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Assistive Technology and Internet of Things for people with ADHD

Ioanna Moraiti, Anestis Fotoglou, Katerina Dona, Alexandra Katsimperi, Konstantinos Tsionakas, Zoi Karampatzaki, Athanasios Drigas

Net Media Lab Mind - Brain R&D IIT - N.C.S.R. "Demokritos" , Athens, Greece

Ioanmora2@helit.duth.gr, anestis.fotoglou@gmail.com, kdona2008@hotmail.com, alexandra.kats88@gmail.com, kons_tsio@yahoo.gr, zkarabatzaki@gmail.com, dr@iit.demokritos.gr

Abstract. This article focuses on how people with disabilities can benefit from new technologies and in particular assistive technology and Internet of Things Applications. Assistive Technology is now an integral part of modern education and even more in the field of special education, as it can prove to be a powerful tool to support educational integration. Through smart devices and artificial intelligence, an attempt is made to recognize emotions and the level of arousal, through sensors, restoring it to a normal basis, and giving continuous emotional feedback. This paper refers to parents, caregivers, and people with ADHD and it gives solutions that improve their daily lives with the help of applications created for smart devices.

Keywords. Internet of Things, ADHD, Assistive Technology, Smart devices, Assistive learning, IoT, Special Education, Executive Functions

1. Introduction

The increasing use ICTs [54-96], AI, STEM & Games [97-110] and accessibility of the Internet, and mobile devices [46-53] offer an additional way of supporting children and young people with ADHD, parents, and also their doctors and caregivers. The technology could be used by parents to engage their children in daily activities, monitor their symptoms, or get further advice on how to manage a child's or young person's ADHD. A recent study showed that parents, children, young people with ADHD, and health professionals appreciate the potential of technology to help manage and monitor a child's ADHD on an ongoing basis [1]. Several applications have been developed for parents and this purpose, some of which are designed to be used jointly by the parent and the child so that the parent can monitor their child's ADHD symptoms, medication compliance, give advice to the parent on managing a child with ADHD and also help with daily routines such as dressing and going to bed. In the continuation of this article, we will mention the terms ADHD, Internet of Things, Assistive technology, Internet applications that help people with ADHD, and many functions of the above technologies which have been managed in recent years to develop and improve everyday life that many people with special educational needs.

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2. ADHD

Attention Deficit Hyperactivity Disorder (ADHD) is a mental health condition that can cause unusual levels of hyperactivity and impulsive behaviors. People with ADHD may also have trouble focusing on a single task or sitting for a long time. Many people experience carelessness and changes in energy levels. For a person with ADHD, this happens more often and to a greater extent compared to people who do not have the condition. It can have a significant impact on their studies, work, and life at home. Children with ADHD may be experienced low self-esteem, troubled relationships, and poor school performance. The symptoms, in some cases, decrease with age. However, some people are called upon to accompany the symptoms of ADHD throughout their lives, without this being an inhibitory factor for their development as with the appropriate treatment, medication, or counseling they learn strategies to cope with daily difficulties. Early diagnosis and treatment can lead to a better standard of living for the person with ADHD. Causes Although the exact cause of ADHD is not clear, research efforts are ongoing. Factors that may be involved in the development of ADHD are related to genetics, the environment, or problems with the central nervous system in key areas of development. Risk factors for ADHD may include:

• Blood relatives, such as a parent or sibling, with ADHD or other mental health disorder

• Exposure to environmental toxins - such as lead, found mainly in paints and pipes in older buildings

• Maternal drug use, alcohol use, or smoking during pregnancy

• Early Childbirth

3. Symptoms – Types of ADHD

All children have difficulty at times paying attention, listening to and following instructions, sitting still, or waiting their turn. But for children with ADHD, these difficulties are more intense and occur more often. The symptoms of ADHD tend to be noticed at a young age and can become more noticeable when the child's condition changes, such as when school starts. Most cases are diagnosed when children are 3 to 7 years old, but sometimes the diagnosis is made at an older age. In some cases, ADHD is not recognized when one is a child but is later diagnosed as an adult. The symptoms of ADHD usually improve with age, but many adults who were diagnosed with the condition at a young age continue to have problems. People with ADHD may also have additional problems, such as sleep disorders and anxiety. The main characteristics of ADHD include carelessness and hyperactive-impulsive behavior. The symptoms of ADHD begin before the age of 12 and in some children, it is evident from the age of 3 years. The symptoms of ADHD can be mild, moderate, or severe and can continue into adulthood. ADHD occurs more often in men than in women and behaviors may be different in boys and girls. Children with ADHD may show signs in one or all of the following areas:

