 2018).

This population is characterized by varying levels of functioning, which are manifested, among other things, in their ability to acquire social and behavioral life skills. In order to help children with cognitive disabilities improve their functioning in these areas, occupational therapy services play a central role. The main goal of occupational therapy clinics is to assist children with cognitive disabilities in actively participating and engaging in a variety of activities. It has been found that the involvement and participation of children with cognitive disabilities in meaningful activities in various aspects of life (such as leisure, play, and learning) impact their health and quality of life (Novak & Honan, 2019a).

The term partnership in therapy, as defined by Rosenfeld (1997), refers to the therapist's ability to meet their clients while acknowledging their experiences and finding ways to cope and solve problems together, taking into consideration their desires and circumstances. When it comes to individuals with cognitive disabilities, such decision-making emphasizes the foundational rights of autonomy and independence, which allow every person with disabilities to participate in society, define themselves, and make decisions regarding their lives (Kon & Morrison, 2018).

Although the discourse on shared decision-making has been developing with the adult population with cognitive disabilities (Werner et al., 2017), the tendency among therapists, including occupational therapists working with children, is to involve parents or educational staff in the treatment process instead of the children themselves. This tendency may arise from the lower understanding level of children with cognitive disabilities compared to what is expected for their age (Wingerden et al., 2018). This situation limits the possibility for children with cognitive disabilities to be involved in decision-making and to understand the therapeutic process. Therefore, in order to promote an appropriate response for children with cognitive disabilities, current research offers a technological solution designed to assist therapists in explaining the intervention areas of occupational therapy to children with cognitive disabilities.

2. Research Population

10 occupational clinics and 20 children participated in the study.

Table 1 Background Data of Occupational Clinics

Identification	Age	Residence	Working	Seniority
Participant 1	63	Jerusalem	Kindergarten, private clinic	30
Participant 2	25	Jerusalem	School, kindergarten	4
Participant 3	27	Sderot	School, kindergarten	5
Participant 4	35	Jerusalem	Kindergarten	9
Participant 5	32	Jerusalem	Kindergarten	6
Participant 6	40	Ashkelon	School, kindergarten, private clinic	14
Participant 7	22	Ashkelon	School	20
Participant 8	30	Dimona	Kindergarten	16
Participant 9	56	Herzliya	Kindergarten, school	10
Participant 10	29	Sderot	School	5

Table 2 Demographic Data of the Children Participating in the Study

Gender	Age	Residence	Functional Level
Boy	5	Ashdod	Moderate
Girl	10	Jerusalem	Moderate
Girl	12	Ashkelon	Low
Boy	6	Sderot	Low
Boy	6	Jerusalem	High
Girl	6	Ashkelon	Moderate
Girl	12	Sderot	Low
Boy	8	Herzliya	Moderate
Girl	5	Jerusalem	High
Boy	10	Herzliya	High
Girl	7	Jerusalem	Moderate
Boy	5	Sderot	Low
Boy	10	Herzliya	Low
Girl	12	Dimona	High
Boy	8	Ashkelon	Moderate
Boy	5	Sderot	Low
Boy	8	Ashkelon	Low
Girl	10	Jerusalem	Moderate
Boy	11	Ashdod	Low
Girl	8	Herzliya	High

3. Materials and Methods

The development and implementation of the experience included:

- 1) In the initial stage, a semi-structured interview was conducted to examine the main intervention areas of the occupational therapy clinics in relation to the population. The interview also assessed how the clinics explained the intervention areas, considering the reception and comprehension abilities of children with cognitive disabilities at different functional levels.
- 2) Based on the information gathered from the interviews, a digital tool in the form of videos was developed and designed, addressing the information accessibility needs of children with cognitive disabilities. The development process consisted of several stages: First, the intervention areas to be made accessible to children were selected based on the interview data. The occupational clinics reported two main intervention areas: ball-play and writing in a notebook including basic motor function reinforcement. Next, two online platforms for creating the videos (Vyond, Genially) were chosen. Texts for the videos were then written, following the accessibility guidelines. Text content focused on presenting key concepts through individual examples. The text structure of the videos consisted of simple and easily understandable sentences. In addition, the text was accompanied by visual support in the form of subtitles at the bottom of the videos, providing an additional channel for processing information and catering to hearing impairments. Visual aids, such as symbols supporting text comprehension, were also utilized.
- 3) After the development of the occupational therapy intervention tool, it was tested within the clinical treatment framework. 20 children used the tool, with ten of them watching the video focusing on ball-play, and ten watching the video on writing in a notebook including basic motor function reinforcement.
- 4) After the trial use of the intervention tool, the occupational clinics that tested the tool administered a

questionnaire to the participating children. The questionnaire consisted of three questions presented in simple language and visual symbols. The children reported their satisfaction with the use of the tool.

