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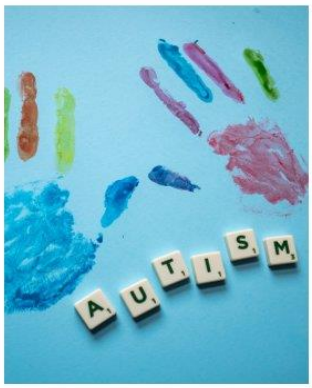
Distance Learning

for Individuals

with ASD

DiLASD



Uczelnia Korczaka

Emphasys Centre

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DiLASD - Distance Learning for Kids & Students with Autism Spectrum Disorder

Educational Multimedia Book

KA226 - Partnerships for Digital Education Readiness
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Partners: Emphasys, Ecoistituto, Include, RTA

DiLASD _ Intellectual Output 3
Edited by Interdisciplinary Network for Special and intercultural education, "Include"
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The DiLASD educational multimedia e book is dedicated to Gilberto Marzano,
the intellectual, the writer, the artist,
our friend the beloved

He will be missed by us and by the whole world, his kindness, openness, sensitivity, fiery spirit and his readiness to always be part of the solution for humanity.

His rich research and scientific work in the fields of social anthropology, social media education, computer science, and art and his collaboration with numerous research institutions in Europe, Rezekne Academy of Technologies, Udine University, Janusz Korczak Pedagogical University in Warsaw and the establishment of the Ecoistituto in Italy, testify to his restless spirit, his scientific and philosophical thinking, While his latest book "Sustaining Creativity and the Arts in the Digital Age" surprises with its penetrating look at the issues of creativity in the modern time and especially in digital era.

Gilberto Marzano
Thanks
You are in our hearts
.

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Prologue

Due to the threat posed by the COVID-19 pandemic, schools in Europe opted to switch to online remote classes with a view to keep their students and teaching staff safe during the pandemic emergency. The consequences have been tragic for students and kids with special needs. Indeed, educational institutions were not prepared for supporting them remotely. As a result, parents of children with special needs found themselves in a new burdensome situation, becoming responsible for supporting their children's education at home.

The educational multimedia e-book on remote teaching and learning for students and kids with ASD was developed by expertise partners JKPU, Ecoistituto, Include, RTA, Emphasys, from five European countries (Poland, Italy, Greece, Latvia, Cyprus) that have a long experience in the ASD scope and experimented with Remote Teaching and Learning in their countries during the schools' closure due to the COVID-19 pandemic. Professors with expertise in the field of pedagogies, special educators, Informatics decided to put together their theoretical and practical experience to realize the multimedia eBook to share knowledge to meet crucial challenges on how individuals with autism could be supported by distance to learn with the support of their caregivers. The main objective is the active learning of individuals with ASD, according to their personal abilities, through the use of digital technology. Remote teaching-learning and online assistance will decrease their marginalization, improving their self-independence and well-being in life.

With the hope that humanity never again has the need of isolation we dedicate this educational multimedia book to educators, social workers, students in social pedagogy, social volunteers involved in the social inclusion of children with ASD, associations of parents of children with ASD, higher education institutions, social services.

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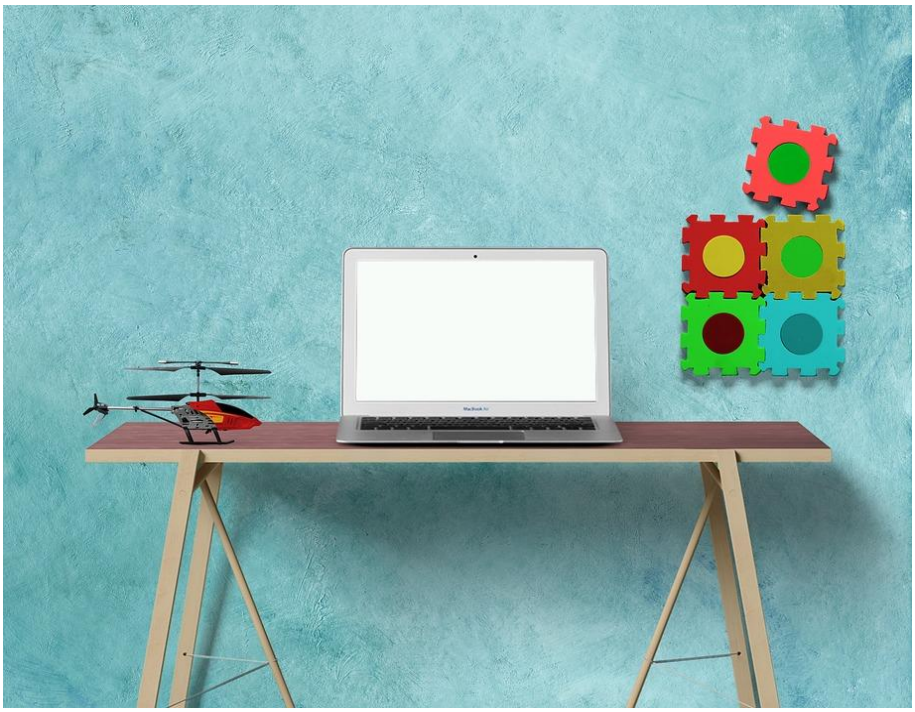

Theoretical Part

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Chapter 1

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What is autism spectrum disorder

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Abstract

This chapter provides basic information about autism spectrum disorder (ASD): what it is, the causes and the main symptoms. The following sections include the specific functioning of a person with ASD. The sensory profile of a child with ASD is briefly discussed, including the specifics of sensory functioning in a person with ASD, as well as stimming (what it is and the reasons why it appears in the behavior of people with ASD and what it means for the person). The next section presents the emotional and social functioning of a person with ASD and the problems they experience. The following section discusses contemporary perceived and current issues related to ASD, e.g.: diagnosis of girls with ASD - as a challenge for contemporary diagnosticians and therapists, monotropism - as a way for people with ASD to perceive the world, neurodiversity - as an alternative to the medical and pathological understanding of ASD. These are extremely important topics that change the perspective on people with ASD. The text concludes with a section entitled "What is worth knowing?". Here, facts about ASD that often contradict the myths and stereotypes about ASD that operate in society are discussed, as well as basic tips for those who come into contact with a person with ASD. The chapter concludes with a summary that draws attention to the huge diversity of

people with ASD and the fact that not all symptoms of ASD are pathological, and that it is worth recognizing the potential of those children (people) whose nervous system acts neuroatypical.

Key words: autism, autism spectrum disorder (ASD), etiology of ASD, symptoms of ASD, neurodiversity, sensory profile, monotropism, gender differentiation in ASD

1.1 Autism - general information

1.1.1. Introduction

Autism is a neurodevelopmental disorder. Previously, this disorder was divided into 'autism' and 'Asperger's syndrome', whereas nowadays it is more commonly referred to as autism spectrum disorder (ASD). ASD has its onset in early childhood, although not all people are diagnosed with it in childhood. Many people with ASD recognize autism as part of their identity. These individuals know that ASD causes some difficulties in functioning, but they do not recognize it as a disorder, but simply as a difference. But let's first look at this topic from the historical side.

Autism was first described by Leo Kanner in 1943. The group of children he called autistic was also described by Hans Asperger in 1944. Kanner and Asperger worked independently of each other, but both used the same word - autistic. Both described children with a specific profile of difficulties. These difficulties included isolation, the need for invariability, interest in objects and lack of interest in people, difficulties in communicating and interacting with people. At the time, the emergence of autism was mainly associated with environmental factors - the cause was seen as "refrigerator mothers" and it was the mothers who were accused of

"causing" autism in the child. Scientific research and the knowledge that has expanded with it has led to changes in both the perception of autism and the diagnostic criteria. The understanding of people with ASD and the therapeutic approach has also evolved (Silberman 2021).

Autism was first described as a spectrum disorder in the DSM-IV classification for diagnosis, which was established in 1994. It was then that this classification divided people on the autism spectrum into more specific terms, including Asperger's syndrome, autism, and atypical autism.

Since the 1990s, research has been conducted into the genetic basis of autism. Scientists have tried to find a genetic basis for each individual within the spectrum, i.e. Asperger's syndrome, autism and atypical autism separately. However, this proved impossible to detail. It has not been possible to identify separate causes and ways to adequately support each person presenting a 'different' type of autism. In addition, diagnosticians often found it difficult to categorize symptoms (as autism, atypical autism or Asperger's syndrome). In the latest DSM-V classification, Rett Syndrome was removed from the autism spectrum because it has a known genetic cause. The understanding of autism as a complex spectrum is in line with current knowledge.

Currently, it is noted that more and more children are being diagnosed as having autism spectrum disorder (ASD). These children can be found in different social groups, ASD is diagnosed among children of different races and among boys and girls. It is estimated that ASD occurs in 1 in 54 children. However, all epidemiological analyses indicate that this 'autism epidemic' is apparent. It does not show a real increase in the prevalence of ASD, but rather can be attributed to increased awareness among both the public and professionals. This is

leading to a more complete recognition of cases along with an expansion of diagnostic criteria. It appears that people with ASD who are currently diagnosed are also only 30 per cent diagnosed as intellectually disabled. The remaining people with ASD are intellectually normal. Previously, 70 per cent of children with ASD were diagnosed with an intellectual disability (Miles, 2011).

The state of knowledge today allows us to conclude that autism is a developmental disability caused by differences in the brain. When a child with ASD is observed, the following behaviors can be observed:

- problems with interaction with other people, with making contact with others;

- problems with social communication;

- repetitive behaviors, words or phrases;

- little or inconsistent eye contact;

- often the child does not point at objects to show interest;

- even when interested, may be unable to talk, play or make contact with others;

- may sometimes show a lack of interest in others at all;

- the child has difficulty adapting to change;

- some children with ASD have a higher-than-average sensitivity to smells, noises, tastes, temperature or other sensory stimuli;

- special interests (there are detailed diagnostic criteria based on DSM-5 at the end of the chapter).

Lorna Wing and Judith Gould studied the social behavior of children with ASD. Their research showed that a triad of autistic disorders is observed in a child with ASD. Firstly, abnormalities in social development. Second, deficits in verbal and non-verbal communication with the environment. And third, the manifestation of rigid patterns of behavior, interests, and activities (Pisula 2020).

However, autistic people can function in very different ways. No two people with a diagnosis of ASD are identical. Symptom profiles and severity vary widely.

1.1.2. Causes of autism

Since the diagnosis of autism and Asperger's syndrome emerged, their causes have been sought. Although there have been various hypotheses, to this day it is still not known exactly what causes ASD. Rather, ongoing research shows that there is no single simple cause. A variety of both genetic and environmental factors contribute to the onset of autism.

The first suspected causes of autism were familial. It was mainly blamed on mothers, who were considered to be frigid. Later, it was suspected that vaccines were the cause of autistic disorders in children, but this hypothesis has not been confirmed in various scientific studies (for more on this, see the scientific article: Taylor, Swerdfeger, Eslick, 2014).

It is now accepted that the causes of autism are differentiated.

Risk factors for ASD in a child currently include:

- the presence of other individuals with ASD in the family;

- genetic mutations;

- fragile X chromosome syndrome and certain genetic diseases;

- the age of the parents (the older the parents, the greater the likelihood);

- low birth weight of the child;

- prematurity (especially severe prematurity, i.e., birth before 26 weeks gestation);

- multiple pregnancies;

- viral infections suffered by the mother while pregnant;

- autoimmune diseases of the mother;

- medications taken during pregnancy;

- Turner's syndrome, Down's syndrome (Miles, 2011).

The occurrence of risk factors affects the early development of the child, including the child's brain. This is when the pattern of communication between different regions in the brain and the pattern of information transfer by nerve cells is established.

Genes are considered to be the main causative factor in ASD. However, the genetic basis is very complex. As early as the 1970s, the importance of genetic factors was recognized through studies of twins. At that time, it was confirmed that in monozygotic twins there was a 73-90 per cent chance that autism would occur in both children, while in dizygotic twins the concordance was 30 per cent. Further research has identified more than 60 genes with a

strong association with autism and more than 200 genes with a weak association with autism. In families of children with ASD, it is common to find people who have traits similar to those diagnosed as ASD. In addition, parents who do not have ASD may have autism-related genes and pass them on to their children. If a child has autism genes and, in addition, there are risk factors in the environment, they are more likely to be on the autism spectrum (Miles, 2011).

Environmental factors include complications occurring during pregnancy, undelivered or carried pregnancies, taking certain medications during pregnancy (e.g., medication for epilepsy), gestational diabetes, hypoxia at birth, low birth weight, a child born after a short interval between pregnancies (Modabbernia, Velthorst, Reichenberg, 2017; Grabrucker, 2013).

It is difficult to distinguish precisely the environmental factors, as it is not easy to eliminate their mutual influences, so it is not possible to answer precisely the question of which factors have a particular impact on the development of ASD.

1.1.3 General characteristics of a student with ASD

Attention - a pupil with ASD may be more interested in objects, paying less attention to people, facial expressions, voice, gestures. In girls, less interest in people is not obvious.

Social motivation - the child may not seek interaction with others and may not feel motivated to share experiences. Such children may prefer to spend time alone or next to other people rather than with them.

Use of social gestures - children with ASD may not use gestures to communicate with others (not pointing to things that interest them), and often do not respond to other people's gestures, appearing as if they do not understand them.

Mimicking others and swapping roles - often children with ASD do not take the opportunity to imitate the sounds or actions of others. They may be less interested in play where interaction with others is important. This trait may be quite different in girls, who may imitate others and thus mask the symptoms of ASD.

Play - children with ASD may play monothematically. Instead of exploring new objects and using them creatively in play, they remain focused on familiar objects and repeating the same games. The disruption of play is stressful for children with ASD. Often these children prefer solitary play to play in the company of peers.

A child/student with ASD may have more problems than a peer with executive functions (planning and organizing activities, working memory, inhibition and impulse control, self-observation and reflection, time management, figuring out the most important things, understanding abstract concepts, using new strategies).

Sensory sensitivity - children with ASD may be hypersensitive to some stimuli (e.g. certain sounds, smells, tastes, tactile stimuli, light) and at the same time sub-sensitive to others. Thus, they may be easily overstimulated on the one hand. On the other hand, a child with ASD may also seek certain sensations due to too few stimuli of a certain type (Rogers, Dawson, Vismara 2015, Furgal, 2022, Hendrickx, 2018).

1.2 Specificity of functioning of a person with ASD

1.2.1 Sensory profile of a child with ASD

Every person has a unique sensory profile, i.e., the way they perceive and process information coming through their senses. Researchers' findings have long pointed to the specific processing of sensory stimuli by people with ASD (Delacato 1995), so it is worth paying more attention to this topic.

The sensory profile of an individual child with ASD describes their responses to visual, auditory, gustatory, tactile and olfactory stimuli, as well as their sense of balance.

In a particular child, it may include his or her hypersensitivity to a particular type of stimulus (e.g. sounds, smells, tastes) and, at the same time, less sensitivity to other stimuli (again, this may include tastes, smells, tactile stimuli, visual stimuli, etc.). This profile can also change dynamically and may not be constant at all times. It is worth taking into account that studies show that the sensory profile of girls is more disturbed than that of boys (Rynkiewicz, Lucka 2018).

This specific way of receiving and processing sensory stimuli means that often a child with ASD may experience sensory overload. Such overload may result in outbursts of aggression, crying, screaming, shutdown, withdrawing from interpersonal relationships. A child with ASD can be sensory overloaded on an almost daily basis. This is very difficult for the child themselves and those around them. As Ewa Furgał (2022) writes, it is not always possible to avoid situations that lead to overload. Sometimes this is hindered, for example, by the place

of residence (noisy city or neighborhood) or by the need to be at school every day in a peer group due to the laws in force in a particular country (the need to fulfil compulsory schooling or compulsory education). Sometimes overload is also caused by the fact that the person with ASD wants to be in certain situations because they are enjoyable. In the case of a child, this may be the desire to spend a long time in the playground with other children. This will be an enjoyable and at the same time overloading experience. Sensory overload will be related to the physiological stress response of the body. Too much stimulus for the body to cope with raises the level of mobilisation and stress hormones. It is therefore important to adapt the environment (as much as possible) to the needs of the individual person with ASD.

It is important to emphasize the fact that not all people with ASD will have the same problems related to sensory functioning. Every child and every person with ASD is different. This is why a 'spectrum' of autistic disorders is referred to.

1.2.2 Stimming

Stimming, i.e., a person's repetitive behaviors, deserve special attention. Every person has behaviors that he or she repeats and that soothe him or her and give emotional relief. This could be tapping one's fingers, moving one's feet, fidgeting in a chair. People with ASD have more stims than the average person.

Examples of stimming in a student with ASD:

- waving hands,

- rocking in different directions,

- rubbing things,

- making different noises (e.g., grunting, singing, mumbling, buzzing, moaning),

- playing with different objects,

- rotating objects in front of their eyes,

- twirling objects.

In girls, stims may take a different form. An intellectually normal girl with ASD can figure out quite quickly which behaviors are not socially acceptable. Often, therefore, girls will replace visible stims with ones that are invisible and do not attract attention. Examples of such behaviors are combing their hair, wrapping their hair around their finger, touching their face, gesticulating excessively, biting pencils and pens, biting their lips or other frequently repeated movements that are not very conspicuous to other people. Some stims may progress to self-aggressive behavior, e.g. pulling one's hair out, biting the cuticles near the nails, biting one's lips into blood (Furgal, 2022).

Stims can be disruptive to those around them, but it is important to remember that they serve an important function for the person with ASD, namely to reduce emotional tension. If those around the child forbid them from using their own stims, there is a good chance that the child will find another behavior (not necessarily safe) to help them cope emotionally in different situations.

It used to be thought that a person with ASD should be taught to use stims. It is now rather recognized that this is simply a symptom of neurodiversity. Left-handedness, dyslexia and ADHD, for example, are now seen in a similar way (more on neurodiversity later).

1.2.3. Emotional development and social functioning

Children with ASD often have difficulty describing emotions. In addition, it has been found that they may be more prone to anxiety disorders and depression, problems with anger control and problems expressing positive feelings (love, friendship).

A higher proportion of people with ASD have emotional problems:

- 40 per cent of people with ASD have elevated levels of anxiety or one or more anxiety disorder;
- 30 per cent of people with ASD have a Specific Phobia;
- 17 per cent of people with ASD have Obsessive-Compulsive Disorder (OCD) (Meier et al. 2015).

But it can be difficult to diagnose anxiety disorders due to communication problems in the child / person with ASD, and the fact that anxiety can manifest itself in hitting, tantrums, running away, avoiding new tasks (Sarris 2020).

The statement that people with ASD are less empathic can often be found. Damian Milton (2012) sees this problem more broadly. He notes that people with ASD may struggle to understand neurotypical people, but neurotypical people also struggle to understand people with ASD. Milton places this phenomenon in a wider social context. The problem of dual empathy arises here. It is a problem in the context of the functioning of a society in which both autistic and neurotypical (non-autistic) people live. Problems with socializing may not so much be a symptom of autism as a consequence of being autistic among non-autistic people. People may not understand a child with ASD, the child may experience exclusion and as a result have even more problems with social interactions.

Deficits in social skills are one of the main characteristics of children with ASD. These children have problems in making and maintaining friendships, communicating feelings, self-control in behavior, controlling emotions, solving social problems, anger management and generalizing social skills (repeating them in different environments). Social skills are acquired through learning: observing the behavior of others, modelling, rehearsing and receiving feedback.

The combination of difficulties in social interactions and difficulties in problem solving makes a child with ASD even worse off. It is therefore important to know ways to support children and young people with ASD. One way that can be used is the POWER method. The steps of POWER-Solving® include:

Put problem into words

Observe feelings

Work out your goal

Explore solutions

Review plan. (zob. Selbst, Gordon 2014)

1.2.4. Special interests of the student with ASD

Pupils/peers with ASD often show an above average interest in certain topics. It is usually noticeable that the degree of interest in a particular subject exceeds the interests/hobbies of the average person (especially a peer of a child with ASD).