1. Carelessness

Children who are careless (easily distracted) find it difficult to focus, concentrate and stay on at work. They may not listen to the instructions well, they may miss important details and they may not complete what they are starting. They may be daydreaming or fooling around too much. They may seem indifferent or forgetful and lose their things.

2. Hyperactivity

Hyperactive children are anxious, anxious, and easily bored. They may find it difficult to sit still or stay quiet when needed. They may be in a hurry and make careless mistakes. They

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may climb, jump or make other dangerous movements without realizing the danger. They can also act in ways that annoy others.

3. Impulsivity

Children who are impulsive act very quickly without thinking. They often interrupt others and may push them or grab something as they find it difficult to wait. They can do things without asking permission, take things that are not their own, or act in dangerous ways. They may have emotional reactions that seem very intense about the situation. Sometimes parents and teachers notice signs of ADHD when a child is very young. But it is normal for young children to be distracted, anxious, impatient, or impulsive - these things do not always mean that a child has ADHD. Attention, activity, and self-control develop slowly as children grow older. Children learn these skills with the help of parents and teachers. Some children do not get much better at paying attention, calming down, listening, or waiting. When these situations continue and begin to cause problems in the school, family, and friendly environment, it can be ADHD.

4. Treatment of ADHD

1. Medicine.

Medication activates the brain's ability to pay attention, slow down, and use more self-control. Medication can help children manage their ADHD symptoms in their everyday life and can help them control the behaviors that cause difficulties with family, friends, and at school.

2. Behavior therapy.

Therapists can help children develop the social, emotional, and behavioral skills that ADHD lacks. The goals of behavior therapy are to learn or strengthen positive behaviors and eliminate unwanted or problem behaviors. Behavior therapy for ADHD can include parent training in behavior management, behavior training with children and beha, and viral interventions in the classroom.

3. Parental counseling.

Through guidance, parents learn the best ways to deal with behavioral problems that are part of ADHD.

4. School support.

Teachers can help children with ADHD to be their best personality and enjoy school more. Proper treatment helps to improve ADHD. Parents and teachers can teach younger children to become better at managing their attention, behavior, and emotions. As children grow older, they need to learn to improve their attention span and self-control. When ADHD is not treated, it can be difficult for children to succeed. This can lead to low self-esteem, depression, adversarial behavior, school failure, risk-taking behavior, or family conflicts.

5. **Assistive Technology for children with ADHD**

Supportive technologies and new technologies, in general, will provide solutions to the difficulties of people with ADHD. Assistive Technology is the organized application of devices, technologies, software, and systems to improve or maintain the functionality of people with disabilities. Sub-areas of assistive technology include computers, automation-assisted environmental control systems, and alternative communication modules. It is aimed at all ages to replace or promote the skills that the person needs at any age to be functional. Using any high-tech device that is part of equipment can give another dimension to the autonomy of the individual and the individual to achieve a higher standard of living. Several devices are used depending on the special needs of each person, but also the form of his or her disability (eg

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mobility - physical disability). However, to utilize the appropriate kind of Assistive Technology, the individual must first be evaluated in all areas of skills by specialized scientists, and then the necessary support aid must be provided. Each person is a unique case. Thus, according to the goals set by the therapists, the appropriate equipment is used.

Assistive Technology is now an integral part of modern education and even more so in the field of special education, as it can be a powerful tool to support educational integration. This technology can, on the one hand, restore any physical weaknesses of students, such as vision, and movement, and on the other hand normalize any learning difficulties (Tailor & Tailor, 1997). Students with special educational needs due to mobility disability can benefit from the application of Assistive Technology in the educational process, as it provides them with physical, cognitive, and supportive access to the educational action. Thus, the use of technological means, support devices, and the computer, which is manned with the appropriate software, contributes decisively to the learning process, helping people with disabilities to integrate into the educational context and better meet the educational requirements. , despite any physical or other difficulty concerning the other students.