4. Results and Discussion

In the research, two main areas were identified relating to the therapeutic process of occupational therapy for children with cognitive disabilities: intervention areas in occupational therapy and the assistive means used by occupational therapists.

4.1 Intervention Areas in Occupational Therapy

During interviews, occupational therapists focused on two main areas: (a) ball play activities — therapists described a variety of games they use in therapy, with the main game being ball play. According to them, the main goal of the game is to encourage social participation and establish meaningful connections with siblings and peers; (b) academic skills — another intervention area is academic skills, including writing in a notebook and reinforcing basic motor skills.

4.2 Assistive Means

Occupational therapists utilize a range of assistive means during therapy (a) Symbols and pictures: Therapists reported using symbols to help children acquire skills and illustrate the therapeutic process. They often show children pictures of writing utensils and games to help them understand the therapy process (b) Simple language: One important means employed by occupational therapists to facilitate learning processes is the use of simple language. They use short sentences to explain to children how to write and to play (c) Video viewing: Another assistive means used by occupational therapists during therapy is videos. Generally, they use videos to teach children various skills, and some therapists reported using videos to demonstrate desired behaviors.

4.3 Findings From The Questionnaire Administered to Children With Cognitive Disabilities After Using The Digital Tool

The occupational therapists utilized a digital tool and experimented with it within the clinic setting. They used it with 20 children, with ten of them watching a video focused on ball playing activities, and ten watching a video on writing in a notebook and reinforcing basic motor skills. After trying both, the children were given a questionnaire consisting of three plain language questions with visual symbols. The children reported their satisfaction with using the tool, and a significant portion of them indicated their understanding of the purpose of the therapy and expressed a willingness to continue attending therapy sessions.

5. Conclusions

In the current research, we examined how occupational therapists explain therapeutic interventions to children and the significance of this for the treatment process. They noted that the children's limited understanding abilities challenge their ability to provide tailored explanations about the therapy. This is in line with research indicating that children with cognitive disabilities face various difficulties, such as impairment in information processing, memory difficulties, attention deficit, and delays in speech and language development (Shevell et al., 2005; Wehmeyer et al., 2008). All these factors affect the understanding abilities of children with cognitive disabilities. In most cases, they demonstrate lower comprehension abilities than expected for their age. The literature shows that when children do not understand what is happening in the therapy, achievement of

therapeutic goals can be diminished (Wingerden et al., 2018). The children who participated in the study reported that after using the tools, they understood what they were working on in therapy, which increased their motivation to collaborate. The research demonstrates that in shared decision-making, the patient and therapist discuss treatment options together and jointly decide on treatment goals (Coyne et al., 2016). This collaborative process is based on mutual respect, open communication, and consideration of individual preferences and values (Elwyn & Miron-Shatz, 2010). In order to achieve such a collaborative process that allows for respect and clear communication with patients, occupational therapists use a variety of aids intended to explain the therapy to children. The most important aids are pictures and symbols that provide visual support for verbal explanations. Sutherland and Isherwood argue that early familiarity with the symbols appearing in written information contributes to the comprehension abilities of children with disabilities. Pictures and illustrations also assist in understanding written information (Sutherland & Isherwood, 2016). It appears that the use of symbols, illustrations, and pictures can provide support for written explanations.

Additional aids related to spoken language that occupational therapists use to promote learning processes are simple language and short sentences. In the current research, they were required to adapt the spoken language and use simple language and short sentences in order to promote the acquisition of learning skills, another factor that aided in achieving therapeutic goals.

In addition, occupational therapists reported using video clips for the purpose of working and practicing skills. However, a variety of adaptations are necessary for children with cognitive disabilities to be able to use videos for information gathering. Current literature provides guidelines on how to adapt videos to make them accessible. These adaptations address font size, contrast, and subtitles displayed at the bottom of the video. In accordance with the literature, videos were designed specifically for children with cognitive disabilities, following linguistic and visual accessibility guidelines, and resembling familiar therapy settings for children. The videos were found to be effective in conveying information and enhancing collaboration between therapists and patients. Furthermore, the occupational therapists participating in this study reported that it was not always clear whether the child understood their explanations about the treatment process. Feedback gathered from the children during the research indicated that, after experiencing the digital tools, the occupational therapists received information from the children, not only about their treatment preferences but also about their comprehension of the verbal explanations provided to them. Therefore, it appears that the use of videos can broaden the existing options available to occupational therapists for delivering information and managing therapy conversations. Additionally, the use of digital tools allows for the integration of technology for the benefit of therapy and enables the circumvention of barriers and communication difficulties that were previously challenging for occupational therapists.

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