Although people with ASD may have a variety of learning, behavioral or social difficulties, they often also have a variety of strengths. These include precisely the degree of involvement in hobbies or interests, creativity, willingness to learn (Kircher, Ruch, Dziobek 2016). It is worth

seeing these special interests as a resource and not as an affliction, a symptom of ASD that needs to be addressed.

The special interests of children/people with ASD can vary by gender. In boys these are often technical passions, interests related to numbers, dates, vehicles etc. In girls, on the other hand, the passion may be and typically boyish passion (some specialized interest that transcends age), but also may not be dissimilar to that of neurotypical individuals, but will still vary in intensity (Furgal, 2022).

Often, the passions of people with ASD become a life goal for them, give life meaning, and provide a great deal of satisfaction. The degree of involvement is sometimes referred to as 'fixation' or obsession. Therapists then focus on extinguishing these behaviors. However, it is worth noting that special interests can serve a variety of functions, e.g. they can help to cope with anxiety, provide pleasurable experiences, allow for relaxation, provide predictability of events, help to understand the world (and sometimes create an alternative safe world for oneself), provide opportunities for intellectual development, identity development. Sometimes a person with ASD immersed in deepening their knowledge of a topic that fascinates them experiences states of deep flow (flow) (Csikszentmihalyi, 2022). This is the state in which, as Csikszentmihalyi writes, one feels happiest, on the one hand, and on the other leads to exceptional results from the work undertaken. The ability to enter this state can be a great resource for a person with ASD.

It is therefore worth seeing the positive side of the special passions of people with ASD and supporting them. They can be the basis for future professional activities, for example.

1.3 ASD - new challenges

1.3.1. Autism Spectrum Disorder in girls

It is worth noting that ASD is diagnosed less frequently in girls. Previously, the profile of a person with ASD developed by autism researchers only took into account its male pattern. However, it has been increasingly mentioned by experts in the field that there should be a deeper understanding of autism spectrum disorders in women and girls (Lai et al. 2011). Learning more about the girl profile of ASD will enable girls to be diagnosed more accurately and given the necessary support in their development. Research and observations in recent years have shown that the symptoms of ASD in girls and women differ from those in boys and men. Diagnostic tools have been found to diagnose boys most readily and to overlook some girls' ASD symptoms (Lockwood et al. 2021). A particularly difficult situation is caused by the high masking of ASD symptoms by girls. Because social and communication skills were considered a marker of ASD, and girls typically score higher in these ranges, only girls with lower IQs were diagnosed. These girls were less able to mask the symptoms of ASD (Furgal 2022). The breakthrough came with Donna Williams' autobiographical book 'Nobody Nowhere: The Extraordinary Autobiography of a Autistic Girl' published in 1992. Also important for understanding ASD in girls was Liane Holliday Willey's book 'Pretending to be Normal: Living with Asperger's Syndrome' (2014, first edition published in 1999). In this book, the author showed the assimilation strategies of girls with ASD.

Research (Kopp and Gillberg, 2011) has shown that certain behaviors typical of ASD are more frequently observed in girls. These include avoidance of demands, lack of attention to physical superficiality, tremendous determination, and making contact mainly with children younger than oneself. In contrast, Lai and colleagues (2011) found that those diagnosed with ASD in childhood were - regardless of gender - similarly autistic. But in adulthood, women with ASD showed less difficulty in social communication. The authors speculate that this is the result of compensatory strategies. However, it can be difficult for a girl or woman with ASD to maintain this type of behavioral style at times of stress, in unexpected situations or for long periods of time. These situations make it difficult for a girl/woman with ASD to maintain the 'facade', the appearance of neurotypical behavior. This proves to be an emotionally costly strategy (Hendrickx, 2018, Cridland et al. 2013, Hull et al. 2020).

It is characteristic of girls with ASD that problems in social interactions increase with age. Over time, relationships with peers become more complicated. This is particularly evident in adolescence. Neurotypical girls develop increasingly diverse relationships, and girls with ASD stop keeping up with these changes and with their peer group. Characteristically, girls with ASD remain focused on their own interests. Girls with ASD are able to maintain a semblance of neurotypicality for a long time, but, as Zener's (2019) research shows, girls with ASD's perception of their lives is different. Female respondents with ASD saw their lives as frightening, unpredictable, and reported that various events overwhelmed them and caused confusion. Girls with ASD often experience isolation, loneliness, which affects their self-esteem, feelings of being misunderstood, and lowers their self-esteem.

Additionally, girls are prone to anxiety and depressive disorders. They are hospitalized more often than boys for this reason (Rynkiewicz, Lucka 2018). Disorders that are more common

among females on the autism spectrum also include eating disorders, autoimmune diseases, ADHD (attention deficit hyperactivity disorder), ADD (attention deficit disorder).

1.3.2. Monotropism

If we want to deepen our understanding of how people with ASD learn about the world, we should pay attention to the concept of monotropism. Well, it is a cognitive strategy that is considered to be typical of autistics. The mind of such a person focuses attention on a small number of stimuli or interests at any one time. At such a moment, other stimuli are overlooked and are considered unimportant (they remain outside the tunnel of attention).

The theory of monotropism was developed in the 1990s by Dinah Murray, Wenn Lawson and Mike Lesser. It was published in the journal Autism in 2005 (Murray, Lesser, Lawson 2005). This way of focusing attention affects the whole functioning of a child, a student or a person with ASD in general. On the one hand, it is related to the omission of stimuli outside the 'attention tunnel', the difficulty to focus on another activity or to shift attention to another task. On the other hand, such focus can lead to intense experiences, triggering deep thinking, experiencing the flow states mentioned above. Pulling a person out of a deep monotropic state (e.g. by attempting to verbally make contact) can be unpleasant, hence Murray et al. (2005) conclude that some people, in response to this experience, shut down communication.

Attention, however, is most often focused on what activates it most at that moment. This causes difficulties in those situations where a wide range of attention is needed, and this is the case in social situations and interactions with other people (even the typical, conventional ones).

Let's look at what difficulties monotropic students may experience. In school, students are often expected to process multiple stimuli at one time. Multitasking is also often promoted. In the older grades it seems obvious that students should take notes while listening, and for students with ASD this can be a huge challenge (Bogdashina 2003). People with ASD may find it difficult to simultaneously understand what someone is saying to them and read their facial expressions. These difficulties may result in avoidance of environments with multiple sensory stimuli, especially as these individuals often have a variety of sensory hypersensitivities (Bogdashina 2003). In such children, there is a tendency to deepen interests rather than broaden interests.

If we consider that the diagnosis of ASD includes the occurrence of restricted and repetitive behavior, it can be seen that a monotropic cognitive style leads to exactly that. The monotropic person has difficulty shifting attention to another object or activity. Externally, this may look like obsessing over an object or creating rituals (the monotropic focus of attention in some people is so strong that they may not even feel pain).

Due to the above-described peculiarities of how a monotropic person functions, they offer the following tips:

1. Motivate connections with other people, and positive views about society, through the individual's interests: 'Start where the child is.'

2. Ensure connections are acquired through the pursuit of an individual's own interests; endogenously motivated links will be stronger and more stable.

3. Improve understanding in order to correct false or partial connections.

4. Reduce task demands in complexity, time pressure and irrelevant stimuli.

5. Make tasks meaningful: if tasks and ideas are conveyed in small portions, ensure that the overall relatedness of the parts is understood". (Murray et al., 2005, p 153)

1.3.3. The concept of neurodiversity

Neurodiversity is a term that was introduced by sociologist Judy Singer in 1996. She is a researcher who herself lives with ASD. She initially used the term in her thesis, and later the term 'neurodiversity' was promoted by the American journalist Harvey Blume. It was intended to show the diversity of human neural circuits, which leads to different ways of functioning in different spheres (e.g. social life, learning, attention, mood, mental functions). Later in 2015, Steve Silberman's book ('Neurotribes: The Legacy of Autism and the Future of Neurodiversity') was also published. These were important turning points in the perception of ASD.

The promotion of neurodiversity aimed to draw attention to the diversity of people (including people with ASD) and to reduce the tendency to pathologize different ways of functioning.

This view is also linked to the emergence of a social model of disability alongside the previously prevalent - medical model of disability (Barnes, Mercer, 2008).

In the medical model of disability, the aim is to identify the symptoms in a person with a disability, find the causes and then reduce the symptoms, eliminate the deficits that are characteristic of the type of disability. With this approach, the condition of the person with a disability is often determined by external symptoms (e.g. behavior), and almost all decisions are put in the hands of professionals and parents (or other family members), disregarding the opinion of the person with a disability.

The social model of disability, on the other hand, draws attention to the fact that some of the difficulties experienced by people with disabilities are not due to the difference itself, but to the social situation in which these people find themselves.

The neurodiversity movement emphasizes the need to accept difference without denying the existence of difference. Initially, the term was mainly used by self-advocates with ASD. Nowadays, the term 'neurodiversity' is increasingly appearing in scientific research as well as in media coverage.

According to proponents of neurodiversity, the brain of a person with ASD is not pathological, it just presents a different pattern of functioning, a different way of processing information, a different way of processing sensory stimuli, different ways of emotional functioning, different learning and memory processes. 'Neuroatypical' people include people with ASD, people with ADHD, dyslexia, left-handedness people, persons with speech disorders, with Tourette's syndrome, dyscalculia, intellectual disabilities, psychiatric conditions (schizophrenia, bipolar affective disorder, schizoaffective disorder, dissocial personality, obsessive-compulsive disorder) etc. The movement promotes the acceptance, understanding and inclusion of people with ASD (and other neurodiverse nervous system patterns) into the normal stream of life while offering them support. People who talk and write about neurodiversity also show what the positive effects of being a different person can be (Kapp et al. 2012).

A child with ASD will perceive the world differently and may behave differently. However, in recognizing his or her right to be different, it would be important to consider how his or her potential can be realized without pressure to become like neurotypical people. Diversity advocates promote support systems, for example: integration-oriented services, communication support and provision of assistive technology, vocational training and support for independent living. The aim is to support people with ASD in such a way that they can continue to be themselves and express themselves, without treatment or being forced to adopt the norms and standards of the majority.

Research shows that taking a different view (changing from a medical/pathological view of ASD to a social model and recognizing neurodiversity) makes a huge difference to people with ASD themselves, as well as their families and society at large. For example, an online survey was conducted by the team of Kapp et al. that included people with ASD, their families, friends of people with ASD, professionals, as well as people not related to the ASD community (a total of 657 people participated in the survey). Through the survey, the evaluation of the concept of autism in the medical model as well as perceptions of the neurodiversity movement were tested. It was found that perceptions of autism as neurodiversity were associated with a positive identity that does not require treatment. The research team concludes that it is important to recognize a deficit-as-difference conception of autism, in which individual neurological conditions may represent important aspects of human diversity (Kapp, Gillespie-Lynch, Sherman, & Hutman, 2012). In another study, Griffin and Pollak (2009) examined 27 individuals with autism, dyslexia, coordination disorder, ADHD and stroke. Semi-structured interviews conducted among these individuals showed two categories of identity as 'neurodiverse'. The first neurodiversity was seen as a difference incorporating a set of strengths and weaknesses. The second neurodiversity - 'medical/deficit' view -where neurodiversity was seen as a disadvantageous medical condition. Although all students reported a variety of school difficulties (e.g. exclusion, bullying, abuse), findings showed that students in the first group showed higher self-esteem and confidence in their abilities. Many of those with ASD had high career ambitions and clear life goals. Many of these students were also in contact with neurodiversity advocates through online support groups.

1.4 What is worth knowing?

1.4.1 Facts about ASD

Autism is a different way in which the brain functions. However, there are many myths around autism or such knowledge that have already been corrected by ongoing research and by people with ASD who are aware of their difference and can communicate how they see the world. The following are facts about ASD that are not necessarily known - sometimes these facts even have to compete with entrenched stereotypes, myths, and false beliefs (in creating the section on facts about autism, I used guidance from Dariusz Chojnowski - a person with ASD, teacher and therapist for children and young people with ASD, and I would like to thank him sincerely for gathering and pointing out this information).

Fact 1

People with ASD are many. Some people think there are more and more, but the fact is that we now have better and better diagnostic tools. It is now easier to diagnose the autism spectrum and help a child or even an adult.

Fact 2

Autism occurs in both boys and girls. Previously, ASD was mostly diagnosed in boys because doctors recognized the 'boy profile of ASD'. Now we know more and more about the specificity of ASD in girls and women.

Fact 3

Autism does not pass with age. A child with autism will also be autistic in adulthood. What can be done is to help him or her understand themselves, understand the world they live in and learn to cope with it.

Fact 4

There is no 'other' person inside a person with ASD. A person with ASD is simply a different person from a neurotypical person.

Fact 5

Autism is not an intellectual disability. People with ASD may have an intellectual disability, but they may also be intellectually normal as well as above normal. A person with ASD may also have other developmental difficulties such as a learning impairment or attention deficit/hyperactivity disorder (ADHD), a mental health disorder such as depression, OCD, PTSD or agoraphobia, or a behavioral disorder such as oppositional defiant disorder or conduct disorder. These additional disorders may (but do not necessarily) exacerbate the difficulties associated with ASD.

Fact 6

Not everyone with ASD is exceptionally gifted or has outstanding abilities. Among people with ASD, there are those who have outstanding abilities, but there are also those who do not have them and function completely average.

Fact 7

People with ASD do not form a homogeneous group. Each person with ASD is different, each with their own individual sensory profile (hypersensitivity and less sensitivity to certain sensory stimuli), talents, limitations, passions.

Fact 8

Vaccines do not cause autism.

1.4.2 Basic guidelines when interacting with a person with ASD

1) Get to know that particular person with ASD - don't assume you know them because you have knowledge of ASD. Recognize his or her individuality.

2) Accept their differences (e.g., characteristic stims, hypersensitivity of certain senses, need to provide themselves with certain tactile, auditory, visual stimuli).

3) Try to get to know and understand her different way of seeing the world.

4) Notice positive traits and behaviors. Some of these are also a symptom of ASD and at the same time are valued qualities (e.g., loyalty, perseverance, honesty, integrity, intelligence).

5) Discover the strengths of the person with ASD.

6) Examine why the child/young person with ASD is having problems in a particular situation. Try to discover the cause. If successful, eliminate the causes of the difficulties first and then correct the behavior.

7) Remember that a child with ASD is also influenced by other factors such as age, gender, personality, character, inherited traits, talents, people around them.

8) Provide opportunities to develop interests and passions (music, computers, books, etc.). Use these passions in other areas of the child's life (e.g., learning, motivation).

9) Use visual information, reinforce statements with pictures, captions.

10) Emphasize the uniqueness and uniqueness of each person (including people with ASD).

1.5 Summary

Autism spectrum disorders (ASD) are associated with differences in communication, learning and behavior, although they may look different from person to person. People with ASD may have a wide range of strengths, abilities, needs and challenges. For example, some people with autism are able to communicate verbally, have a normal or above average intelligence quotient and live independently. Others may not be able to communicate their needs or feelings, may struggle with disabling and harmful behaviors that affect their safety and wellbeing, and may depend on the support of other people in all (or selected) areas of their lives. Additionally, for some people with autism and otherness may not cause any suffering for themselves. However, their suffering may result from barriers imposed by social norms, causing social exclusion and inequality.

Supporting neurodiversity in school can be very important. Barriers usually arise as a result of ignorance, stigma and lack of appropriate infrastructure (e.g. school organization, classrooms). Understanding and embracing neurodiversity in society, in schools, in various other places can improve the inclusion of all people. It is important to create environments that foster neurodiversity. It is also important to recognize neurodiversity and provide individual support to meet needs, as well as highlighting the individual strengths of people with ASD.

Modern technology provides great opportunities to adapt educational materials to the specific needs of students with ASD. This provides the opportunity to capitalise on different learning styles, cater for different needs, and respect different behaviours.

Diagnostic Criteria for Autism Spectrum Disorder

To meet diagnostic criteria for ASD according to DSM-5 (American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed.), a child must have persistent deficits in each of three areas of social communication and interaction (see A.1. through A.3. below) plus at least two of four types of restricted, repetitive behaviours (see B.1. through B.4. below).

A. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently or by history (examples are illustrative, not exhaustive; see text):

1. Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions.

2.Deficits in nonverbal communicative behaviors used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication.

3. Deficits in developing, maintaining, and understand relationships, ranging, for example, from difficulties adjusting behavior to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers.

Specify current severity:

Severity is based on social communication impairments and restricted, repetitive patterns of behavior.

B. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history (examples are illustrative, not exhaustive; see text):

1. Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypes, lining up toys or flipping objects, echolalia, idiosyncratic phrases).

2.Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior (e.g., extreme distress at small

changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat same food every day).

3.Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests).

4.Hyper- or hyperreactivity to sensory input or unusual interest in sensory aspects of the environment (e.g. apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement).

Specify current severity:

C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life).

D. Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.

E. These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay. Intellectual disability and autism spectrum disorder frequently co-occur; to make comorbid diagnoses of autism spectrum disorder and intellectual disability, social communication should be below that expected for general developmental l

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Chapter 2

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Social Communication in Autism

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Abstract

Social communication, the synthesis of social and communication skills, is strongly connected to both emotional and cognitive development. The Innate social adaptation abilities that first become apparent in infants' perceptual field, result in their predisposition to selectively attend to other human beings visually and auditorily. In childhood, there are various communication differences and delays that differentiate autistic children from typically developing children. Autistic children show a reduced frequency of orienting to social stimuli and reacting spontaneously during communication, while other abilities necessary for social communication. Due to the cognitive difficulties in processing the information they get from the environment it is very painful for them to understand the way our society works and that is why they seem alien to this society. Social communication skills and suitable intervention for the autistic children are of great importance and discussed further.

2. What is social communication?

Social communication, according to the American Speech-Language-Hearing Association (ASHA), consists of the ability to communicate or interact with others within a social context. Social communication described by Winner (2011) as “the ability to effectively adjust one's behavior based on a situation and what one knows about the people in the situation so that people react and respond in one with the way they hope. Social communication is defined as the interdependence between social interaction, social cognition, pragmatics and linguistic processing (Adams, 2005).

Social communication is the synthesis of social and communication skills. Therefore, refers not only to the ability of the individuals to communicate their needs, but, also, to the ability of communicating in order to interact with other people.

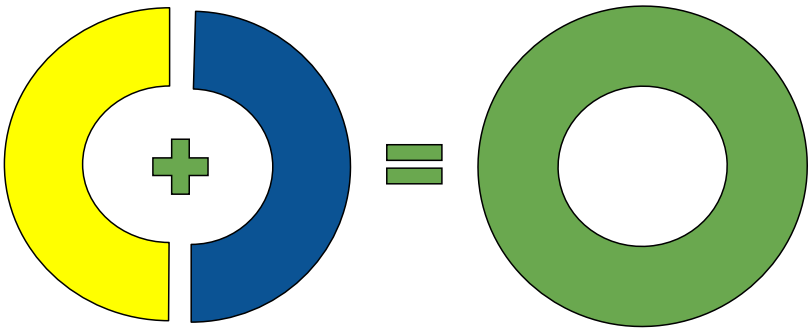

Fig. 1 The synthesis of the social and the communication skills is the

2.1. Why is social communication important?

The Importance of Social Communication - Barry M. Prizant | MedBridge - YouTube

Social communication is linked to both emotional and cognitive development. The infant looks at us interactively, so he connects with us emotionally while at the same time learns through our movements and words. That is, through us he learns how to learn, a skill particularly important for his cognitive path.

Social skills combined with communication/language skills are activated and allow each of us to communicate effectively in our various social environments (at home, at work, with friends, in a formal setting, etc.). To be able to communicate effectively many of our abilities are activated at the same time. It requires us

- to have original ideas,
- know why and want to share them, and
- have a common code with those around us to share them effectively.

Good social communication is the best means of preventing behavior problems. The better we know how our child feels and reacts, the better we can deal with tantrums or other difficult behaviors.

For some of our children, these abilities have not emerged or are malfunctioning. So, some of them may not have original ideas, they may not know that if they share them, they will

"influence" the behavior of those around them (intentional communication) or they may not wish to do so. Other times we meet children who do not have the means, i.e., they do not yet have sufficient language code to communicate effectively.