The Treatment of Attention Deficit Hyperactivity Disorder (ADHD) can be based on new teaching aids. Technological developments have increased people's dependence on technology and computers to help them with the means it provides for their daily activities and needs. Assistive technologies are a set of mechanical and electronic means designed to be used by people with disabilities to assist in their daily lives. The needs of each person with ADHD are different. For this reason, assistive technology cannot help all children with ADHD, but conversely, each assistive technology must be able to adapt to the individual needs of each student. Assistive technologies aim to integrate people with special learning needs into the school environment.

Assistive technology can be any device, software program, or tool that could improve and stimulate the skills of a person with ADHD, for example in educating people who have difficulty with topics such as reading, writing, or math.

Auxiliary Technology for Reading is audiobooks. If a child has difficulty concentrating or understanding the meaning of sentences while reading, he or she may benefit from listening to a recording of a book. The internet is a place where the user can find many audiobooks. Necessary tools for assistive technology are the computer, a tablet, or smartphone for playing the recording,s, and headphones for listening. If a person with ADHD finds it difficult to sit still to read a book an audiobook could help them move while listening to the narration.

1. Text in speech

Speech texts allow the person to convert the text on the screen of their computer, tablet, or phone into a sound that they could hear. In addition, individuals can speed up or slow down the sound as well as select the option to repeat the sound signal. Listening to a text at the same time as reading it enhances the recognition of the person's words and helps him to pay more attention, more concentration and better understand the words he sees and hears.

2. 2. Optic Character Recognition (OCR)

This type of on-screen text hardware and software allows people to transfer text images from books, worksheets, and objects such as billboards to a screen and listen to audio.

3. Auxiliary Writing Technology

Word prediction software. This tool is for word processors and its use is to guess the word that the person is trying to type. This tool helps users to develop their vocabulary and write syntactically correct sentences.

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4. Portable word processors

If the person has difficulty taking notes during the lesson or writing assignments by the hand he can type words more easily on small computer-like devices. Some portable word processors have built-in text-to-speech and word-prediction software.

5. Speech recognition software

The person speaks into the microphone of a computer or tablet and his words are displayed on the screen. This saves time and helps people express themselves more easily if they have difficulty writing by hand.

6. Support technology for courses such as Mathematics

Talking calculator. It works like a regular calculator, only it utters the numbers and symbols on the buttons that the child presses as well as the answer it gets. In this way, it helps people process the digits they see in a math problem and makes them feel confident that they are pressing the right calculator keys as they solve the problem.

7. Mathematics worksheet

The math worksheet is a type of computer software that allows the child to solve math problems on a computer screen. It can help children organize numbers as they solve the problem and read them aloud to them so that repetition can help them understand the problem.

8. Reminder devices

These gadgets remind faculty users to focus on a task from which they have been distracted. An example is a vibrating clock. The individual's user or caregiver can set it to vibrate as often as he/she sets the tasks to remind the individual.

It is important to use each case the special support technology solution needed for the needs of each individual. To achieve the optimal solution for the needs of each individual, it is important to be evaluated by different specialties of therapists.

6. Technologies that use the IoT devices to help people with disabilities

Internet of Things technology is a technological revolution in computers and communications. It depicts a world networked with smart devices as objects are transformed into smart objects with the help of low-capacity processors and built-in sensors. Smart objects can sense, interpret and react to the environment thanks to the combination of the internet and emerging technologies such as radio frequency identification (RFID), emotional intelligence algorithms, and machine learning. This technological development allows new ways of communicating between people and things. One of the most important benefits of the Internet of Things is that it can provide useful solutions to people with disabilities and provide them with the tools they need to achieve a better quality of life. Assistive IoT technologies are powerful tools for individuals' independence.

Some of the technologies used by the Internet of Things are RFID and NFC technology. RFID - Radio Frequency Identification solutions are a surefire way to improve your healthcare services. RFID is an acronym for "radio frequency recognition" and refers to a technology where digital data encoded in tags or smart tags is read by a reader via radio waves. This technology is similar to a barcode, as we read data from a tag or a tag from a device that converts this data into databases. The technology has many advantages over systems that use barcodes. More specifically, we can read RFID tag data out of sight. However, we must always keep legible barcodes for an optical scanner. RFID belongs to a group of technologies referred to as Automatic Data Recognition (AIDC). AIDC methods automatically identify objects, collect data about them, and feed this data directly to computer systems without human intervention.