2.2 How is Social Communication Acquired?

During development, the child not only learns what to say but also how, where, to whom and under what conditions. By social communication we mean the infant's predisposition to communicate with us. For example, from a very early age we talk to him and he smiles at us, or when we are not paying attention, he makes noises to get our attention. Thus, social interaction with both parents and caregivers is present in every day activity.

The acquisition of basic communication behaviors begins at birth and lasts until the age of 18 to 24 months. It would be very difficult to examine the child's communication development in isolation from the social domain, and this is because the child develops communication skills based on his innate abilities to

Social interaction contributes to its further development. Innate social adaptation abilities first become apparent in infants' perceptual field and result in their predisposition to selectively attend to other human beings visually and auditorily. Thus, infants display a number of signaling mechanisms designed to ensure the approach of others and the development of social interaction. Such mechanisms are for example behavioral manifestations such as crying and smiling (Schaffer, 1996). Infants, based on the above mechanisms, develop their communication skills long before they acquire the skill to

they use the spoken word.

Communication begins with:

• the utterance of the first sounds and cries produced by the infant,

• the development of eye contact and turn-taking

• with the movements used in communicative content.

From birth to the age of 18 months, the child through social interaction and interaction with adults (communicative framework) understands the concept of communication. Only through interaction with adults does the infant master the concept of communication, i.e., what communication consists of. The child will later rely on this key knowledge to acquire speech. The mastery of basic communication skills that takes place up to 18 months is of significant importance for the subsequent development of speech (language development) since basic communication skills constitute the pragmatic level of speech, i.e., its use in the social context.

Bates (1976) explains that the remaining two are derived from pragmatic discourse.
Semantic and syntactic. Specifically, it is argued that semantics emerges developmentally and logically from pragmatics, in the same way that syntax seems to emerge from semantics. From the 24th month onwards, the child makes the transition to symbolic communication using and developing the language skills and structures of his native language. He is getting closer and closer to them
Rules of language (Bruner, 1974/75; Bates et al., 1977).

The development of communication in children with autism follows the same Course as the development of normally developing children. However, it is blocked in different ways at various developmental stages. Depending on children's mental ability and degree of autistic disorder. The development of communicative behaviors in children with autism is different from the normal developmental sequence. While in the normal development of communication the individual functions appear simultaneously, the development of communication in children with autism occurs

more in a sequence. The model of communicative development followed by children with autism differs both quantitatively and qualitatively from the typical prelinguistic development series. Due to the extraordinary diversity and differentiation observed within the contexts of the autism spectrum, we cannot generalize the data we provide about early communication development to all children with autism. If we follow the model of Bates, Camaoni & Voltera (1975), in the first months of life all infants, even those with autism, are in the first stage of their development, the so-called "dialectical" stage or the stage of unilateral communication (perlocutionary stage). Research (Ricks 1975, Wing 1976) indicates that signs of autistic disorder are evident from early infancy and correlate with the quality of crying, which is produced in an idiosyncratic mannerist tends to be monotonous and difficult to understand. Nevertheless, infants with autism have been found to express through crying the same emotions as normally developing infants (request, lack, greeting, surprise (Ricks 1975). As a result, around 6 months of age the interpretation of the meaning of crying is difficult while at 8 months it is observed limited or unusual squealing/linguistics (e.g., squeals or screams). The severe deviation in communication development in infants with autism begins during the second stage of the Bates model. In this stage, which is called "illocutionary", an absence is observed imitating sounds, gestures or expressions. Specifically, some infants with autism do not establish the required eye contact and do not participate in the "turn-change" audio game (Ne Wilson, 1979). Also, they do not use pointing as a means of communication behavior to attract or direct their attention Taking initiative includes expressing desire or taking initiative with adults. Around 12 months, the first words are likely, but they are often not used appropriately. The cry remains frequent and loud and therefore its interpretation becomes difficult among children with autism, those who are high-functioning or who have Asperger's syndrome may display proto-inhibitory behaviors, i.e., they declare their desire to the adult in order to be satisfied. However, they do not develop proto indicative behaviors, i.e. they do not direct the adult's attention to an object with the aim of changing his mental state (they do not indicate the location or existence of an object due to their difficulty in defining their own personal space and by extension declaring something beyond themselves idea behind this behavior is that she understands

the theory of mind, which, as stated above, is disrupted in individuals with autism; this behavior assumes the other doesn't know or didn't notice something. sm. A large percentage of children with autism ranging between 50%-80% (Jordan 1996) move into the third stage of Bates et al.'s model. the so-called "declarative" and develop oral reasons they have not yet passed the developmental stages of communication, their speech is limited and primarily used to ask for something or repeat stereotypically something that interests them. Thus, at the age of 24 months, a vocabulary smaller than 15 is observed words. Often words appear and then are abandoned while not gestures are developed. Few children point to objects. At the age of 3, words are rarely combined, possible echolalia of phrases while the creative use of language is absent until very limited. By the age of 4, few children are able to creatively combine 2-3 words. Echolalia remains and can be used communicatively. Autistic children imitate TV commercials and make requests.

2.1. What are Social Communication Skills

https://www.youtube.com/watch?v=iPTUsaRZplI

Social communication involves three basic skills - with many separate ones:

A) Using language for different purposes, such as (but not limited to):

Greeting: We say "hello" or "goodbye" or "thank you".

Update: "I'll have a cookie."

Claim: "Give me a cookie now."

Promise: "I promise to bring you a cookie when I get back."

Request: "Would you give me a cookie, please?"

B) Changing the manner of speaking depending on the listener or the situation, such as:

We speak differently to a baby than to an adult.

We give more information to someone who doesn't know what we're talking about.

We consciously/intentionally leave out some details when someone already knows the subject.

We talk differently in a school classroom than we do on the playground.

C) Following rules when we dialogue or narrate something, e.g.:

We talk in turn; one does not monopolize the conversation.

We inform others about what we want to discuss but also when we change the subject (e.g., "talking about the summer..." or "since the conversation brought it up...")

We stay on topic.

We try another way of saying what we mean when someone doesn't understand us (e.g., “sit down, I mean…”)

We use gestures and body language, e.g., we shrug our shoulders when we say "how should I know".

We are careful how close we stand to someone when we speak to them.

We use facial expressions and look at our interlocutor. We nod in agreement, shake our head disapprovingly, etc.

What should I expect from my child at each age, in relation to social communication?

In the table below you can see the stages of development for Social Communication. It is particularly helpful to understand what stage our child is at and if

Age:	Skills
0-18 month	Brings objects to an adult to show. They try to gain attention using sounds, gestures, and grabbing with his hand. They wave his little hand to say hello or goodbye or approach the word "hello". Ask for things using gestures, sounds or words (e.g. reaching for the cookie cupboard). Protest by shaking the head, shouting or pushing an object away. Comment on an object or action by drawing the adult's attention, pointing, calling, or saying a word (eg, pointing to the dog and saying “wav-wav” with the intention of pointing the dog to the adult). Look at the speaker or respond with facial expression, voice or words when someone speaks.
18-24 month	Use words or short phrases for various language functions (e.g., to greet: “hello”, to protest: “no”, “mine”, to make a statement: “blue ball”, to give an order: they say "ball" and show it to you so you can go get it). Use phrases like "What's that?" to attract attention. Name things in front of other people. Begin to take turns in speech.

2–3,5 years	They can assume the role of another person in the game. Make more turns in verbal interactions. They begin to recognize the needs of other people and speak differently to a baby than to an adult. Respond to the interlocutor's messages by saying things like "yes", "ah!", "ok". Begin to use vocabulary for imaginary and symbolic play. Ask for permission to do things (eg, “Mommy, can I go outside?”). They start correcting others. They are able to do simple narration and begin to guess what might happen in a story (making inferences).
4–5 years	Can use terms such as "this", "that", "here" and "there" correctly. Use language more and more often to discuss feelings. Use indirect requests (e.g., "I'm hungry" instead of "I want your chocolate"). Storytelling begins to develop more and the child can describe a sequence of events (e.g., “The man is on the horse, he will jump over the fence and then go home”).
5–6 years	The ability to tell stories develops further and the child is now able to tell a story with a central character and a logical sequence of events - although he may have difficulties with how to end the story (e.g., 'Once upon a time' once upon a time there was a little girl called Littlefinger and she had a sister and a brother and she liked to walk in the forest. One day..."). They start to threaten and even insult ("If you do that again, I'll tell mom!"). They can praise someone (“Well done, you did it”).

	Begin to make promises (e.g., “I swear/I promise I'll do it tomorrow”).

2.2. important Cognitive Skills in social communication

2.2.1. Joint focus of attention

At the age of 8-12 months, the joint focus of attention begins to appear in the infant.

That is, the ability to focus his attention on another object in order to communicate with the adult.

At this stage the infant toys or objects together with the parent create a triadic relationship.

The infant has begun to interact and participate in activities and games with greater interest!

Joint attention is an important developmental achievement for communicative development (Bruner, 1983).

2.2.1.1 Why is joint attention important?

The infant's ability to follow with interest what is shown to him with the eye or finger and to maintain his attention on objects helps the child to learn the connections between the language he hears every day and the objects, events and concepts that he represents. For example, when we are looking at a book together with your baby and we say to him “Where is the cat? Point at me." or when we leave a place we say "Say goodbye to grandma." , in this way we help it understand the language of adults, while at the same time it learns to communicate and interact with them.

2.2.1.2. Joint Attention and Autism

But we often observe that infants and toddlers who show autistic elements have not mastered this skill or it is developed to a very small extent.

At the age of 12-13 months or even earlier, we expect an infant to follow with interest what we show him with our eyes or fingers and to maintain his attention on objects. However, in infants and toddlers who show early symptoms of Autism, this does not happen naturally, but requires education and intervention from the environment. This is why it is important for parents to monitor their child's social and emotional skills.

2.3. Non-verbal communication and Social Skills

Social Skills of Children with Non-Verbal Communication

When we interact with other people, we are constantly sending and receiving silent signals. All of our non-verbal behaviors, the gestures we make, the way we sit, how fast or how loudly we speak, how close we stand, the eye contact we make, send powerful messages. These messages don't stop when we stop talking. Even when we are silent, we communicate non-verbally.

Non-verbal messages allow people to:

- To amplify or modify a verbal message. For example, someone might move their head vigorously while saying "yes" to emphasize that they agree with their interlocutor. A shrug

of the shoulders and a sad expression on the person's part as they say, "I'm fine, thank you," may mean that things really aren't that good.

- To convey information about their emotional state.
- To identify or strengthen the relationship between people.
- Provide feedback to the other person.
- To regulate the flow of communication, signaling the beginning or end.
- The five roles of non-verbal communication
- Repetition: Non-verbal cues can repeat the verbal message giving it emphasis.
- Contradiction: Nonverbal cues can contradict the message the person is trying to convey.
- Substitution: Non-verbal cues can substitute for a verbal message. For example, a person's eyes can often convey a much more vivid message than words.
- Complement: Non-verbal cues can add to or complement a verbal message.
- Emphasis: Nonverbal cues can emphasize or underline a verbal message.

2.3.1 Types of non-verbal communication

There are many different types of verbal communication. Listed below are the most important ones such as:

Facial expressions

The human face is extremely expressive, able to express countless emotions without saying a single word. Facial expressions for joy, sadness, anger, surprise, fear, and disgust are the same across cultures.

Body movements and posture

Our perceptions of people are influenced by the way they sit, walk, stand, or hold their head. The way we move and position our bodies communicates a wealth of information about the world. This type of non-verbal communication includes body posture, posture and subtle movements.

Gestures

Gestures are an integral part of our daily life. Many times, we use our hands unconsciously, without thinking about it. However, the meaning of movements can be very different between cultures. So it is important to be careful to avoid misunderstanding.

Eye contact

Since eye contact is dominant for most people, eye contact is an especially important type of nonverbal communication. The way we look at someone can communicate many things, including interest, affection, hostility, or attraction. Eye contact is also important for keeping the conversation flowing and for gauging the other person's response.

Touch / touch

To a large extent we communicate through touch. Consider the following messages: a weak handshake, a timid tap on the shoulder, a warm hug, a reassuring slap, etc.

Space

Have you ever felt awkward during a conversation because the other person was standing too close and invading your space? We all have a need for physical space, although this need varies by culture, situation, and the closeness of the relationship. You can use physical space to communicate many different non-verbal messages, including signals of intimacy and love, aggression or dominance.

Voice

It's not just what you say, it's how you say it. When we speak, other people "read" our voices beyond our words. Our voice contains tone and intensity, where sarcasm, anger, love, trust, etc. appear through them.

Appearance

Our choice of color, clothing, hairstyles, and other factors that affect appearance are also considered a means of nonverbal communication. Research has proven that different colors can evoke different moods. Appearance can also alter normal responses, judgments, and interpretations.

The new "Great Social Skills" series of intervention materials is adapted to the development of the social skills of children on the autism spectrum. The goals of the program focus on emotional understanding, responding to communication and initiating interaction

2.4. TIPS to develop Social Communication

Is there anything that can be done? Yes! The science of speech therapy deals with social communication and specialized speech therapists have methods and materials to help the child improve his skills. What can we do at home to help the child with social communication?

To help the child learn to use language for different purposes, we can try the following:

- We ask questions or prompt the child:
- We use it in everyday situations. Give the child opportunities to practice good social communication throughout the day. For example:
- Ask several questions about a topic (e.g. how was school), to practice staying on topic.
- Have the child ask others what they want for dinner to learn to ask practical questions.
- Let the child ask for what he needs, ask for help to complete something, e.g. a school activity, a project.

To help the child understand that we change the way we speak depending on who we are with or where we are, we can try the following:

- Discussion with role-play. Play by pretending to talk to different people in different situations. For example:
- Play with dolls, where you are a doll-child. Show how you talk to another child doll and how to an adult doll.
-

- Accordingly, demonstrate how to speak to a family member, how to a family friend and how to a stranger.
- Play school and show how we talk in class and how we talk at recess.
- Ask the child to explain the rules of a game to different people (grandpa, sister, dad, a friend).
- Teach the child the different ways we have to pass a "message" to our interlocutor:
- Talk about the different ways we have at our disposal to get a "message" across, such as:
- Polite (“Mom, can I go to the party please?”) or rude (“If you don't let me go there will be chaos”).
- Indirect (“Poop…is the radio too loud, or is it?”) or direct (“Turn off the radio!”)
- With humor ("whew, the little feet stink, time for a bath!") or with irony/sarcasm ("be careful not to bathe every day and melt...")
- Discuss that people are more willing to do something if they are asked in a polite way.
- Ask the child how he himself would ask for something and "work" it with him.

To help the child learn to dialogue and narrate, we can try the following:

For the dialogue:

- Before you start a dialogue about something: Give information so that the child has something to press on. This will help it stay on topic. E.g., if you want to have a dialogue about "what do you like to do on vacation", first talk to him about the

different types of vacations (in the mountains, at the sea, on an island, in the village, at the grandparents' house, abroad, Christmas vacation, summer vacation, etc.).

- When you start a dialogue, ask questions (e.g., Where do you like to go on holiday? Where did we go on holiday in the summer? What did you do there? What did you like best? Where did we go for Christmas? etc.)

Help the child stay on topic for longer by giving information from your side as well. E.g., "I like the mountain because it is cooler in the summer. Come to think of it, have we ever been on a mountain holiday?"

- Learn the rewording technique. What do we do when someone doesn't understand what we're saying? Teach the child to ask questions such as:
- "You mean…;"
- "Are you saying that….?"
- Emphasize the non-verbal elements of communication. Teach the child to "read" the face of the interlocutor, to understand when the interlocutor is happy with what we say and when it is time to change the subject. Look at pictures. Study the faces and talk about how each person might be feeling at the time of the photo. Discuss what is happening that the facial expression does not match what someone is saying (eg, we are back from soccer, the kid didn't take off his shoes, the house is a mess, and mom is smiling broadly, but her arms are folded in chest and her mouth says "you're gone now" or "out, out, OUT").

For the story-telling:

- Use visuals such as pictures or objects to help the child tell a story in the correct order (sequencing and storytelling activities - what happened at the beginning, what happened next, at the end?)
- Read our article Come Tell Me Your News: The Importance of Narrative Speech for very helpful instructions and games.

2.5. How social communication difficulties affect individuals with autism spectrum disorders?

Amazing Things Happen - by Alexander Amelines - YouTube

According to research that has been carried out, it has been confirmed that symptoms of ADHD affect in the majority of cases the ability of children to communicate at an age less than or equal to one year (Adrien et al., 1992. Maestro, 1999). In childhood, there are various communication differences and delays that differentiate autistic children from typically developing children. Autistic children show a reduced frequency of orienting to social stimuli and reacting spontaneously during communication, while other abilities necessary for social communication such as eye contact, joint attention, responding to the sound of one's name, social interaction through gestures and vocalizations, mimicry, and speaking or babbling occur rarely or not as often, relative to typically developing children (Chiang & Carter, 2007. Osterling & Dawson, 1994. Osterling, Dawson & Munson, 2002).

The family appears to be a determining factor for the development of the child's communication skills. Specifically, according to the findings of Baixauli – Fortea, Mira, Berenguer - Forner, Rosello & Miranda (2019) autistic children who grow up in a friendlier family environment with less stress and more opportunities for communication appear more developed communication skills. On average, the apparent normal development of autistic children is interrupted around 12 months of life, and it is precisely there that deficits, mainly in communication and mobility, begin to appear. This is also the period in which ASD can be safely distinguished from mental retardation. Frequent symptoms at the age of one year are that children do not react when they hear their name or do not have eye contact with the adult at their visual field (Landa & Garrett - Mayer, 2006. Osterling et al., 2002). But a lot of children grow normally, they do not show special delays until the age of 15-24 months and then appear completely unexpected and sudden loss in communication and language skills (Lord, Shulman & DiLavore, 2004; Werner & Dawson, 2005). Social communication presupposes unconscious choice means, ways and contexts to communicate, which fall under countless rules, not strictly defined. This is how autistic people feel suffocated often in situations of social interaction and communication (Lam, 2014). The lack of social predisposition and/or the difficulty in combining cognitive abilities that support social interaction and communication leads to disorders often described with the term autism or pervasive developmental disorders. But because this disorder includes the individual's qualitative deviation from appropriate social and communicative behavior, people with autism are nothing alike only in basic behavioral characteristics concerning social interaction, communication and in their thinking and interests (Vogindroukas).

2.5.1 How is social communication disorder diagnosed?

Many symptoms of SCD overlap with those of other conditions and learning disabilities, which often complicates diagnosis, according to a study completed in 2013. Sometimes we have to rule out other possible problems first. For example, a doctor may recommend a full hearing evaluation to first rule out hearing loss. A speech and language pathologist with a thorough understanding of co-occurring conditions and learning disabilities should complete the listening and other assessments, taking into account age, cultural norms and expected developmental stage.

Screening for SCD often involves interviews, observations, self-report questionnaires, and information filled out by parents, teachers, or significant others, according to ASHA. You should also consider your family medical and educational history. ASD symptoms are more likely if a family member has been diagnosed with ASD, communication disorders, or specific learning disorders, according to the Children's Mind Institute.

After the evaluation, the speech and language pathologist can provide a diagnosis, a description of the characteristics and severity of the condition, recommendations for interventions and referrals to other specialists as needed.

2.5.2 Why do individuals with autism spectrum disorder (ASD) experience social communication difficulties?

How Autism Feels, From the Inside | Op-Docs - YouTube

A theory that is often cited when studying the communication skills of autistic individuals is the Theory of Mind. The Theory of Mind counts as a theory because its building blocks, such as intention, perception, and doubt, are not measurable and immediate. Observable (Premack et al.,1978). They are elements absolutely necessary for social communication. The inability of children with high-functioning ADHD to master the theory of mind seems to be a strong predictor of their deficits in communication and social interaction (Berenguer, Miranda, Colomer, Baixauli & Roselló, 2017).

The term "Central Coherence" was introduced by Frith (1989) and refers to the individual's ability to process information appropriately, which leads to the perception of situations and events depending on the context. It is a continuous cognitive profile, and in the typical population, it varies in the sense that it extends from the weak (preference for the part of the whole over the whole, the surface over the essence), to the strong (ability to emphasize the essence of things over the surface).

Due to the cognitive difficulties in processing the information they get from the environment, it is very painful for them to understand the way our society works and that is why they seem alien to this society

2.6. Intervention

Advancing early interventions for autism - YouTube

The therapeutic support of children with social communication disorders has been designed by the World Health Organization to operate on three axes:

To build on strengths to address weaknesses related to basic functions that affect social communication.

To facilitate special activities the child's better participation in social interaction by training the child in new ways to master basic communication skills that will help him apply them in his daily life.

At the same time, to reduce all negative factors, such as stereotyped or repetitive behaviors, distraction, inappropriate use of games that prevent the manifestation of proper social communication.

After a developmental screening has been done, some developmental deficits have been identified.

2.6.1 Basic strategies of therapy in social communication

All strategies in social communication therapy aim and focus on increasing the child's active and spontaneous participation in daily activities with the ultimate goal of covering the developmental deficits identified in the initial assessment.

2.6.1.1 Provisional diagnosis

Quite often it takes a long time from the suspicion of a social communication disorder to its diagnosis. Especially, when it comes to an infant or a small toddler where the imperfect development of the infant's brain in combination with the influence of the environment significantly affects the development of a phenomenon that was initially recorded as

pathological. For the above reasons it is safer to maintain a provisional diagnosis and recommend early intervention.

2.6.1.2. Early intervention for infants from 8 to 36 months and counseling for parents

According to the American Pediatric Society, early intervention is recommended even in infants and toddlers with suspected social communication disorders. It is usually detected by the mother who cares for the infant every day or the pediatrician as part of the periodic developmental checkup through the child's developmental health booklet.

What does early intervention counseling involve?

Parents are given instructions for the most appropriate education regarding the daily care of their child, as well as recommendations for the most appropriate use of free time. Advice and instructions are given regarding the treatment of accompanying symptoms by parents, such as stereotyping, echolalia, anger outbursts, etc.

Advice is given on the specifics of the disorder with simplified terminology to make it understandable for parents. Educational videos are presented, discussion follows, commenting, exchange of views, answers to parents' questions by watching practical videos - examples of desirable and undesirable behaviors in practice.

2.6.1.3. Early intervention kit for children with suspected social communication disorder

The Early Intervention Kit is a bag containing a selected variety of toys that we often use in early intervention for Developmental Disorders. It enables parents who wish to help their child at home. They have gathered all the material as well as a handbook with suggested activities for extra home training. Frequent practice reinforces therapeutic goals and encourages the child to meet developmental milestones.

2.6.1.4 Ways to treat social communication disorder when diagnosed

Social communication disorders, since they are not a temporary diagnosis but are an official diagnosis of the child according to ICD-10 or DSM-5, are not treated in the sense of complete recovery of mental health. People suffering from social communication join therapeutic programs, which are long-term and mainly educational, aimed at reducing pathological symptoms and improving the person's functionality. Disturbances in social communication can be treated by applying several treatment options, all of which have the common goal of reducing symptoms and making the child independent.

2.6.1.5 Which doctors and therapists are involved in social communication interventions?

Treatment involves a set of specialists, and is usually a planning of actions involving different specialties working together:

Developmental or child psychiatrist, child neurologist who undertakes the diagnosis but also the monitoring of the progress every 4-6 months.

Occupational therapist with early intervention programs for infants and toddlers with a frequency of 2-3 times a week and maybe more, depending on the age of the child and the severity of the symptoms.

Psychologist or social worker. Psychopedagogical education. The child's diagnosis has the effect of disrupting the rhythm of the household familiarity, while at the same time it creates many questions about how it happened, what caused it, if it has a hereditary correlation, what is the nature of the disorder, what is its evolution for the future of the child and how much it

will affect his life and that of the family. The psychopedagogical training of parents and counseling regarding the special characteristics of the disorder gives parents explanations for questions such as what it is, how it affects the child's development and what is the best way of education that parents need to adopt.

Individual treatments. Therapeutic intervention usually takes place on an individual level, therapist - child. Sometimes parents attend part of the session to see handouts and learn about therapeutic manipulations to reduce the child's pathological behaviors.

Group therapies. Depending on the child's level and developmental potential, it may be recommended to participate in a group program of 2-3 children with similar difficulties, so that the children have the opportunity to be exposed to a group environment and actively test their social skills in a peer group.

Speech therapy intervention. Usually upon completion of early intervention, the child also undergoes speech therapy in order to deal with the individual quality deficits of speech, expression, morphology, semantics, pragmatics.

Social interactions. Older children participate in programs of social activities in everyday life. An occupational therapist or special educator undertakes the education of the child outside the home in daily activities in the community, such as buying goods in a supermarket, etc.

2.6.1.6. Interventions in school environments

The school is an important integration factor, because the successful integration of the child in it also determines his development. In most cases, it is not easy for the child to adapt to the school context. By the term "school context" we mean (kindergarten, kindergarten, elementary school, high school). Therefore, it will be necessary to make environmental arrangements as well as the synergy of mediators, such as that of the parallel support of the student.

2.6.1.7 Intervention on nonverbal communication

An important means of communication besides eye contact is also gestures. Observing and recording the gestures displayed by an infant could be said to be a developmental indicator that assures us that our baby is communicating correctly. The first gestures begin to appear at 9 months. Scientific studies on infants have shown that a large repertoire of facial expressions and gestures indicates that the child can speak faster and have a better adjustment in school.

Age	
From 9-18 months	the infant can make about 15 different gestures, which appear gradually throughout this period of time.
9 months	the child shakes his head to show us "no".
10 months	the child raises his arms to show us that he wants to be hugged.
11 months	brings us objects he likes to show us.
12 months	looks for interest, i.e. to look at it when it does something: e.g. when he puts a wedge in the right place.

13 months	points with his finger to something he is interested in or something he knows, e.g. where is the duckling?
14 months	claps, pats and kisses
15 months	can imitate the quiet gesture by placing a finger in front of the mouth.
16 months	can do the shrug and open arms implying “where did he go”? He can say thank you by hitting his little hand on the sternum, do good to the teddy bear he hit, feed the doll with the spoon, etc.

When our child can combine the above gestures spontaneously, always communicate with us by showing interest when we talk to him and always carry out all commands then we can feel that our child is growing as expected even if he has not started to say words.

A person with social communication problems may:

To say the wrong thing or behave in the wrong way when speaking. He may laugh at the wrong time or start talking about something unrelated.

To tell stories that don't make sense.

To use language, speech, in limited ways. He may not say "hello" or "goodbye" or "thank you" or he may shout instead of verbally asking for what he wants.

Children are not born with an innate knowledge of these rules. But they learn them growing up and learn to follow them without thinking about it. If a child has a lot of trouble with these rules, they may have a social communication disorder or even an autism spectrum disorder. Why is it important to know if our child has these types of difficulties? Because social communication problems can make it difficult for a child to make friends or succeed at school or - later in life - at work. So, it is important to know in order to help it overcome them.

Early Intervention and Beyond: 5 Tips for Teaching a Child with Autism - YouTube

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Chapter 3

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Remote support for students with autism

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Abstract

Children with autistic spectrum disorders need support both in the learning process and in everyday life. With the development of information technologies, wide opportunities for learning, acquiring skills, using the capabilities of smart devices, open up. For children with autistic spectrum disorders, it is an opportunity to learn learning material remotely, taking into account their weariness from school noise and crowds. However, it cannot remain the only form of learning. It should be remembered about the problems of these children in the field of communication and socialization. Only by mixing different learning forms and methods can effectively help children with autistic spectrum disorders to develop.

Keywords: distance learning, digital tools, smart devices, socialization, communication, learning methods, brain activity

3.1 Introduction

Nowadays, new technologies are increasingly entering the household, which contribute to economic and social progress and improve the quality of life. The majority of society cannot imagine their daily life without Internet connections, especially teenagers and young people. Among young people between the ages of 13 and 24, the most popular activities on the Internet are using social networks, using e-mail and watching videos. E-learning has also become a reality. Using digital tools offers many advantages over traditional learning. The visual learning material is available at any time, you can also receive remote consultations, learn the learning material at your own pace. This learning option is also applicable to students with autism spectrum disorders.

Each child with ASD is likely to have a unique behavioral pattern and severity. Some children with autism spectrum disorder have learning difficulties, others have normal or high intelligence - they learn quickly, but there are still difficulties in communicating, socializing and applying knowledge in everyday life. All people with autism have difficulties to a greater or lesser extent in 3 important areas: social interaction (difficulties with social relationships, such as the desire to be isolated from others, indifference to the people around them); in social communication (difficulties with verbal and non-verbal communication, for example, incomplete understanding of the meaning of generally accepted gestures, facial expressions and voice tones); in imagination (difficulties in developing play and imagination). In addition

to this triad, repetitive actions are often characteristic, as well as resistance to changes in daily routines and routines. In order to obtain an effective education for such students, it is recommended to create individual education programs, but to organize lessons in an integrated environment, so that the child has the opportunity to observe the actions of other students, to take joint actions, promoting the formation of tolerance among peers. This is one of the most important recommendations in the education of students with AST - lessons should be created in different forms, with the application of different methods, taking care of the development of communication and socialization.

3.2. Information technology in our life

Due to the growing importance of technology, most of the ministries of education of different countries in all regions of the world have set national goals, policies that clearly indicate the role of information technology in improving the education systems of these countries.

In the classical learning process, the left hemisphere of the brain is used more, without realizing how much learning could be facilitated if the student learned to use the right hemisphere of the brain as well. The right hemisphere of the brain is more associated with emotional reactions than the left. It is in charge of creative activity, intuition. A person who is dominated by the functions of the right hemisphere of the brain perceives reality figuratively, synthetically, and in a unified way. The characteristics of the left hemisphere of the brain (logic, abstract thinking, analytical perception, verbal memorization) are necessary for people in learning, so the function of the left hemisphere of the brain dominates in our education system, as a result of which the left hemisphere of the brain is developed more. Educators usually use the following teaching methods in their work: discussions, illustrative explanatory

methods, problem-based learning, exercises, demonstrations, analysis of situations, "brainstorming" (initiation of new ideas), project method, work with cognitive literature, heuristic method, lecture, didactic games (Lanka, 2004) In recent years, there have been efforts to develop learning methods and approaches that would use both hemispheres of the brain, using both logic and emotions, such as the connectivism theory discussed further in this work, it deeply integrates ICT in the learning process (Siemens, 2004, 2005).

The European Commission (Communication from the Commission, 2000) defines "e-learning" as the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services" (European Commission, 2008, Project E - process e-learning report, 2015). The following advantages of e-learning are most often mentioned:

• Facilitates the learning of the curriculum;

• Ensures an appropriate learning pace for everyone;

• Adapts to different learning styles;

• Allows adaptation to health conditions and intellectual abilities;

• Provides an opportunity to see and hear the results of your work;

• Motivates to learn new skills and abilities;

• Offers global resources that match readiness levels and interests;

• Provides the opportunity to communicate with students remotely, using the chat room, forum, e-mail, etc. available in the e-learning environment, providing individual feedback;

• Provides access to a variety of information presentation formats: documents, presentations, video, audio, educational games, lessons, etc.

An integral part of the 21st century learning process is the use of digital tools in the learning process, including face-to-face, and the development of digital skills. The Covid-19 pandemic

created an opportunity for distance learning through the active use of information technology tools. For many teachers, the distance learning phase was an incentive to familiarize themselves with the already existing possibilities in multiple digital platforms. Different digital platforms are also a good support in differentiating tasks. All those platforms where you can dynamically complete tasks and immediately receive feedback on the mistakes made are highly appreciated by parents. As a very valuable thing, parents also indicate the possibility of continuing to use online conference tools, such as zoom, to organize various meetings - counseling for children or parent meetings. Parents would also greatly appreciate it if teachers continued to create digital learning materials (worksheets, lesson plans in the form of videos or presentations), as this could help in learning for those who are forced to miss classes for various reasons or simply want to repeat the learning material. Both teachers and parents admit in surveys that remote learning helped a lot to develop students' independence. Students learned to plan their own time - when to complete tasks, when to look for additional information needed for studies, when to rest, when to communicate with teachers or classmates, etc. The students found it positive that they could concentrate on their studies in peace and quiet. Many appreciated the opportunity to complete the work at a time more convenient for them. (IZM, 2020).

Experts and survey respondents - parents, teachers, students and school leaders - point to the lack of socialization as a risk during distance learning. Teachers remind us of the importance of school in a wider context, including providing opportunities for socialization and developing skills, especially for younger children and children with special needs.

In various surveys (IZM, 2020) the desire to meet classmates and friends crystallized in all class groups. As the age of students increases, aggravated, depressive feelings and depression are more observed. However, some younger children have also defined their feelings as

loneliness. In one of the surveys, a teenager wrote: “We all become digital persons for each other, with the ability to turn off the camera in class, the ability to remain silent, the ability to disconnect from the conference without the teacher's permission. A person is likened to a ghost, which not everyone can see, hear and feel if he is present."

3.3 Distance learning: pros and cons

In recent years, the demand for distance learning schools has grown in Latvia. Students who are anxious, shy, have experienced many unsuccessful moments when answering in front of the class, feel a lot of stress in a traditional school. In distance learning, this can be done more anonymously using digital tools. Many interactive software allows students to answer and ask questions anonymously and participate in discussions without fear of embarrassment. It not only helps them learn, but also consistently increases their self-esteem, self-esteem. Research by psychologists in schools in different countries shows that about 69% of students are stressed about grades. Children suffer because they are forever compared with others, they suffer from failures in the learning process and if they do not understand something. Most of them are afraid to answer at the blackboard, because if they don't know something or make a mistake, then it is a "failure" not only in front of the teacher, but also in front of the whole class. In distance learning, you don't have to stand at the blackboard and only the teacher knows the answers - right or wrong; they don't know the grades of other students either. It could be that the spirit of competition disappears, but students learn to compare themselves only with themselves. Distance learning teaches you to think and analyze for yourself, search for answers and formulate questions correctly. When doing homework, looking for the right

answers, you can search for material on the Internet, find different options for the explanation of the question you are looking for, and critically analyze what you find. Living in a time of change, it is important to learn to respond to change, to change with life. In distance learning, each child has an individual approach - both face-to-face and non-face-to-face consultations with the teacher are available.

When studying in distance learning, the student determines his own study schedule - when, at what time to stick to schoolwork; how much time to allocate for completing tasks; you can go and do tests thousands of kilometers from home. This means that the distance learning school saves time and allows you to shape the learning process according to your taste. The student can regulate the training pace himself - if everything is clear, then go on; if it is not clear, then ask the teachers for help - both face-to-face and face-to-face consultations are possible. In distance education, children have more freedom, but also more responsibility: there is no need to spiky, zubrit or write off. It develops personality flexibility, independence, prepares for remote work in the future. Another positive aspect of e-learning is the use of online documents. It allows you to create and share documents and folders, track homework and collaborate with other students, teachers on materials. Access to shared folders allows you to leave comments about anything you don't understand, and they can be answered by the teacher or classmates, you can create joint project works in your work group.

Communication with peers in a traditional school is an important moment. Despite the negative aspects (competition, aggression, comparison with other children and adaptation), it is still a contact experience. It is in the classroom, in interaction with classmates, that the first sympathies and friendships are formed, and many social skills are improved. In distance

education, all this must be compensated by participation in clubs, sports lessons, family events, etc.

The distance learning process can also be negatively affected by technical support (technical parameters of smart devices) and technical complications (quality of internet coverage and connection, inability to use the possibilities of digital tools). We should also talk about screen fatigue. Stimulating vision and hearing in the virtual classroom is difficult to implement, especially younger students lose attention in class and become unmotivated to learn. After just 10 minutes of sitting in front of the screen, children start to lose focus and feel sleepy, lack of movement. There may be misunderstandings about the work to be done or the time.

In a physical classroom, the teacher can approach each student in the classroom and, speaking quietly, help anyone who needs help. In a virtual classroom, this mutual interaction is complicated by the presence of other students who can hear this supposedly individual interaction. For shy students or students with learning disabilities, the thought of this very public one-on-one can be very upsetting and they decide not to ask for help. Such a learning organization can be very detrimental to their future prospects.

If the child is studying at a distance, parents should be ready to be more involved in the learning process: follow the schedule, regime, sports lessons, provide the child with the opportunity to contact peers and socialize.

3.3 Methods for promoting the development of children with autism spectrum disorders

As previously written, autism spectrum disorder (hereinafter ASD) is one of the variants of the development of the central nervous system. It is not one particular disorder. Some of the variants may be closely related to our immunity, some to the intestinal microbiome - the range of bacteria that live in the intestines, others to the bioelectric activity of the brain, others to hereditary characteristics, but at the given moment it is not yet possible to diagnose each of these reasons in specific cases (Bezborodovs, 2020). ASD is manifested by a certain set of signs (symptoms) and functioning characteristics that differ from individual to individual. In general, ASD can be described as "a lifelong disorder that affects how a person communicates with others and sees the world around them" (The National Autistic Society, 2017).

ASD symptoms in children affect five main areas of functioning:

• Impaired social interaction and communication skills;

• Imagination, ideas, creativity;

• Gestures and non-verbal communication;

• Sensory sensitivity;

• Narrow range of interests, routine, repetitive behavior.

It is not that these symptoms - social communication, functional disorders, stereotyped behavior patterns - are manifested only in one sphere of the child's life. Difficulties can be expressed in different ways in different environments. Difficulty in functioning occurs when the child comes into conflict with the environment because it cannot meet the child's needs. These peculiarities may also not be noticed if the child has no difficulties in the environment,

they appear only when the demands of the environment increase, which the child is no longer able to satisfy (Bezborodovs, 2020).

One of the most effective and internationally popular pedagogical correction methods is TEACCH therapy. The TEACCH (Treatment and Education of Autistic and related Communication handicapped Children) program is a development promotion of children with autism and similar communication disabilities (Häußler, 2006 cited by Bethere et al., 2013). Today, TEACCH is more than just a method. Its structure includes certain methodological techniques, especially structuring and visualization, as well as cooperation strategies with families and various services that provide lifelong care and development of people with autism (Bethere, 2013: Kutscher, 2014). The implementation of the TEACCH program uses structuring techniques in several interrelated areas. Simultaneously with the structuring of space, time, task list and task solution, a daily routine is offered and practiced within the TEACCH theory.

Today, ABA (Applied Behavior Analysis) is considered one of the most effective systems of methods. A child with autism can learn to speak, communicate, can regulate and correct attention to work, develop thinking, motor skills, reading skills, etc. If the tasks are chosen according to the abilities of the particular child and the teacher has considered everything necessary, the work proceeds like a routine. It is known that this type of work gives children with autism a sense of security, peace of mind at work, because he knows what needs to be done, how long he will have to work, what he will receive for good performance, what he will do afterwards. The free time of children with autism should be organized according to this system. According to the principles of ABA implementation, it is important to reward the child after the correct performance of the task (Bethere, et.c. 2013; Leach, 2012).

Methodical system DTT (Discrete Trail Training) is a program for children with ASD to develop academic skills, cognitive functioning and communication. The implementation of the program provides children with opportunities to develop visual perception, imitating, imitating (verbal and non-verbal) skills, understanding of instructions, understanding of relationships between objects and actions, motor skills, reading and writing skills, understanding of arithmetic concepts, etc. It helps to organize the learning process, promotes the ability to concentrate, develops communication (verbal imitation), helps to combine movement (action) with thought (integration of two functions of the psyche). Thus, conscious learning and exploration of the world is promoted (Lowaas, 2003. cited by Bethere, et al. 2013; Maureen, 2008).