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To achieve this, these techniques use radio waves. Simply put, these systems consist of three parts: an RF-ID tag or a smart tag, a reader, and an antenna. The labels contain an integrated circuit and an antenna. We use it to send data to the RFID reader. The reader then converts the radio waves into a more user-friendly data format. The information collected by the tags is then transferred to a host system via a communication interface. There we can store the data in a database for analysis at a later date.

RFID systems track people and stocks in real-time. In this way, healthcare providers, for example, receive more information about cost reduction, stock control of medicines, and control over their expiration date.

Wristbands or other wearables with embedded RFID systems can have positive effects on patient well-being and safety. This can optimize the management process of the individual's diet/medication plan or even display the user's entire medical history and medical record in a single scan. RFID chips can also be useful in locating contacts to instantly inform a person's close relatives and caregivers without wasting time. In addition, RFID systems can monitor people with ADHD or other disorders in real-time if they follow hygiene standards such as hand washing. One of the most common solutions that RFID provides to people with disabilities is to be able to lock and unlock the door of a room or house using wearable and RFID technology. This technology collects data about patients, medical staff, stock, and treatment. The data comes from different sources - wearables, dentures, health equipment, and, labels. This is a major challenge in data management and analysis.

So that the data have a real effect in real-time, the analysis process must be automated. With the right system and procedures, decision-makers will have access to the right data. How is this achieved? First of all the raw data from various RFID tags should be transferred to a single location for further transformations. They are then formatted, filtered, and categorized. Once the data is cleared, they can finally get some form of visualization, reports, and graphs. In combination with other technologies such as cloud computing and the internet of things, RFID is ready to be the main pillar as it has excellent capabilities.

Another technology useful for people with disabilities is Near-field communication technology (NFC). By using this technology, users acquire skills such as paying for their shopping in the supermarket without having to count the money, thinking about the change that needs to be returned to them, and worrying if they will have the exact amount with them. NFC technology is integrated into smart devices such as smartwatches, mobiles, and any other device the user manages to control. If a person uses NFC technology for example through a smartwatch, he stops worrying about the possibility of losing his mobile phone or wallet, with the result that users who have attention deficit or hyperactivity disorder enhance their fine mobility, and develop their technical knowledge and increase their social skills. In this way, the parents of the individuals feel safe for the transactions of their children and the teachers of the individuals manage to educate the individuals at a fast pace on a human needs such as that of serving their needs - food with a few simple moves and a smart device. These devices are among the solutions provided under the umbrella of IoT.

7. Uses of IoT in executive functions

By the term staff functions, we include the cognitive processes that are necessary for a complex behavior directed at him and include metacognitive action that demonstrates the ability to self-regulate, self-observe, and adapt cognitive skills. Attention is the process that connects the cognitive and the metacognitive skills. Thus acquired or growth deficits in this category of functions are manifested by easy distraction, difficulty in taking initiative, difficulty

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in keeping one predetermined strategy and reaction to external stimuli, lack of patience, impulsivity, and inhibition. As we understand ADHD is related to the above skills to a great extent with a prominent lack of attention control and inhibition can affect negatively on students' academic performance. The right ones must be found within the school as well as at home ways to organize and adopt a learning approach that will be easy to use and efficient. With their help in this area, Internet devices can give students and parents many solutions. Students with ADHD find it difficult to plan activities because a step plan is required to complete them. The reduced ability to plan the development of appropriate strategies in conjunction with Lack of attention and impulsivity contributes to academic difficulties of children. Internet devices can help drastically in shaping a sufficient level of stimulation, capable of enhancing executive functions by adjusting an appropriate sensory environment. The devices we study store them processed information in the cloud point that they are easy to use by consumers. So we understand that the IoT system effectively helps parents and therapists to monitor the image of children and provides customized learning approaches aimed at developing staff functions. The sensors alert us to changes in heart rate as well as environmental data.