3.4 A child with an autistic spectrum disorder in the distance learning process

On December 12, 2007, the Committee of Ministers of the Council of Europe adopted the resolution "On education and social inclusion of children and young people with autism spectrum disorders", which defines the right to receive education that is suitable for their needs, is non-discriminatory and promotes social inclusion. Currently, support for parents and their children with autism spectrum disorders is provided by the educational institution's support team (specialists who help the child individually, promote more successfully planned and organized pedagogical work with children who need help), support groups for parents organized by local government social services , non-governmental organizations. Support

groups are widespread and are based on the principles of self-help and support for people with similar problems. In the group, people bring up their difficulties, listen to the experiences of other participants in solving various issues, find strength and hope to change their lives. In the group work process, getting to know themselves, people improve and improve their relationships and quality of life (Bechtere, Līdaka, Plostniece, Striguna, 2013). Currently, this support is organized in person. During the Covid-19 pandemic, we also had to use the possibilities of the e-environment. Lessons learned that point to the benefits and pitfalls of remote support.

Specificity of cognitive activity can be observed in children with ASD. Difficulties are caused by independent planning of activities and selection of priorities. Children can be impulsive and inflexible when solving a problem. Limitations in the development of working memory are often observed. Sometimes children with ASD have well-developed cognitive abilities. On the other hand, their self-care skills do not develop according to the requirements set in the educational environment (Emmons, 2011; Kanner, 1998).

Scientific studies prove that children with ASD experience a double burden in the educational process. They should pay more attention to observing the norms of behavior, understanding the emotions of teachers and peers. Creating social contacts, getting involved in the communication process requires a lot of tension from children with ASD and the ability to adapt to set tasks, which do not cause special problems for other children. A significant obstacle to an effective learning process is the changing environment of the educational institution. Great difficulties are caused by daily living in noisy rooms where different

conversations are going on and people are moving around. For a child with ASD, it resembles chaos, which puts a lot of stress on the nervous system.

The hemispheres of a child's brain are just forming. The right hemisphere dominates, it deals with imagination, where the leading element is presentation. This phenomenon is very relevant in teaching reading to children with ASD, because it has been scientifically proven that the right hemisphere of the brain is dominant for them. The brain is plastic, it must be trained by performing certain actions, certain brain centers, certain functions are trained. Visual support helps to structure actions, helps to memorize information, sequence of actions, etc.

Most children with ASD perceive visual information better than auditory information. Information presented in a visual form, such as photographs, pictures, drawings, is easier for these children to understand than information presented in other ways. One of the advantages of using visuals is that they can be used as long as needed. Verbal information, on the other hand, is ephemeral – once the message is communicated, it is no longer available. This can cause problems for students who have problems with language processing and need extra time. In addition, it can be difficult for a child with an autistic spectrum disorder to perceive important information and abstract from background noise. The use of visual support helps the child to focus on information (Emmons, 2011).

Visual support materials can be used in the classroom in different ways:

• To explain the order of things, promote self-organization of students (daily plans, lists of activities, calendars, etc.);

• To provide instructions (class rules, cards with instructions for specific actions);

• To familiarize with the surrounding environment (names of various items/ indications of use);

• For the development of social skills (various provisions), incl. social stories. Social stories are descriptions of social situations that include social cues and appropriate responses and are written for specific, individual situations;

• To reduce problem situations, promote self-control (instructions, including pictograms indicating socially acceptable actions) (Latvijas autism apvienība, 2015).

When choosing the type of visual support, the child's abilities and needs should be taken into account. The information presented in the visual material should be presented in the simplest possible way. Visual support materials differ in complexity - they can be concrete objects, color or black-and-white photographs, pictures, drawings or written text, they can supplement books, daily plans, social stories, written instructions, etc.

Special computer programs are available for creating visual support materials. In Latvia, the project "Creating a support system for students with functional disabilities" has been implemented, and within the framework of this project, the symbol language Widgit program SymWriter-2 has been translated into Latvian, trainings have been held and software has been distributed. (Latvijas autisma apvienība, 2015). You can also find many videos on the Internet, prepared by various organizations for working with children with ASD.

For today's children, the use of smart devices is a natural part of everyday life. From the point of view of the child's development, it is important for what purposes he uses the smart device and the content offered there. A smart device in itself is not a bad thing, what matters is the

content that the child is watching. There is a need for both developmental, educational content and entertainment content. If you use a smart device and entertaining content for a long time and at a young age, it causes difficulties in maintaining attention, you cannot concentrate on one thing for a long time, the brain develops worse. It is important to learn how to use a smart device in a purposeful way. Neurologists recommend that children should not use smart devices until they are 1.5-2 years old. After that, until school age, 1-1.5 hours a day could be used and only half of this time could be filled with entertaining content, although it would be more valuable to learn developmental things. The condition should also be observed that after every 20 min. there must be a short break, to rest the eyes. At this age, eye musculature is still underdeveloped, eye tics may appear with overexertion. As the child grows, the time spent using smart devices also increases. On the part of parents, there should also be control in which time limit programs, content control programs can be used. For children with ASD, the virtual assistant becomes a personalized support system. However, in this regard, it should not be forgotten that these children have difficulties with communication and socialization. Therefore, the child's time should be structured in such a way that there are also activities in interaction with other children. Children with ASD should not be isolated from society for a long time. Children are very satisfied with distance learning (silence, own pace, no evaluating glances, retorts from classmates), but they may develop a dislike for people, dislike communicating with someone. This leads to regression in personality development of the child with AST. This is evidenced by interviews with parents of children with ASD about remote learning during the Covid-19 pandemic, where it is recognized that four months of isolation (the first wave of the pandemic) led to younger students having to reteach many social skills and the time of return to society occurred with a high level of stress, aggressive behavior, some with panic attacks. Digital tools create an

opportunity to individualize learning content, duration, planning, which is very important for children with ASD.

3.5 Concluding remarks

The rapid development of modern information technologies opens up opportunities to diversify and improve the learning process at school and at home.

With digital tools, we can help children learn and achieve well, but it can't just be about switching on a screen. It must have a specific tool and methodologies - how to promote learning motivation, how to provide feedback if the teacher does not see the child, it is also time: how long he uses digital tools.

Using digital learning tools is a bit different than distance learning. Programming activities, educational robotics, etc. can be used in the classroom. c. Finland has long introduced digital learning tools in the learning process, with which the student can operate himself. Digital learning tools have potential, they can do a lot, but you have to learn how to use them.

These positive aspects cannot be viewed separately from the child's willingness to learn independently, from the availability of appropriate learning materials, from the students' digital literacy to use various tools for learning purposes and from their motivation to overcome difficulties, because learning also requires overcoming certain difficulties.

Communication is a basic human need throughout life, but it is especially important for a child's social-emotional development. Interaction with others develops the child cognitively,

emotionally, socially. Therefore, when organizing teaching work, it is necessary to structure the work in such a way that teaching forms and methods change.

Chapter 4

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Remote assistance services and autism

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Abstract

Children with ASD often phase different difficulties in developing their social communication and cognitive skills which can in turn cause struggles in their educational and learning experience. This chapter aims to first offer some theoretical explanations of the difficulties children with ASD phase so that the reader can better comprehend them. Subsequently, this chapter explains how social and cognitive skills of children with ASD change with age or can vary depending on the severity of the symptoms a child is experiencing, the type of support they receive as well as their different strengths and personal interests. Finally, this chapter explains how remote assistance can be used in an online learning environment to help parents and teachers address the difficulties that children with ASD phase and ensure they have an effective and fruitful educational experience. An explanation of the use of educational software for remote assistance is also given together with criteria of how such software can be developed to help children with ASD in their learning.

4.1. Introduction

Children with ASD phase different social, cognitive and motor difficulties which make the educational experience a particularly challenging process for them. In particular, research shows that children with ASD aged 6 to 11 often experience restrictions in their classroom participation due to both internal (i.e. sensory dysfunction, difficulties in social communication, self-management and organization etc.) and external (i.e. school culture, educators' knowledge and skills) factors (Hodges et al., 2020). Even though children with ASD are capable to perform well in their professional and personal life they are often at risk of phasing sever difficulties, if they are not given the adequate support during their school years (Van Hees et al., 2015). In particular, the rates of children with ASD for graduation and employment are much lower than those of children with other cognitive and learning disabilities (Sanford et al., 2011; Shattuck et al., 2012). The increased demands of the educational system and the overwhelming school environment can often significantly increase stress and anxiety experienced by children with ASD (Pinder-Amaker, 2014). Especially, in the context of online education, learning can be particularly challenging for a child with ASD due to the increased difficulty to stay concentrated and focused (Buchnat & Wojciechowska, 2020). These are the basic guidelines about how to best help children with ASD during their education, whether this received online or in-person:

- **Create a routine:**

Children on the ASD feel comfortable with structure, order and stability. They struggle to deal with unpredicted situations therefore ensuring that they are following a

structured routine schedule avoiding disturbances during their learning will certainly decrease their anxiety levels and help them learn more easily.

- **Remember their sensory sensitivity:**

Children with ASD can not deal well with loud sounds, bright colors, strong smells and tastes therefore avoiding to expose them to such sensory information can enhance their learning experience.

- **Ensure clarity and avoid metaphorical language:**

Due to the difficulties children with ASD have in their social communication it is important to teach and give instructions in a clear manner avoiding metaphors, rhetorical questions or long sentences.

- **Invest in children's strengths and interest:**

In spite of the severe difficulties children with ASD phase, they also have other important skills which can help them in their learning experience. For example, due to the fact that they respond well to visual stimuli, they are thought to be strong visual learners so using imagery and pictures during teaching can really help them. Similarly, they often have strong mathematical and technical skills due to their tendency to give attention to detail in a practical and pragmatic manner. Additionally, due to their tendency to have stable and repetitive tastes, if they have a particular preference for an item, this can be used during teaching to enhance their learning. For example, if a child with ASD loves dogs then including images of dogs during their spelling or mathematical exercises can certainly increase their engagement.

- **Increase parents' participation:**

  Due to the specific tastes, sensitivities and habits that a child with ASD might have, it is important to get the parent, caregiver or guardian of the child involved in the learning experience so that they can advise the educator accordingly and make the child feel safer.

It is critical to fully understand the difficulties phased by children with ASD in education and design personalized interventions based on the aforementioned guidelines in order to successfully meet these needs as well as train parents and educators to be able to address them during teaching.

This chapter aims to firstly offer some theoretical explanations of the difficulties phased by children with ASD and then explain how these can be huddled using remote assistance services in order to meet children's cognitive and learning needs. While this chapter offers a theoretical insight into the learning difficulties of children with autism, the equivalent practical chapter of this guidebook (i.e. Topic 2 of the practical part) offers specific and detailed examples of different educational software which can be used during the learning process of children with ASD.

Source: Pexels

4.2. Theoretical explanations of ASD

When finding ways to assist children with ASD in their education and learning it is vital to understand their special cognitive and learning needs and where they originate. Educators and parents need to be aware of the most prevalent theoretical frameworks which attempt to explain difficulties of individuals with ASD in order to better understand their special needs and address their difficulties in the best way possible.

4.3. Theory of Mind

One of the most prevalent explanations of ASD is based on the theory of mind approach which refers to the ability of individuals to understand thoughts, feelings and intentions of other people (Rabinowitz et al., 2018). The traditional tasks used to investigate whether a child has successfully developed theory of mind is a false-belief task like the Sally-Anne task (Leslie et al, 2004). During this exercise, children are introduced to two different dolls, Sally and Anne. During playing, Sally puts a marble in a basket and then leaves the room. Then Anne moves the marble from the basket into a box while Sally is away. The critical question then asked by the instructor to the child is 'Where will Sally look for the marble when she returns?' Typically developing children older than four years are likely to answer this question correctly and say that since Sally was away when Anne changed location to the marble, Sally will look for the

marble in the basked. However, children younger than four years old or older children with ASD are likely to reply incorrectly to this question and say that Sally will look for the marble in the box, failing to understand that since Sally was away, she is unaware of the change in location and she continues to believe the marble is where she left it. These children have not successfully developed theory of mind and hence they struggle to understand intentions and thoughts of other people and differentiate them from their own. Additionally, successful performance on these false-belief tasks also requires executive control and functions like flexibility, planning, cognitive control and working memory. Children with ASD experience cognitive deficits in these domains and this explains their difficulty in completing such tasks (Ozonoff et al., 2004). Therefore, theory of mind explanation for children with ASD offers a solid justification for some of the social and cognitive difficulties that these children phase. In particular, due to the fact that they struggle to attribute mental states of their own and of other people, they have difficulties in communication and social interactions.

Here you can watch a video with an explanation of Theory of Mind in children with ASD

4.4. Weak Central Coherence theory

As observers when we interact with our environment and perceive different objects, we are usually used at viewing them as a whole and do not pay much attention to their individual and distinct parts. For example, when we see faces of people, we usually observe them in a

global way and do not break that image down to individual parts of the nose, the eyes and the mouth. This is generally referred to central coherence which is the tendency of our perceptual system to view items in a holistic manner. Nevertheless, this is not always the case as there are instances where individuals fail to integrate different bits of perceptual information together, like in the case of people with ASD. In particular, a theoretical explanation used to justify their cognitive and learning difficulties is the Weak Central Coherence theory (Happé, 2005). This theoretical framework for autism is primarily concerned with how well individuals process information and combine it in order to arrive to an overarching conclusion. Weak Central Coherence theory refers to the difficulty individuals with ASD have in understanding things in a general context and 'seeing the bigger picture' while at the same time they are often really good at paying attention to details. This theory explains why some people with ASD might have extraordinary abilities in subjects like mathematics and engineering where attention to detail and pragmatic approach to problems is needed and is something that they are generally strong at, while they have more severe difficulties in more theoretical domains like languages (Frith, 1989). Weak central coherence is found to be related to a range of different cognitive functions like planning, verbal language, joint attention and memory which are all areas that children with ASD often struggle (Morgan et al., 2003).

Here you can watch a video with an explanation of Weak Central Coherence in children with ASD

4.5. Cognitive and learning needs of children with ASD across different ages and school subjects

For a child to receive an autism diagnosis, they are usually examined on different criteria with the most important ones being:

- Difficulties in social communications and interactions with other people
- Cognitive and learning difficulties
- Sensory sensitivity
- Difficulties in motor control and coordination of fine movements

However, the severity of these symptoms and difficulties varies amongst different individuals and this is why autism is characterised as a spectrum disorder (from high functioning to low functioning). In general, the earlier a child is diagnosed with autism, the sooner they can get the support they need so that they can properly develop skills and competences and more successfully integrate in the society (Gabbay-Dizdar et., 2022). The aforementioned difficulties that a child with ASD might be experiencing can change as they grow older or can contribute in the development of other problems and difficulties. For instance, research shows that children with severe sensory sensitivity as toddlers might experience anxiety problems in their school years (Green et al., 2012). Similarly, children with ASD who exhibit stronger cognitive skills (e.g. executive planning, attention etc.) at the age of four to seven, are more likely to have stronger theory of mind and be able to better understand thoughts

and intentions of other people in their later years (Pellicano, 2010). Parental involvement in the education and learning of children with ASD is another factor which can influence the development of their skills and competences in later years. In particular, research shows that children whose parents are actively involved in their therapies and learning, show improved verbal abilities and coordination in different daily tasks in their later teenage years (Anderson et al., 2011). Therefore, it is important that educators and parents monitor the severity of the symptoms that children with ASD phase over time in order to be able to address their individual needs and potentially prevent future problems.

Source: Pexels

Similarly, the difficulties a child might phase during their learning also depend on the subject they are studying as children with ASD might have severe difficulties in one subject but show exceptional competences in another. Children with ASD generally pay great attention to detail therefore they are likely to be particularly interested in pragmatic subjects in which preciseness and attention to detail are of great importance. For example, children with ASD might show particular interests for domains like mathematics, maps, engineering, music and

computer science (Loftus, 2021). In these areas a practical and rational approach to problems is vital and it is something that children with ASD often have. Parents and educators can use children's preferences and interest to boost their performance and understanding of other areas or subjects they might be having difficulties with. This is referred to as the 'Strength-based approach' where a child can be taught about different concepts through their special interests and preferences (Steiner, 2011). Research shows that talking about their interests, largely facilitated social communication and emotional skills of children with ASD (Winter-Messiers, 2007). For example, if a child with ASD has a particular interest in animals then this be used by parents and educators in their teaching in order to help the child develop skills in many areas like:

- Verbal language: Children with ASD are more likely to talk about things they are interested in than things they find hard, confusing or overwhelming.
- Written language: Teach children with ASD the spelling of words and new vocabulary by teaching them words related to animals and nature.
- Mathematics: Children with ASD might be more likely to understand mathematical concepts and calculations of these incorporate things they might be interested in (e.g. using images of even small toys of animals to learn addition and subtraction).

Here you can watch a video about things to avoid during teaching of children with ASD

Here you can find tips for teaching children with ASD

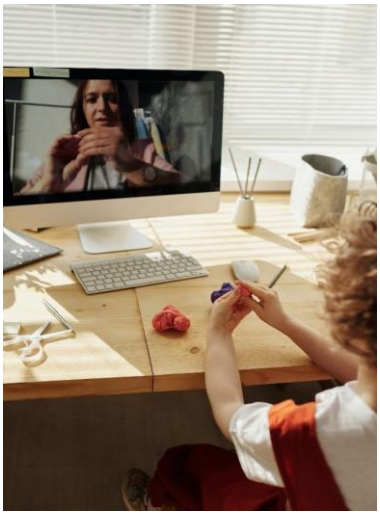
4.6. Different Learning Styles for children with ASD

Learning styles refer to different ways in which an individual can gain information and knowledge. Different people have different learning styles depending on their personality, abilities and interests. This is the case in children with ASD as well. Learning styles are usually based on our different sensory modalities: visual (e.g. looking at images or reading information), auditory (e.g. listening to lectures, instructions, explanations) and kinaesthetic (e.g. using tactile sense and physically interacting with objects; Edelson, 2021). Using the appropriate learning style for one's interests and abilities can be critical for school attainment and successful learning. In particular, if a child with ASD has a strong preference in looking at imagery books, watching television, observing people, then they are likely to be a visual learner. Similarly, if they like listening to music and respond well to verbal instructions then auditory learning might be best suited for them. Alternatively, if a child with ASD likes puzzling, building things up, pushing buttons etc. then they might be more likely to learn through kinesthetic learning. Children with ASD might respond well to more than one style of learning or this could also depend on the type of task they are about to do. In any case, it is critical that parents and educators find out the primary learning style of a child in order to adjust their teaching accordingly and ensure the child will be able to successfully absorb as much information as possible without feeling overwhelmed.

Here you can watch a video about the different teaching strategies for children with ASD.

4.7. Remote assistance during learning to help children with ASD

As described in the previous sections, children with ASD often have difficulties in their social and communication skills which however are vital skills for educational attainment and successful social interaction in later adult life. In particular, research shows that early social interventions to children with ASD can improve both their cognitive and communication skills in adulthood (Kalyva & Avramidis, 2005; McGovern & Sigman, 2005). It is important for a parent or educator to understand the specific difficulties phased by each child as well as the areas in which they are strong at and interested in, so that they can offer them appropriate assistance during learning. It is therefore critical that current educational systems address these special needs and interests of children with ASD and help them develop their soft skills in order to facilitate their smooth integration in the society. Special attention needs to be given to a digital environment for learning where remote assistance needs to be given to these children.



Source: Pexels

During online learning, there are different things which both parents and educators should consider in order to increase the likelihood of the child with ASD being able to follow the lesson and successfully learn. These include:

- ✓ Corporation between parent and teacher
- ✓ Ensuring appropriate workspace at home and minimizing distractors
- ✓ Explaining to the child the set-up of an online classroom and what to expect
- ✓ Attracting attention of the child during teaching (e.g. visual, auditory or tactile aids)
- ✓ Using Frequent breaks
- ✓ Monitoring children's performance and focus
- ✓ Offering more individualized assistance to every child
- ✓ Establishing a standard routine for learning
- ✓ Use visual timer and schedule to help the child get organized

Here you can watch an online webinar for offering remote support to individuals with ASD

Με σχόλια [1]: -

4.8. Using educational software to offer remote assistance during learning to children with ASD

Different kinds of software have recently started to get developed using the latest research findings and finest technological systems in order to offer remote assistance to children with different learning difficulties and allow them to have an enjoyable and fruitful educational experience. This software can address many of the aforementioned issues that parents and educators should consider during online learning and offer solutions to them (e.g. help the child get organized using visual aids, attract their attention in different ways, monitor their performance etc.). Really promising results have been found regarding the learning effectiveness of this educational software in teaching children with ASD, indicating noted improvements in both social and cognitive skills (Alkinj et al., 2022; Pereira et al., 2022; Staikou et al., 2008). While the current chapter offers a theoretical approach on cognitive and learning needs of children with ASD and explains how these can be met using remote assistance and educational software, the corresponding practical chapter of this handbook gives detailed examples of this software together with detailed explanations and guidelines on how they can be used (i.e. see Topic 2 of the practical section of this handbook titled: 'Software for kids with ASD').

4.8.1 Criteria to be considered for development of a software for children with ASD

In order to develop an educational software which will be successful in helping children with ASD develop their social, cognitive and academic skills, it is vital to first fully understand the

difficulties faced by these children and carefully design the software to meet these needs. In particular, three of the most important criteria to consider when developing such software include (Cabanillas-Tello & Cabanillas-Carbonell, 2020):

a) The *type* of software you intend to develop

Given the rapid development of technological and digital tools, different options exist nowadays regarding the assistive technology which can be used to help children with ASD develop their social and cognitive skills. In general, there is a preference for using digital applications or any other forms of interactive software (e.g. virtual reality, mobile games) to help children with ASD as this software has the ability to more easily capture the attention of the child with its unique design and structure. Given that individuals with ASD respond well to imagery and have high visual thinking skills (Grimmick, 2022) a lot of assistive technologies for children with ASD put emphasis on visuals to capture children's attention in an interactive way in order to facilitate learning. Nevertheless, when choosing the type of software you want to develop, you need to consider the age group of your target group and where exactly they lie on the autism spectrum. For example, children with more severe symptoms who experience sensory sensitivity in both visual and auditory input, might find a virtual reality environment with bright colors and loud sounds very overwhelming and difficult to huddle. This might result in negative symptoms of nausea, dizziness, loss of balance or even epileptic episodes (Anses, 2021). As a result, the type as well as appearance and structure of assistive technologies for children with ASD need to be carefully chosen and designed to ensure they will only have positive impacts on the child.

b) The particular *symptom* of ASD you intend to address with your software

In order to develop a software which will effectively help children with ASD you need to precisely decide on the particular symptom or difficulty which you aim to address. Whether this is social and communication skills, language skills or cognitive and learning skills, this needs to be decided when designing the app to ensure it is properly addressed and insight from appropriate experts is used.

c) Supervision when using this software

In most of the cases when children with ASD use assistive technology, there needs to be some degree of supervision by a teacher, parent, tutor, therapist or caregiver to ensure the proper use of the software and help the child. So, when designing an educational software for children with ASD, proper instructions or manual also need to be created to ensure the supervisor knows how the software needs to be used, its functions and capabilities as well as how it can best help the child depending on their specific needs and abilities.

4.8.2 Choosing the right educational software for a child with ASD to offer them personalized remote assistance

Given the abundance of educational software which is available at the moment, choosing the appropriate one for a child with ASD can be a challenging process with a lot of concerns for parents, teachers or caregivers particularly when it comes to distance learning. Educational software aims to teach a variety of different skills to the child ranging from social and communication skills to motor, academic and daily living skills. In generał, successful educational software achieves to:

- ✓ grab the attention of the child
- ✓ intrigue their curiosity
- ✓ allow them to explore new ideas and tasks
- ✓ offer them a chance to apply what they are learning in an interactive manner

When choosing an educational software for a child with ASD you can follow these steps (RaisingChildren, 2021):

1) **Set an *aim***

When first choosing an educational software for a child with ASD you need to first clarify what you are aiming at and identify the difficulty or symptom of the child which you aim to address using this software. What do you want your child to get out of this process? It is important for this goal to be realistic, feasible and relevant to the child's abilities and interests.

2) **Think about *how you expect the software to help your child* in their learning**

Educational software should always act as complimentary to what a child is already learning and their surrounding environment and routine should facilitate the learning process. You can consider what type of tasks the child already performs successfully and then think how an educational software can help progress some of those to the next level. For example, if a child already knows the meaning of some words but is not yet able to pronounce them successfully you can try using an educational software aiming at improving speaking skills in children with ASD and use it for the child to learn the pronunciation of those specific words. This is more likely to be successful than teaching the child to pronounce words they are not familiar with. What is also important to remember is that as a teacher, parent or caregiver you need to

transform the things a child is learning through an educational software, outside of that context as well and help the child use and apply that knowledge and skills in their everyday life. This is the only way to ensure that what they are learning will remain in their memory.

3) Design a *schedule* for using the software

Stability and consistency are important aspects for the lives of all children and especially of those with learning difficulties. When you start incorporating educational software in the learning process of a child with ASD you need to set up a plan for using it and gradually show to the child how to use it before allowing them to explore it independently. Setting up specific days and times during which they are using the software can allow the child to get the most out of this process as they will know what to expect and when to expect it. You can always seek advice from professional therapists who work with children with learning difficulties so that they can help you design a schedule for using such educational software.

4) *Monitor the impact* of software use on your child

It is important to remember that what is helping one child might not necessarily help another. Each child has different interests, needs and abilities therefore you need to explore which app is most helpful for each specific child. A helpful way to check whether the software is indeed heling a child is by monitoring their progress in relation to the initial aims you set when you first started using the software and try and quantify the progress by dividing it into stages. For example, if you started using a software to teach a child how to brush their teeth or put

on their shoes or clothes, you can count each day the number of subtasks the child performs independently and see whether this number progressively increases until the child can perform the whole task on their own. If you struggle to monitor a child's progress you can always seek advice by professional therapists.

You can search for educational software available for children with ASD on the following online finder. This gives you details about each application and instructions on how to use it: http://autismapps.org.au/

4.9 How can an educational software for remote assistance be used with other therapies and supports

When using an educational software to support the learning process of a child with ASD you need to consider how well this software fits with the work that the child is doing either at home with their parents, at school with their teachers or at therapy sessions with professionals of the field. For example, if a parent is using an educational software to teach their child how to read at home but during the same period of time the teachers at school or the therapists use different software to teach the child numbering, then this might be extremely overwhelming for the child and get them confused so the effectiveness of their learning might get compromised.

Source: Pexels

4.10. Concluding remarks

To conclude, this chapter aims to give a theoretical explanation of the cognitive and learning difficulties phased by children with ASD. Initially, it explains two theoretical frameworks which according to researchers, offer the basis for the symptoms experienced by children with ASD; Theory of Mind and Weak Central Coherence. Then this chapter explores the social and cognitive difficulties phased by these children as well as how these change over the years and also depend on the interests and strengths of these children. Finally, this chapter explains how remote assistance can be given during online learning to address the social and cognitive difficulties phased by children with ASD, as well as how specific educational software can help in this.

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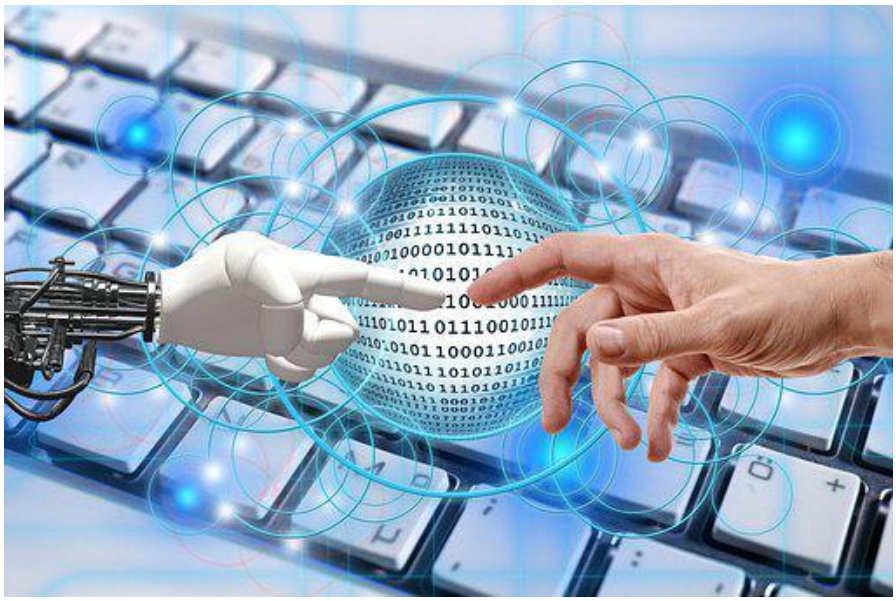
Chapter 5



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Social robots for social applications

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Abstract

This chapter presents and discusses the notion of social robotics and analyzes the different applications of social robots.

The more popular robots designed for assistive purposes.

The chapter focuses on technology for autism spectrum disorder aimed at improving the communication and interaction capability of autistic people.

5.1 Introduction

Over the last decades, social robotics has evolved as a concept that presently covers different areas of application, and interacts with different domains in technology, education, medicine and others.

Robots can be categorized based on their form and capabilities in four categories:

- Humanoid robots or androids, which come in a form that is similar to that of a human.
- Industrial robots, which complete tasks and execute commands automatically and without human intervention.
- Telerobots, which refers to a specific type of semi-autonomous robots that are used for telecommunications.
- Autonomous robots, which are designed with a built-in artificial intelligence (AI) system, to complete tasks and to act without receiving commands from humans
- Based on their functionality, robots can also be categorized as follows:
- Social robots, which can become engaged, to a certain extent, in social interaction with humans through speech and gestures.
- Assistive robots, which help people with special needs, and especially those with motor disabilities.
- Service robots, which can be designed to offer any kind of help a person may need

The most popular definition of social robotics is a scope concerning the design, implementation, and use of social robots that are robots designed to operate and interact with humans, in contexts similar to human–human interaction contexts.

Industry employs social robots in industrial processes such as arc welding, spot welding, to move, pack, and selecting products, assembly components, and other activities.

There is an increasing use of social robots in education. They concern various educational aspects, including teaching assistant, tutor, and novice. Educational applications also include the support to improve skills of people with behavioral deficiencies. The majority of robots used in education are humanoid and Nao from SoftBank Robotics is a well-known example.

A recent review presents a review of social robots used to deliver the learning experience through social interaction with learners, as opposed to robots that were used as pedagogical tools for science, technology, engineering, and math (STEM) education (Belpaeme, Kennedy, Ramachandran, Scassellati, & Tanaka, 2018). The review focuses on the benefits of social robots as tutoring agents. Learning positive effects are related to cognitive and affective outcomes. From the survey, the importance of the physical appearance of the robot emerged.

Social robots are also used for telepresence applications. Telepresence aims at ensuring social interaction among people being at a distant location from them. Different technologies have been implemented to allow a realistic interaction from both user and interaction partner sides. Telepresence robots require features such as autonomy, controllability, maneuverability, and stability to ensure safe interaction with humans.

Other domains of application where social robots have emerged is assistance in health and daily care services. There are social assistive robots designed to support elderly care. In general, social assistive robots have been proposed and implemented to support people with health conditions in social interactions, with the aim of improving their health and well-being and for in-house personal assistance. In healthcare, robots have a variety of applications, and can be classified into three categories: surgical, rehabilitation, and social robots. Furthermore, social robots herein were divided into service and companion categories, dedicated for assistance in one or more tasks, or for user companionship, respectively. In the last context, the appearance of the robot and the extent to which it resembles a human being were reported to affect its acceptability by end users. Social robots are also used to support people with Autism Spectrum Disorder (ASD).

ASD cause disturbs and impaired development in social communication and interaction, and in restricted and repetitive patterns of behavior, interests, or activities. Individuals with ASD have difficulties interacting and communicating with others.

This chapter focuses on social robotics applications for people with ASD.

5.2 Autism Spectrum disorder

In 2013, the American Psychiatric Association released the fifth edition of its Diagnostic and Statistical Manual of Mental Disorders (DSM-5). The DMS-5 deleted a number of previously separate conditions for autism, including Asperger's syndrome, in favor of a single category, Autism Spectrum Disorder (ASD).

The ASD diagnostic Criteria are

1. Persistent deficits in social communication and social interaction across multiple contexts, such as deficits in social-emotional reciprocity, deficits in nonverbal communicative behaviors, deficits in developing, maintaining, and understanding relationships.
1. Restricted, repetitive patterns of behavior, interests, or activities, such as stereotyped or repetitive motor movements, use of objects, or speech, insistence on sameness, inflexible adherence to routines, or ritualized patterns or verbal nonverbal behavior, highly restricted, fixated interests that are abnormal in intensity or focus, hyper or hypo-reactivity to sensory input or unusual interests in sensory aspects of the environment.

There are three recognized severity level for ASD:

1. Level 3, "Requiring very substantial support"
2. Level 2, "Requiring substantial support"
3. Level 1, "Requiring support"

In Europe, the three-year (2015-2018) program *Autism Spectrum Disorders in Europe* (ASDEU) was funded by the European Parliament to research autism prevalence, costs, diagnosis, and interventions throughout Europe (http://asdeu.eu/).

The program scrutinized 631,619 children, with an average estimated prevalence of 12.2 per 1,000 (one in 89) children aged 7-9 years. Overall ASD prevalence estimates varied among European countries, from 4.4 - 19.7 (percentiles 10 and 90) per 1,000 aged 7-9 years.

Another research study reported that, in Europe, the median prevalence of autism was 59 per 10,000 population (range, 8 to 420; mean, 80) over the period to 2020 (Anorson, Male, Farr,

& Memon, 2021). The study argues that while better case ascertainment likely plays a part, further investigation of other factors is needed to explain the increasing prevalence of ASD in Europe, North America, and Oceania.

Several physical theories of autism focus on the right and left hemispheres of the brain. In fact, many researchers have collected evidence that ASD is predominantly associated with significant impairment in the left hemisphere (Green et al., 2020; Im, Ha, Kim, Cheon, Cho, & Song, 2018; Perkins et al., 2014; Roberts et al., 2014), whereas Asperger's syndrome is largely associated with deficits in the right-hemisphere (Enticott, Rinehart, Tonge, Bradshaw, & Fitzgerald, 2010; Gunter, Ghaziuddin, & Ellis, 2002; Säisänen et al., 2019). Interestingly, it is the right hemisphere of the brain that is responsible for expressive and creative tasks. It processes information related to spatial imaging, social interactions, and emotions. In contrast, the left hemisphere is concerned with logic, language, arithmetic, and sequential tasks. The major areas of the brain affected in autism are believed to be the frontal lobes (responsible for coordinating behavior, reasoning, and controlling emotions) and the limbic system (which, along with the amygdala, is the center of the emotions (Figure 1).

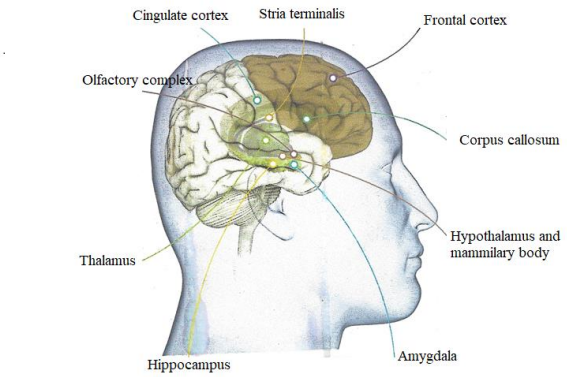

Figure 1. The emotional brain (source: elaborated by Carter, 2019, p. 126)

Many psychological theories have been developed concerning autism, such as the *Theory of mind* (Andreou, Skrimpa, 2020; Baron-Cohen, 2000). To date, however, none of these theories has been able to explain autism in its entirety, although they may be able to explain some specific aspects relating to it.

5.3 Stimulating creativity of people with ASD

The recent literature is rich in studies and experiments on the creative ability of children with ASD (Artemova & Ryazhenova, 2020; Epp, 2008; Khodadadi, 2018; Perriello, 2019). They show that creativity is something that can be built upon and enhanced. An autistic child's creative progression relies on a number of factors. These can include the encouragement of teachers and parents to promote creativity, as well as the type of approach they take (Smith & Madden-Zibman, 2014). The case of a 6-year-old boy diagnosed with autism without mental deficit that was presented and discussed by Melinda J. Emery illustrates many aspects of art therapy and

how it can help improve the social skills of an autistic person (Emery, 2004). However, at the same time, this case provides an insight on the role of the therapist and the effort necessary to achieve results. Emery reports that the boy began the process by working with colored play-doh over several months, gaining control of tracing around the circular shape. After tracing, he progressed to cutting the clay in cookie-cutter fashion. After several months of repeating this process in therapy, the child drew a fragmented figure with a head disconnected from a body. The boy began to draw continuously at home. Emery claims that:

> "[…] in his artistic development, I could observe his progress in his voice, which was now in a more normal tone and not as high pitched. He also improved his eye contact with me while in session" (Emery, 2004, p. 145).

From her experience, Emery concludes that:

- The constancy of parents, teachers, and therapists is necessary to help children with autism.
- Children with autism thrive in an environment where patience, acceptance, understanding, and constancy are fundamental for their growth and development.
- Art therapy for autistic children may serve as a path toward increased awareness of the self, and the sense of self is a cornerstone for relating.

A study based on sandplay showed that this form of art therapy encourages autistic children to become more creative and imaginative (Lu, Petersen, Lacroix, & Rousseau, 2010).

Art therapy methods have been used to help children with ASD develop a better understanding of appropriate ways to respond in social situations (D'Amico & Lalonde, 2017; Van Lith & Beerse, 2019). Art therapy with puppet making and puppetry using the *Expressive*

Therapies Continuum model (Kagin & Lusebrink, 1978) has been explored as a means of promoting emotional empathy in individuals with ASD within the broader scope of addressing issues of socialization (Malhotra, 2019).

Robot interaction has also been experimented as a method of enhancing creativity (Wainer, Ferrari, Dautenhahn, & Robins, 2010). The following paragraph reports an experience of the combined use of programmable toy robots, social stories, and drama.

5.4 ICT and autism

Research on information communication technology (ICT) has been active in the domain of the education of people with autism. Research in socially assistive robotics have tackled the treatment of individuals with ASD, increasingly since 2000, with different studies and investigations.

Robots have been employed to improving imitation skills for young children with ASD. Imitation involves translating from the perspective of another individual to oneself and creating representation of this individual's primary representation of the world (Duquette, Michaud & Mercier, 2008; Zheng, Young, Swanson, Weitlauf, Warren, & Sarkar, 2015). Indeed, imitation, as a deficit in imitation is a symptom of ASD.

In general, research shows that the intervention of robots improves the social motivation and skills of children with ASD, as measured by eye contact frequency and duration, and verbal initiation frequency.

Robots help people with ASD to overcome the difficulty of human-to-human interaction, which tends to be unpredictable. Robots exhibit a predictable form of communication and people with ASD feel safer and “in control” with them. Moreover, robotic tools, in contrast to

humans, can focus on one task at a time, making learning more targeted and simpler for the child with ASD.

It has been observed that children with ASD have difficulty in establishing eye contact with other people, but according to a study conducted with the use of the robot “Kaspar”, eye contact was increased. A human face appears more intimidating to a child with ASD than that of a robot, whose expressions and reactions are more limited and predictable (Amran, Gunasekaran, Mahmoud, 2018).

5.5 Popular robots for supporting people with ASD

5.5.1 The most popular robots used with people with ASD are:

“Nao” is one of the most popular robots for autism therapy and was developed by Aldebaran Robotics. Nao is a humanoid robot in the size of a toddler and it has 25 Degrees of Freedom, which allows it to move freely and adapt to the environment. It can be programmed to fit to a child’s needs and its height is 57 cm. Although it is a humanoid robot, its facial features are quite simple, making it less intimidating for children with autism (Figure 2).

“Kaspar” is also a minimally expressive humanoid robot with a height of 60 cm. It has 6 DoF on its head and neck, 6 DoF on its hands and 2 DoF on its eyes. Kaspar’s face is made of a silicone material, allowing it to display expressions and feelings in a simplified way. It can respond to touch and move its eyes, face and hands (Figure 3).