So impulsivity, inhibition, and hyperactivity are recognized through heart rate in daily activity about the ambient temperature. In this way the enable the teacher feedback can understand the student's emotional state and form an appropriate plan for teaching and strengthening senior functions. In addition, through internet devices, we can control the sensory environment of the child by adjusting the temperature, the lights, and the sounds, as well as by providing tactile stimuli through pressure on the child's chair for proper sensory adjustment and processing set helps control attention, memory, and impulsivity. The direct relationship between internet devices and staff functions was captured above which is our ultimate goal. THE control of attention and through it metacognition is the purpose for achieving multiple goals in children's lives [111-133], also in this procedure nutrition and environmental factors are studied and could help [134-136].

8. IoT – Support systems for parents with ADHD

ADHD affects people by causing a low quality of life, not only for those who present with the disorder but also for those around them. Carelessness can manifest itself in different situations, in school, professional and social life. People with this disorder may not pay much attention to detail and make mistakes of carelessness. They also find it difficult to stay focused on one task and often jump from one task to another, failing to complete some of them. Carelessness also affects the ability to solve problems, forgetting tasks, dates, and objects. They often tend to forget appointments and items in their daily activities.

Hyperactivity in adults is perceptive in behaviors such as the difficulty of staying calm in certain situations. Hyperactivity usually affects sleep and activities that require you to stay still for a long time, especially when the activity is not interesting. It is important to know that both adults and children with ADHD can stay focused for hours if this activity is enjoyable.

The difficulties for parents with ADHD may be different for everyone, but they converge on one component. Daily routine. The house is in constant disturbance, as a result of which the parent with ADHD cannot invite friends or other parents, as he is ashamed of it. His inability to remember things, the fact that he goes from one subject to another without hesitation, along with the difficulty in maintaining concentration in general, make it difficult for him to maintain friendships. Problems with taking care of her hygiene are another problem with other people.

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Usually, he does not want to know his wider environment about his disorder and for this reason, he allows many to characterize him as careless when he does not have the power to maintain attention as is generally expected. Also, the fact that he finds it difficult to implement things, characterizes him as lazy. But when he starts doing something, he devotes himself to it and finds it difficult to leave it if he does not complete it. This means that he often does not sleep at a reasonable time and has to suffer for it the next day when he is tired and has low energy levels.

He often forgets things or finds it difficult to find what he needs - sometimes he needs an extra quarter to go home from work just because he needs to look e.g. the keys.

When he is at home, he often struggles with negative thoughts about his inadequacy, which often leads to depression. He tries to create routines, such as going to work for a few hours every day, because he knows that routines help him a lot in dealing with everyday life. However, she finds it difficult to maintain her routine. He also finds it difficult to realize this and often promises things that he cannot keep.

Many applications can be developed using the IoT and each of them can improve the quality of life of a person with some kind of disability. With the advent of mobile applications and their greater acceptance by users, several "health applications" have been developed. Currently, we have applications focused on various situations, such as depression, obesity, stress management, cardiovascular control, and ADHD, among others. Specifically for ADHD, some applications have been developed for informational and educational purposes, others to monitor and manage patient behavior, while others seek to assist in its diagnosis.

Indicatively, we can mention the following applications:

1."You Can Handle Them All", an application for parents and educators that aims to help manage patient misconduct.

2." IBAA Behavioral Assessment App" Suitable for psychologists, this application summarizes behavioral information and offers different observation methods and reports.

3." WHAAM" This application monitor and collects data that allows the measurement of the behavioral parameters associated with ADHD and, finally, evaluates whether the interventions to reduce the symptoms and integrate the patient into the environment were successful.

We can find some commonalities in these applications, as they focus on monitoring, collecting, and analyzing patient data. In addition to mobile solutions, there are online applications that seek to inform and/or educate parents, caregivers, educators, and even patients themselves. However, these sites only have the power to educate and inform. Telemedicine has proven to be a tool with a lower cost and able to reach the most inaccessible places. Study (1) dealt with the use of telemedicine in patients with ADHD. The study compares children who received treatment through telepsychiatry and another group who received conventional treatment through counseling forms. The study presented quantitative results that indicate a significant improvement in the group receiving treatment through "ttelepsychiatry compared to the group of conventional therapy. No devices were used in the study to interact with the patient.

Study (2) reviews the literature on applications related to mobile devices for the health of people with ADHD. It includes the "Angel ADHD" application, which uses the reminder function to help the daily life of the patient with ADHD, as well as updates the medical information, helping to monitor them. This application can be considered as a modification of the work organization of an adult with ADHD, but it still does not allow device interaction.

In a study (3) "Everyday Balance" helps its users to create a better balance between fun and boring things that need to be done in everyday life. In this way, the application becomes

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a support for creating and maintaining the routine, as well as a reminder of when the routines start to fall apart. The application is based on game mechanics (gamification) and gives the user points to do boring things. These points can then be exchanged for fun activities, e.g. video games. The basic idea behind the idea is to help the user positively change their behavior. The goal is for users to move from simply reacting to what needs to be done - as usual, as calendar reminders do - to be motivated to schedule daily tasks to be more manageable. Using the app should lead to more household chores being performed and completed before the TV or computer game starts. This in turn should offer better well-being, as it is more satisfying to have a tidy home. Homework becomes more fun and you also gain something from it. Visualizations of time, illustrative images, and job descriptions can make everyday tasks a little more specific. It can also contribute to better cohesion and cooperation in the family when its members do things together and common goals are achieved. The idea would be very useful even to parents who do not have ADHD, as many parents struggle with everyday life trying to remember everything that needs to be done.

Managing the economy can be difficult for many with ADHD. Impulsivity can lead to many spontaneous purchases, especially when they are stressed. A Mobile Good Man can be used to ease the situation. With the help of mobile, the bank account can be divided into many parts, where for example one is only for food, another for clothes, and a third for rent. By deducting a certain amount for different types of things, there is less risk of spontaneous purchases affecting rent, food, and other significant expenses.

Hygiene sensors are a personalized sensor system that helps the user maintain good hygiene and create conditions around it. The sensors can read if an object has been used or when it's time to do something. For example, the flush button on the toilet seat may notify the sink that someone has used it and the sink will start to illuminate, reminding the user to wash their hands. Sensors on the toothbrush, shaver, and shower can detect how long ago they were used and alert the user with sound or light that it is time to use them again. A further example could be sensors on clothes that detect when clothes need to be washed or if they need to be washed under the hands.

In people with ADHD, technology helps by providing brain stimulation, but it can also help the brain slow down through meditation practices and applications such as Calm, Headspace, and Open, which involve conscious movement. Neuroimaging shows that meditation increases focus and attention not only for people with ADHD but for everyone. For those who want a more technological option, there is the "David Delight" application. It uses light and sound to help regulate brainwave activity and can help with focus, attention, and sleep.

From basic to-do lists and productivity apps to "Mobile Good Man", there is a wide range of technology to help parents with ADHD. For anyone struggling to manage their ADHD, it is helpful to know what works for others, although the most important thing is to take the time to explore strategies that work best for each individual.

9. Use of Applications in ADHD

Application development includes monitoring ADHD behavior in children and data sharing between parents, teachers, and health professionals [2]. In a skin conductivity sensor application, parental stress can be measured by alerting the parent to stressful times to make him or her aware of his or her feelings. Another mobile app aims to improve morning and bedtime routines.

Globally, the management of ADHD involves a combination of non-pharmacological and pharmacological interventions. In mild to moderate cases, behavioral interventions such as

psychoeducation and cognitive behavioral therapy are used alone, while in more severe cases, the simultaneous use of pharmacological and non-pharmacological approaches is recommended. Involving children and young people in technology could help them gain self-awareness, improve caregivers' self-management or management skills, and manage the situation in adulthood.

Studies report the use of handheld devices to help organize daily activities [4] or self-monitoring of symptoms, software to improve reading speed, and games to improve math ability. The success of these technologies has been measured in several ways, including observational data, Dysfunctional Syndrome Behavior Assessment, quality interviews, reading speed, and completion time [5]. Technology can enhance the learning of people with learning disabilities.

Another study looked at a computer sending game that aims to promote behavioral learning and the organization of everyday skills such as time management and scheduling or organization. The children played the game either 3 or 8 times a fortnight. A user satisfaction survey showed that no differences were observed between the groups in the satisfaction with the game, but the children enjoyed the game and reported that they learned from it [6].