“Probo” is an animal-like robot that is 58 cm in height and has 20 DoF. It is designed in a way that it can provide a “natural” interaction with humans and it is controlled by a Robotic User Interface. It is made of a flexible and a furry material. The robot Probo is able to give the right

cues to the users in order for them to develop social interaction. Its 20 DoF allow Probo to display facial expressions, making it easier for children to maintain eye contact (Pop *et al*. 2014). The robot can be controlled through a "Wizard of Oz" interface (Figure 4).

"Pleo" is another animal-like robot that resembles a dinosaur toy. It has 16 DoF and it is equipped with a navigation and orientation system, a camera, microphones, touch, movement and orientation sensors, which allow it to move freely. This robot is also able to express feelings through its movements and sounds when a child touches it (Figure 5).

"Aibo" is an animal-like robot in the form of a dog which is equipped with 5 touch sensors in the head, chin and back area. These features allow it to interact with the environment and move freely. Aibo can also follow voice commands (Figure 6).

"Bandit" is a humanoid socially assistive robot that has been designed by the researcher Maja Mataric in the University of South California of Los Angeles in 2004. Bandit has been used as a partner in interventions for children with autism and for the rehabilitation of stroke patients. This robot is able to display various feelings and expressions and it is also able to move, as it is equipped with wheels. Bandit is 56 cm high and it is designed to move its hands in order to express social gesture (Figure 7).

"Jibo" is a 12-inch socially assistive robot that is equipped with a touch screen and has 3 degrees of freedom. This robot can communicate verbally through its speakers and can also make eye contact with the user through its animated eyes. This robot can also exhibit expressive behaviors through its color-changing lights (Figure 8).

Figure 2. Probo robot

Figure 3. Nao robot

Figure 4

Figure 5. Pleo robot

Figure 6 Aibo robot

Figure 7 Bandit robot

Figure 8. Jibo robot

5.6 Robot therapy for people with ASD

In recent years, programmable toy robots (PTRs) have been experimented with a view to helping individuals improve their social skills and communication abilities. Over the past decade, the use of PTRs with autistic children has received considerable attention, even though research on this topic is still in its infancy (Begum, Serna, & Yanco, 2016; Cabibihan, Javed, Ang, & Aljunied, 2013; Saleh, Hashim, Mohamed, Abd Almisreb, & Durakovic, 2020).

Some humanoid robots such as Zeno R-50, Nao, and Kaspar, as well as nonhumanoid robots such as Pleo, Keepon, and Popchilla, have been experimented with as vehicles for promoting the social skills of children with autism (Dickstein-Fischer, Crone-Todd, Chapman, Fathima, & Fischer, 2018; Gandomi, 2018). Milo by RoboKind (Figure 2) is one of the most advanced robots designed to support social and emotional learning for people with ASD (https://www.robokind.com/robots4autism/meet-milo). Working with Milo, individuals with ASD learn to:

1. Tune in on emotions;
2. Express empathy;
3. Act more appropriately in social situations;
4. Self-motivate;
5. Generalize in the population.

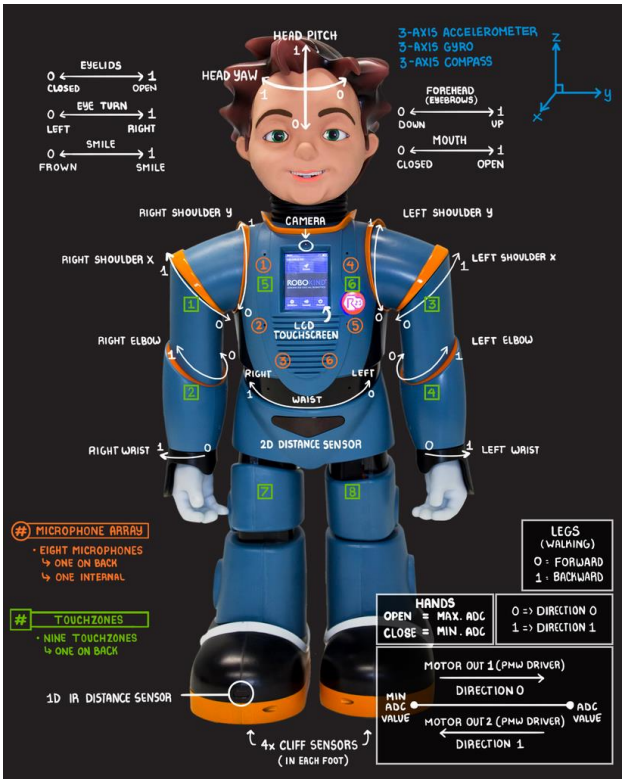

Figure 9 Specifications of the Milo robot (source: https://www.robokind.com/robots4autism/meet-milo).

The in-field experience has confirmed that PTRs represent a powerful means for engaging with children and adolescents with ASD and improving their social communication skills (Kostrubiec & Kruck, 2020; Ricks & Colton, 2010; Talaei-Khoei, Lewis, Kaul, Daniel, & Sharma, 2017).

During the educational intervention reported in the previous paragraph, it emerged that all the autistic people involved in the in-field experience displayed empathy towards Vernie, interacting with it as a pair. They were enthusiastic about the activity, not bored at repeating a task, and were intensely engaged in communicating with the robot. The interaction with Vernie stimulated their creativity. They were excited to describe their relationship with Vernie

to the educator, readily transferred their feelings to the robot, and attempted to offer suggestions and advice.

The experience matured with the educational intervention, albeit within its limits, shows how robots can stimulate and strengthen social skills. However, integrating the use of the robot with storytelling and drama was a crucial element. Moreover, the skills of the educator played a pivotal role and, actually, the educator's involvement was crucial in the definition and execution of the educational intervention. Undoubtedly, the interaction with the robot facilitated users' learning of social and adaptive skills, but the figure of the educator proved to be essential for stimulating motivation.

5.7 Conclusion

The continuous processes of digitization and digitalization are profoundly changing contemporary society, affecting private and public organizations as well as public and social services.

Robotics and artificial intelligence can provide valuable solutions to extend and enhance social services, for example, in supporting people with various cognitive disturbances or limited opportunities. Moreover, digital competence has become a prerequisite to societal participation.

In this chapter, the question of assistive technology and ASD has been discussed, focusing on robot therapy.

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Chapter 6

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Organizing remote learning for students with ASD

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5.1 Introduction:

In the era of Pandemic and restrictions on educational institutions, remote learning has become a necessity and a daily accompaniment to the education of all children, including those with special educational needs.

Learning and therapy moved into the virtual zone overnight, and one and a half billion male and female students in 190 countries around the world in April 2020, did not go to school. This group included children and adolescents with Autism Spectrum Disorder.

Most educational institutions, schools and clinics were not working remotely, especially with children with ASD, until Pandemic.

De facto Covid-19 ushered in irreversible changes and the development of a new era in education, introducing us to the world of cyberspace. This created the space that the international inter-university project "Dilasd" is addressing.

The main goal of the "Dilasd" project has become to equip teachers working with children with special educational needs, as well as social workers, with the necessary competence to help students and children with ASD and their families with distance learning and expectations for social integration of students and children with ASD.

The need for the project proved to be a tragic consequence of the COVID-19 pandemic for students and children with special needs, as educational institutions were not prepared to support them remotely.

It is worth noting that, first of all, the children themselves were not prepared for such a change - versus any change by its very definition in the world of Autism is initially a bad thing. It needs to be well understood, tamed and introduced into daily life in order to be accepted by the child. For all this, there was little time, lack of knowledge and experience. It quickly became apparent that remote education for male and female students with ASD was not beneficial in this group of children and adolescents, which was confirmed by research findings (e.g. Baweja et al.2021; Colizzi et al. 2020).

In parallel, the needs analysis conducted in the European Union countries, during the period

of closure of educational institutions, showed and confirmed the urgent need to support teachers working with children with special needs and social workers in remote educational activities for students and children with ASD.

5.2 On-line Teaching to children with ASD:

The lack of previous experience and research on remote teaching of children with ASD with a parallel lack of preparation of the staff itself for the new situation, that is, conducting learning and therapy in the remote option, was a source of many failures, but at the same time a source of new knowledge and inspiration to find safe solutions and principles in the virtual world of learning. The cooperation of teachers and therapists in obtaining feedback from parents has made it possible to take appropriate educational and therapeutic measures. Such cooperation greatly facilitates the selection of appropriate methods and forms of work. It is worth presenting parents with ready-made tools that can be used at home: relaxation techniques, breathing exercises, books, tutorials, films. It is very important to establish a daily schedule with parents and the student, which must not consist only of school and household duties. During the day, it is necessary to reserve time without a computer, television or telephone. The child should be allowed to play freely, or play movement games, for example, with elements of imitation. A daily walk is really important, oxygenation of the brain, change of external stimuli after school, and relaxation itself. And let's not forget elements of sensory therapy: experimenting with different textures, smells, sounds and tastes. The listed activities require the involvement of parents or caregivers. Children with autism have attention problems, often spending a short time in front of the computer is a huge challenge for them.

Be sure to summon the child's attention, through short, easy commands and simple questions. Let's also reach for the following exercises: jigsaw puzzles, memory, repetition of rhythms, "find the difference", "state the order", mental stories, questions to illustrations, repetition of simple movements, answering questions about the text read. Remember that the result of his work the student can always show off by sending us a photo, drawing, etc. An essential element of working with a student on the autism spectrum under any conditions is a motivational system. It is advisable to use, for example, a plus board or a system of tokens. The final reward does not have to be a toy at all, but listening to favorite music or stacking blocks, a good grade, praise. It is very important to praise the child for every success, even the smallest. Such motivation of the child through the use of therapeutic praise and choosing such ways of administering knowledge that will encourage the child to cooperate brings positive results. In order to strengthen the student's motivation to perform, let's build on his interests, favorite subjects and his strengths. In creating an appropriate educational environment for children with special needs, an individual approach to each student is important. Teachers and therapists take such measures to support the development of the child. They adapt their working methods to his cognitive, emotional and social needs and abilities. The level of the child's functioning influences the selection of appropriate therapeutic interventions, for example: adjusting the way of communicating with the child, reducing or increasing the amount of material, lengthening or shortening the time of work, changing the forms of activity, introducing activities that allow multisensory cognition, using various didactic means. It is also important to provide the child with multidisciplinary assistance that takes into account the needs of the child (e.g., psychological, pedagogical, speech therapy, physiotherapy /Sensory Integration, rhythmic and other developmental therapies).

In the process of remote education of a child on the Autism Spectrum, proper preparation of the external environment also plays a key role. What kind of environment the child is in and what aids he or she uses have an impact on the proper development of his or her competence. When working with a child with ASD, the teacher tries to provide a place with limited distractions. When translating activities from school to remote, we should explain to Parents and Guardians of children with Autism that creating the right conditions for remote learning is very important especially in terms of concentration and achieving better learning results. It is important to eliminate all disturbing noises - the sounds of cooking, cleaning, siblings playing, pets, radio or television. Silence introduces an atmosphere of work and concentration helping our child learn. On the other hand, the surrounding space, and in it order and a small number of objects will be in the room during remote learning, just as conducive to better concentration and education. Let's try to have an empty space around the student, clean unnecessary things from the desk, leaving the computer and basic school supplies, air out the room, turn on aromatherapy. Into such a prepared space we can invite the child for lessons.

The main factor determining the organization of distance learning is the degree of functioning of the child and his cognitive abilities. We can talk about differentiated learning needs in the case of children with Autism. The group of children with autism includes:

For specialists, the biggest challenge is to provide the child with the best possible forms and conditions to further support his development. So, methods, must be adapted to the age of the child, the degree of disability and psychophysical capabilities.

- High-functioning children (intellectual norm) and children with intellectual disabilities

- Speaking and non-speaking children;

- Children with difficulties in emotional and social functioning;

- Children with sensory processing problems;

- Children with increased challenging behaviors.

The main barrier to remote contact between a therapist and a child with a disability is the inability to immediately respond, correct and model the child's behavior. When teaching remotely, the therapist's task is not only to operate the computer and images during instruction, but primarily to guide the student's attention and concentration. Children on the Autism Spectrum often have difficulty focusing attention and completing tasks independently. If they are left with a task to do on their own, they are likely to abandon it quickly.

When working with a child on the Autism Spectrum, the therapist also encounters difficult behaviors. During inpatient therapy, it is much easier to develop strategies and techniques for dealing with difficult behaviors. Online classes, therefore, must be attractive and encouraging to the child to minimize by design such behavioral options. The specialist is expected to anticipate and control the child's stress by selecting tasks that are manageable,

and explain new activities in detail and in detail. Full information about what is going on, what is being done, what is expected of the student is crucial to communication. If disruptive behavior occurs, the child's attention should be redirected to prevent escalation of difficult behavior.

Korczak University is the founder of three elementary schools in Poland, 20% of which are attended by children on the Autism spectrum. In the era of Cowid-19, when the distance learning system was introduced, our schools have made a special effort to care for children with ASD, providing them with tools to support their education and the socialization process, so weakened by the lack of contact with peers in the distance learning option.

As part of the remote work, therapists created teaching content, worksheets, interesting experiments, ideas for cooperative movement games, sensoplastic and art activities.

Teachers and educators also recorded videos of songs and nursery rhymes. A series of travel podcasts was produced: "Mom Wasn't Always Mom" as part of an interesting form of geography lessons, as well as online sports meetings and physical education lessons recorded in episodes in the school gym by a well-known and well-liked teacher-therapist.

All this is done so that children with ASD at any time of the day-when their form is efficient-could have access to materials whose content would not introduce confusion but only solidify previously tamed topics, such as the decor of their classroom or the sight of their therapist, the voice of a teacher they know.

All specialists were in constant contact with children and their parents (classes held on the online platform, online conversations with parents, email correspondence). Our educators provided multi-specialty therapies, consultations and guidance to caregivers of children on the Autism spectrum during online classes. Invaluable in this case was the role of parents, who supported not only the teachers, but especially their own children, with their commitment. In the remote teaching of children with special educational needs, it is the parents who have a very significant impact on the course of the classes. Through their involvement, support and willingness to help their children, they make it very easy for the therapist to conduct therapy or lessons and achieve the goals. Thus, the parent becomes the glue in building a long-distance relationship between the therapist and the child. It is very important for specialists to have constant contact with parents and guardians of children during remote classes.

The involvement and cooperation of families contributes to the therapeutic success of the child. However, from the parents' point of view, therapists and teachers are responsible for the child's therapy. It is important to clearly define roles and tasks. Of course, the responsibility for conducting therapy should not be transferred to the parents. Their job is not to teach, but to support the therapists by participating in remote learning, providing assistance to children and modeling when they need it. During online learning, the parent, together with the therapist, can develop ways of working with the child that will facilitate teaching at home. Introducing children to certain rituals that can be easily repeated both at home and at school, and that at the same time stimulate behavioral stimuli in the child, is very important on the way to achieving results with remote learning.

The reduction of educational facilities and the introduction of remote learning has brought a lot of concern, anxiety and questions from parents of children with special educational needs. Systematic inpatient therapy and the child's contact with a specialist play a key role in the child's development. Multispecialized interactions are designed to promote psychomotor and social development. Transfer to the online mode of the child's education can contribute to the appearance of regression in the child's functioning. Therefore, concomitant therapies are important.

Remote learning is also a new situation not only for teachers and parents, but also for the children themselves. Students strongly feel negative emotions such as fear, stress and anxiety.

The change in the form of teaching certainly has a significant impact on children's behavior - a school or counseling center is a familiar and predictable place, providing a sense of security in which harmony is introduced by the daily repetitive patterns. Disruption of the daily routine can result in the emergence of challenging behavior that prevents proper functioning.

Providing the child with a sense of security is very important during this period: let's devote our time to playing together, talking about feelings, let's plan each day together with the child and warn about changes. Let's praise for any good behavior, motivate them to perform assigned duties (educational, domestic). Let's also find time for rest. The overriding task of families and therapists is to look after the well-being of children.

During this difficult time, the child's emotional sphere and mental health hygiene should be especially kept in mind.

The first answer to the lack of contact with peers is the use of new technologies, among which our Korczak Dream School has chosen a robo-dog called Photon. Photon is a robo-dog with appropriately selected software that allows the child to interact with the toy.

The premise is simple: the child has his own dog friend with whom he interacts - talks to him, programs him, takes care of him, plays with him. After all, learning through play is a pleasure for all children. An important element of robo-dogs is the ability to work with emotions, but also with sensors, which is often a big field for rehabilitation in children on the Autism spectrum.

In our schools, classes with robo-dogs were introduced before the start of the Covid-19 pandemic, which allowed students to prepare at least a little for the difficult conditions of distance learning. At Korczak's Dream School, each child went home with his new friend Photon, who proved to be an indispensable teacher providing tools for normal social functioning.

Conversations with parents convinced us that the teaching decision was the right one, as the children at home did not lock themselves in their own world, but let their robo-dog friend inside, interacting with him, playing and rehabilitating at the same time.

The second tool we decided to introduce as part of therapies to support children on the Autism spectrum is aromatherapy, a natural method of alleviating many mental and physical ailments by sniffing properly selected plant hormones, or pure essential oils. The oils, through the most sensitive sense - the sense of smell, reach the brain as external stimuli and directly affect the nervous system.

No one needs to be convinced that a spring meadow full of herbs, flowers and fresh green grass evokes joy and optimism. A walk in the woods after the rain calms you down, removes nervous tension, guarantees healthy sleep, and a bouquet of fragrant flowers in a vase in the room, soothes the mood.

Specially selected natural oils under the fragrance preferences of children are designed to calm them and help the concentration process and alleviate depressive states, which increased especially during the Covid -19 pandemic under social isolation and distance learning. Currently, at home, sitting in front of a computer for several hours a day, it is much more difficult for a child to concentrate than in a classroom. In addition, the inability to discharge emotions causes tension and substandard, forms of discharge and relaxation.

These are difficult situations for both the children themselves and their parents or caregivers. Therefore, stimulating the brain with favorite scents that affect the nervous system and is helpful for the child himself and his academic performance.

At Korczak's Dream School, we played with aromatherapy in geography lessons even before the Covid-19 pandemic broke out, so that we learned it and liked it. Children sniffed and said what they felt, what they liked: lemon or orange, mint or lavender, or eucalyptus, thyme or maybe pine.

Then we virtually took the children to various interesting places in the world, showing the places where the different smells of fruits, flowers, plants and herbs come from. The children were calm, admired the landscapes, asked questions, were interested. It was evident that they liked this form of activities.

With easy access to aromatherapy at home, you can cultivate school fragrance rituals as part of on-line lessons, remembering to first address the child's mood and select a favorite scent to match it.

Essential oil packets are kept in the homes of Korczak's Dream School children to support their harmonious development in distance learning and are dispensed by Parents or Guardians.

The oil chosen by the child is appropriately dispensed on clothing or administered in a diffuser in the room where the child is staying.
At school, this is handled by the teacher. At home, as part of a remote lesson, a parent will help by applying the chosen fragrance after the first part of the on-line meeting described above.

Introducing children to certain rituals that can be easily repeated both at home and at school, and which at the same time stimulate behavioral stimuli in the child, is important on the way to achieving results in distance learning.

Summing up the private practices implemented at Korczak's Dream School, during the Covid -19 pandemic, it should be clear that our answer to supporting children with Autism Spectrum Disorders, in the age of distance learning, has been new technologies and the natural power of plants as co-adaptive therapies.

5.1 Conclusions:

On-line educational work with children on the Autism Spectrum requires special commitment from teachers and therapists and is also a huge pedagogical challenge.

It is noteworthy that this is also a new situation in which educators are not alone with students in classes, but on-line meetings are attended by Parents or Guardians of children with ASD. De facto this situation is new for all three parties teacher-student-parent, and therefore it is all the more important to develop safe patterns and patterns.

Working on line with a group of male and female students with ASD requires dividing them into small groups, shorter but more frequent connections that are configured in a specific pattern, allowing these individuals to maintain the daily routine so essential for their proper development.

When establishing a relationship, it is important to make the first contact with the child in order to make him curious. It is necessary to speak in a clear, simple, concrete manner and

gesture for better transmission of information, so that he understands the command. It is good to tell the child what he is doing at a given time.