The technology has also been used by clinicians to diagnose ADHD and monitor results. For example, the Quantitative Behavior Test (Qb) uses the Continuous Performance Test to produce a visual graph of the three main symptoms of ADHD and has been used to aid in the diagnosis of ADHD. The main results are the time for diagnosis and the accuracy of the diagnosis. The secondary outcome measures are the diagnostic trust of the clinician and the usual clinical outcome measures. A web-based technology, Health Tracker, has also been used by parents, children, and professionals to monitor the long-term outcomes of children and adolescents with ADHD to enable more effective treatments and more effective services.

The use of mobile phones and mobile devices has increased dramatically in recent years. As a result, mobile applications are also becoming more popular and there has been some success in using them to interact with children or young people with ADHD. These applications may include games, information on the diagnosis and treatment of ADHD, various ADHD tests, task management, and reminders. These efforts often incorporate rewards, bright colors, and a variety of visual stimuli. They include the use of applications that are said to monitor ADHD behavior, improve behavior, improve organizational skills for drug compliance, improve reading motivation and summary, and improve knowledge through the use of games [7].

Although an increasing number of applications are being promoted for use by or with people with ADHD, there are still minimal guidelines to support the reliability, validity, and suitability of currently available applications. There are a few rules and regulations about which applications are suitable and for whom. Many of the applications identified were unsubstantiated and data privacy and security were found to be inadequate.

ADHD is a chronic condition with about 60% showing some symptoms in adulthood. Medication treatment for ADHD decreases significantly in the second decade of life — a period during which many young people with ADHD struggle with school, family, peer relationships, and risks such as drug abuse. As with all chronic conditions, empowering patients to manage their symptoms is vital. People with ADHD, especially those with ASD, often enjoy the technology and are indeed experienced in using it.

The perspectives of both clinicians and young people are needed to create a complete picture. It is important to have the views of clinicians on whether applications promote positive behaviors and target specific needs. The views of young people give guidance on whether they would use the application and whether they found it enjoyable and/or useful. People with

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ADHD give more reliable answers to the frequent positive rewards, so this seems to be a prerequisite for a successful application for young people themselves.

Both clinicians and their patients wanted the applications to be technically reliable, to relate in some way to the user, to be age-appropriate, and to be interactive. Both also wanted to take advantage of technology to help them, including, for example, an application to treat ADHD symptoms in some way. Application developers may advertise their applications to offer what clinicians and young people want, but at the moment there does not seem to be a real evidence base to help families and clinicians decide if an application is possible. to work for them. Allegations that applications can improve the symptoms of ADHD need further investigation. Clinical networks and children, young people, and families could work with application developers to test existing applications and develop new ones.

Clinicians also saw the use of applications as a way to collect data from their patients. For example, some young people do not regularly take medication for ADHD. An app could be used to remind young people to eat and record what they are eating. If a young person has a low mood, maybe an app could be used to record it and share the mood with the clinician. An application can also reliably report a person's dietary intake or mood over time when attending appointments [8].

10. Discussion

The conclusions that emerge from the efforts to evaluate these applications include benefits for children and young people with ADHD. An application can improve organization and time management, reduce conflicts with parents during the morning routine, and improve academic improvement and work behaviors. We can realize through our research that many devices we have in our daily lives are used in a way that will achieve the integration of people with disabilities in society and education. It is important that new technologies, in addition to the abuse that many claims to cause, manage to provide solutions to people with disabilities. The way of using the applications is simple, user-friendly and without the need for special computer knowledge to serve users with difficulties in technological means, elderly users, or even those who have not dealt with in the past. The future is bright for the smart devices, mobile applications, and technologies mentioned as they have all the specifications to stand next to those who need them and with the necessary sensors to collect the required data and provide the necessary functional amenities. Applications with the Internet of things technologincludeud, helping adults with ADHD organize their daily activities and their day-to-day tasks. A, also Applications can be used as a tool to aid adults with ADHD in performing their activities. It is expected that with the combination of technology and occupational therapy, the person with ADHD may have even more auto very of their disabilities and further abilities with less try.

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