An important point of teaching is breaks implemented at most optimally every 20 minutes, as this is the maximum time to maintain the child's attention in front of the monitor being in contact with the teacher-therapist.

Remote education should be based on very specific material, which will make it easier for children on the Autism spectrum to understand the content contained therein.

This includes the introduction of as much graphic, interactive materials and videos as possible, since material presented verbally may not be properly understood and received by students with ASD.

In addition to the electronic versions prepared, by publishers' textbooks, you can also use alternative methods, such as using quizzes, competitions, or education using escape room, that is, tasks in the form of puzzles, which are developed by various publishers for implementation in online form, and you can also create such puzzles yourself using Internet resources guided by the interests of children. The remote form requires the involvement of the student enough to, on the one hand, focus his attention, and on the other hand, in a clear and readable way to convey the program content.

Remember that an essential link in the process of remote education are Parents and Guardians of people with ASD. Their role is invaluable. Most often, without their support, the process of remote education can prove extremely difficult and sometimes impossible.

Changing the school routine for students on the Autism Spectrum can cause problematic situations, reluctance to undertake remote learning, the consequences of which are felt most acutely by Parents and Guardians. They are the ones who directly have to deal with the consequences of changing the pattern and routine of the day. Hence, in addition to expecting them to cooperate, it is also worth implementing support for them in the form of psychological and pedagogical assistance, training in the use of remote learning tools or coping with difficult situations. It is also important to support them and motivate them to continue therapeutic and

pedagogical recommendations. This is particularly important in the use of communication systems alternative and assistive communication (AAC). Using them in a remotely is extremely difficult. This is because it requires translating symbols, pictures, and sometimes gestures into an electronic version. Sometimes, however, it is also an opportunity to expand this form of communication using electronic tools, e.g.

the introduction of a free application to support communication "LetMeTalk".

To summarize the topic of the work: ORGANIZATION OF REMOTE TEACHING FOR STUDENTS WITH ASD", I would like to close the whole thing in a guide - a decalogue versus presenting below a mini vademecum for teachers and therapists conducting on line classes with children with Autism.

1. Prepare a place to work.

In order to provide the child with a sense of constancy and security, prepare a permanent place for learning. When choosing a place, pay attention to good lighting, a comfortable chair, a table sized to fit the child, and tidiness around it and a limited number of objects. Be sure to use aromatherapy and select scents that are appropriate for the child to stimulate his mood and concentration.

2. Avoid distractions.

The place where the child studies should be free of additional stimuli (auditory, visual) that distract the child. On the table or desk should be only the things necessary for learning: computer/tablet, notebook, worksheet, book, pencil. Other necessary aids that will be used in class can be placed out of the child's sight and reached for when needed.

3. Create a daily schedule.

Graphic depiction of the daily schedule helps the child organize the activities of the day. The need for constancy and emerging difficulties in adapting to change can cause anxiety and challenging behaviors. As a result, the child may refuse to participate in activities. A daily schedule will allow predictability of activities throughout the day and thus give the child a sense of security. As a result, the child will be able to prepare for remote teaching and be more willing to participate in classes.

4.Create rules and regulations for learning.

Children with autism often develop difficult, problematic and disruptive behaviors. Such behaviors can be a reaction to change, frustration from not being able to complete a difficult task, providing themselves with additional stimuli or drawing attention to themselves. Various deficits of the child, such as motor overactivity, concentration problems, poor communication, may also contribute to engaging in undesirable behaviors. In order to help the child in the process of quieting difficult behaviors, you can jointly create a code/rule in the form of a poster, which will include such rules as: I listen to you, I listen to mom/dad, I sit still, I have calm hands, I have a quiet face. The rules and regulations should be placed in a place that is visible to the child and the rules in it should be reminded often.

5.Build your child 's motivation.

Children with autism need a lot of support and motivation during education. A child deprived of positive reinforcement can very quickly become discouraged and even frustrated leading to difficult behavior. Therefore, it is necessary to praise the child as often as possible during learning, appreciate efforts and encourage further attempts (e.g., "You did the task super!", "You did very well", "Bravo! You managed to complete the task!", "You're doing great, you'll manage", "I like that you're trying to complete the task", "I think you'll succeed the second time, try again", etc.).

6.Create a system of reinforcement.

In a situation where the child, despite praise and encouragement, continues to engage in difficult and disruptive behavior, you can introduce a positive reinforcement technique, the so-called token economy. This method involves awarding points for each good behavior or task performed. The child earns points during the class (e.g. 5 points for 5 tasks during learning). At the end of the class, when the child manages to earn a certain number of points, he can exchange them for a predetermined with the parent for a reward such as soap bubbles, a snack, playing with a favorite toy, a balloon, a sticker, etc. - it is important that the reinforcement is attractive to the child and available only after the points are earned.

7. Allow breaks between tasks.

A child whose attention span is at a low level or is overactive in motor skills needs a breather between tasks. During this time, the therapist in charge of the class can turn on a song, read a story, talk to the child about any topic, or allow a moment of play/relaxation (breaks should be no longer than 5 minutes).

8. Model the child's activities.

A child who is unable to perform tasks requiring fine motor skills on his own needs the support of an adult. In such a situation, the parent can "shadow" the child, that is, follow the child's movements with his hands (manual direction), during such tasks as graphomotorics, coloring, writing, drawing, threading beads and other manual exercises.

9. Use simple and short messages.

When learning, a child needs simple and short messages, directly addressed to him, that he can understand. When a child is unable to perform a task, give the child specific instructions (calmly explain the task or model the activity).

10. Take care of the child's mental and physical health.

Keep in mind that in the process of education it is also very important to have time to play, relax and take a break from the busy tasks. Remote teaching involves the child being in front of a computer screen a lot. The child may feel fatigue from the excess stimuli. During the day, the child should be provided with:

- wholesome meals, a diet free of sugar and gluten, rich in vegetables will certainly facilitate the learning process and eliminate undesirable behavioral patterns.

- Active time outdoors (e.g., play on the playground, bike, walk),

- relaxation (reading stories to the child or turning on relaxing music),

- de-sensitization or stimulation (e.g., body and facial massage, during which balls and brushes of different textures can be used, wrapping the child in a cocoon, patting the child's body, walking with bare feet on materials of different textures, washing the child's body with sponges of different textures, swinging the child),

- free play,

- appropriate length of sleep,

- talking about emotions, listening to the child and answering questions.

Implementation of the above guidelines is able to help children with Autism Spectrum Disorders to like remote education and learn with a smile on their face, and after all, this is what we care about, because as our mentor Dr. Janusz Korczak used to say:

"When the Child laughs, the whole world laughs"

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Chapter 7

Co-funded by the Erasmus+ Programme of the European Union

Tools and software for remote assistance services

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Abstract

Children with autism spectrum disorder (ASD) tend to have communication and social interaction deficits. The use of interactive technologies has been demonstrated to enhance the social interaction tendencies of children with ASD. For children with ASD not only concentrating on the learning material but keeping an eye contact or interacting with others can be extremely challenging. Nevertheless, decades of research and Artificial Intelligence (AI) tools which are currently being developed show that these challenges might be overcome. Many families may have welcomed a virtual assistant — such as Alexa, Google Home, or another artificial intelligence (AI)-powered technology — into their home over the holidays, and many parents have Siri or another voice-activated assistant on their phone.

Keywords: Assistant, child with ASD, virtual reality, virtual assistant

7.1 Introduction

Statistics show that the prevalence of autism spectrum disorders (ASD) in the world is increasing. (World Health Organization, 2022). It means that the percentage of children with autism is very high, and educators must take their unique needs into consider. Since the world become connected through information technology, we need to apply this technology to assist students with autism so that they may better participate in this exciting global development. Students with Autism have many characteristics, and no two children are alike, but there are common symptoms. One of them is having difficulties with the imagination, so we could assist them with the Virtual reality system to overcome this problem and many others like social skills deficits, fears, and phobias, and lack of fear of the danger (Munshi, 2022).

The assistant should only perform those support activities that are necessary for the child to help him participate fully in the educational process. The assistant does not have to be constantly next to the student, does not have to perform tasks for him and does not have to suppress the initiative and wishes of the student.

Assistive technology can offer a means to practice skills through an inexpensive, less time-consuming, and more scalable option. Not only can assistive technology help children by allowing them to practice lessons outside of therapy, but they may also help professionals by providing data regarding behavioral and communication skills (Rosenfield et.al, 2019).

Children with Autism Spectrum Disorder (ASD) have been shown to display high levels of comfort with computers for many reasons. Computer programmers are predictable, logical,

and can provide an intellectual outlet for children with specialized interests (Smith, Bone, 2022).

This chapter includes possible software and apps that parents, educators, caregivers, and therapists can use as virtual supports and assistants in the development of children with ASD.

7.1 Examples of software and apps

The purpose of this section is to offer a list of software and apps that provide opportunities to assess and track the development of a child with ASD, as well as offer a virtual support or assistant service. The chapter provides a description of each software or app, as well as its uses and effects.

7.2.1 Identifor and assistant Companion by Identifor

Identifor was founded by the husband-and-wife team of Cuong Do and Lori Rickles - a mom and a dad who worry a lot about their son's future. They teamed up with the best and brightest minds in science, education, and technology to develop a better way to identify individual abilities, skills, and interests. Identifor isn't a skill-building technology. It's not designed to help students do better in math or science or language. Instead, it is a tool that systematically uncovers an individual's underlying abilities and executive functioning skills. It also uncovers how the individual likes to spend his/her time to explore relevant career interests.

identifor

HERE you can access the website of the software.

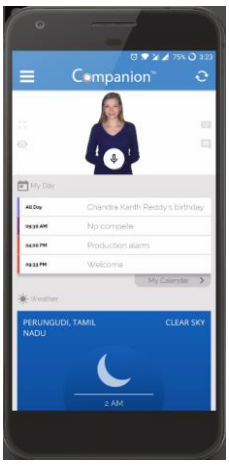
Identifor uses objective metrics and quantifiable data. Metrics reveal an individual's:

- Multiple intelligences. Abilities using the work pioneered by Harvard Professor Howard Gardner in his theory of Multiple Intelligences.
- Executive function. Executive Function (EF) skills based on the work by Professor George McCloskey from the Philadelphia College of Osteopathic Medicine, a leading author in the growing field of EF.
- Career interests. Career interests building on the work by John Holland from Johns Hopkins University.

Identifor's Dashboard provides a quantitative understanding of how an individual's abilities compare to others who use tools. If a person is among the top 10% in some ability or executive function, this perhaps is an area of strength that can be built upon to craft a meaningful future. Objective metrics and quantifiable data provide parents and teachers a common understanding of a student's unique strengths and needs. It allows both parties to improve Individual Education Plans to leverage and track progress against areas of identified strengths.

Identifor helps parents identify and build upon each person's unique abilities, skills, and interests. Unique approach to this understanding comes from the analysis of data collected while individuals play games they will truly enjoy.

Adults with special needs have stated that managing course schedules (including exam dates, labs, etc.) and returning from scheduled breaks can be especially challenging in everyday life. Identifor created the "Companion by Identifor" app to help teens and adults address these challenges, and many more. The Companion app is a 24/7 personalized aide for teens and



adults with special needs. It uses Abby - artificial intelligence avatar - to have real back-and-forth conversations with the user.

Abby is different than the other artificial intelligent personal assistants, like Siri or Alexa. Abby is specifically designed to support someone in a direct and meaningful way.

When parents, teachers, and aides are no longer around to answer questions and help with various needs throughout the day, who can help? Identifor's Companion can. Companion works on smartphone and is specifically designed to help a person address various needs and challenges throughout the day. It uses a human avatar named Abby to answer questions. Abby can even help with:

• Calendar management — everything goes on the calendar to stay organized.

• Reminders for anything you can imagine (morning wake up calls, medications, daily bedtime, weekly laundry, social engagements, etc.).

• Reminders delivered via phone call, SMS, phone alerts and/or Abby pop-up.

• School schedules — class times and locations, exam dates, labs, etc.

• Work schedules — start/end times for work and breaks (including reminders).

• Navigation — public transit, walking/driving directions, and even Uber.

• Money — split bills, tips, bills/coins combinations, expected change.

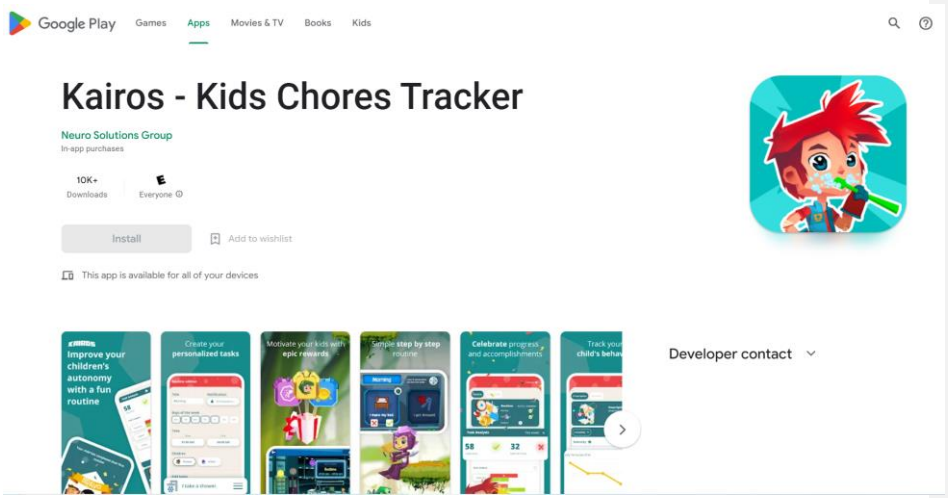
• Weather — plan clothing & accessories based on daily weather, etc.

• Wikihow and Wikipedia — prepare meals, fix things around the house, etc.

The more you use Companion, the more Abby will learn your routines and provide more targeted (and proactive) assistance. While Companion was designed for teens and adults with Autism Spectrum Disorder, it can really help anyone who can benefit from its various modules.

7.2.3 A virtual assistant to support parents of children with ADHD and ASD

Kairos is a web-based, mobile application based on video game principles that gives parents of children with ADHD or ASD access to a routine management system, virtual coach and side-effect monitoring tools. The goal of the tools is to increase children's independence and monitor medication use more precisely. It provides parents and health care professionals with a more complete and objective view of changes in a child's health. It helps with medication decision-making for health care professionals.



HERE you can access the website of the software.

Turn your family routine into a game. Motivate your children with a fun and motivating game! Develop their autonomy without having to repeat yourself. And find the family harmony you've been dreaming of! Kairos relies on the appeal of video games to motivate 6- to 12-

year-olds to do their everyday tasks. Routine becomes a mission to save the planet from aliens.

Discover the parenting coach, a virtual assistant that offers custom advice based on child's progress. A host of tips to manage routines, sleep, child development, screen time and more! Recommendations based on the best practices in positive parenting.

How it works?

1. For the “Task management” module. The parent logs on to Kairos on their smartphone. The parent schedules tasks for the child (e.g. make their bed, get dressed, brush teeth). The child logs on to their smart tablet where they can view the tasks to be performed. After the child completes the tasks, the parent validates them in Kairos. Validation allows the child to receive rewards through a video game (such as experience points or superpowers). A dashboard summarizing the child’s performance is generated based on the data for the parent and the healthcare professional.
2. For the “Medication management” module (that complements Kairos). The parent enters the child’s medication as well as the dosage. At certain times, the parent receives questions from the “coach” on various adverse reactions that may potentially be related to the medication (e.g. sleep, appetite, mental health). Parents can view the information over different time periods and share it with their child’s care team. The parent has access to behavioral and side effects monitoring dashboards. A dashboard summarizing the potential adverse reactions of the drug is generated from the data for the parent and the health care professional.

7.2.3 Average Teaching Assistant (TA) with ASD Skills Hourly Pay

Teaching assistants work at a range of academic levels, from preschool to university. Their duties vary by position, but they usually assist with both academic and administrative tasks. In preschools, teaching assistants often take part in the instruction portion of the day since there is much less instructional time at this level. They usually assist with art activities and play, and they constantly supervise the children during free time.

Teaching Assistant (TA) Tasks:

- Teach courses to reach curriculum objectives.
- Attend trainings, meetings and functions for the organization.
- Address behavioral problems, identify discipline issues and create a learning environment.
- Adapt and design activities, assignments, lectures and course plans.

Teaching assistants can have different basic functions. In agreement with parents, educators and after evaluating the child's needs in the educational process, assistants are assigned tasks for the implementation of one or more functions: Carer; Teacher; Planner; Appraiser and consultant; A "binder" that creates a connection between different activities in the school.

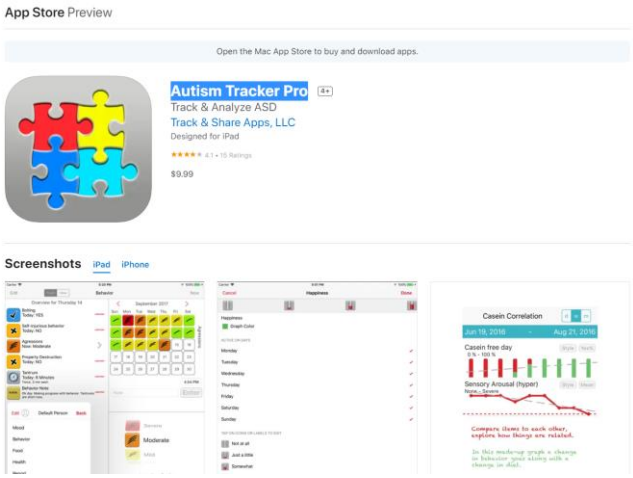
7.3 Autism Tracker Pro

Autism Tracker can be life changing for families with a child on the spectrum. Explore Autism. Track what matters to your child and your family. Use the visual calendar and multi-item

graphs to view and discuss patterns. Share individual events or entire screens with your team using Dropbox, email. Now, track several persons on one device.

HERE you can find the website for this software.

Autism Tracker is an educational app that helps families explore Autism. Each of its screens represents a different domain of Autism. Several screens are already set up to get you started:



- MOOD - Happiness, - Stress, - Activity Level, - Hyperactivity, Weather;

- BEHAVIOR - Bolting, - Self-injurious, - Property Destruction, - Tantrum;

- FOOD - Casein, - Lactose, - Gluten, - Colorants, - Caffeine;

- HEALTH - Sleep, - Bowel Movements, - BM Texture;

- REPORTS - show and compare all items at a glance.

7.4 A-Mate: Integrated Solution for Monitoring, Analysis and Anticipation of ASD children's behavior

The aim of the project is to build assistant applications targeted to autistic people, their parents and therapists to help autistic people to handle unexpected situations on a daily basis more effectively, hence facilitating their integration in the society.

HERE you can find the website for this software.

Biometrical data has been acquired using the wristband specially designed for medical research. The Wristband has different kinds of sensors: accelerometer, skin temperature sensor, photoplethysmography (PPG) sensor and electrodermal activity (EDA) sensor. The photoplethysmography sensor measures Blood Volume Pulse (BVP), from which heart rate, heart rate variability (HRV), and other cardiovascular features may be derived.

The A-MATE activity recognition module is connected to a virtual assistant designed to interact with children with ASD. A transitional object – the virtual assistant - can improve the children engagement.

The project makes use of solid know-how on autism and state-of-the-art machine learning, big data techniques, virtual assistants, and biometrical technologies. Specifically, people use (1) wearable technologies to gather information regarding children's activities, (2) process the information with machine learning algorithms to detect and anticipate behaviors, and, finally, (3) mediate the communication through a Virtual Assistant able to speak with the child.

7.5 Concluding remarks

People with autism find that interacting with a computer or tablet is less stressful and more attractive than interacting with people. It is known that about 25 % of all people with autism communicate nonverbally only, and it causes communication difficulties, and significantly

affects the quality of life, education, and inability to interact. Well-known means of overcoming these difficulties are PECS (Picture Exchange Communication System), a system of communication exchange of images, MAKATON – a simplified sign language; and VOCAs (Voice Output Communication Aids), the portable electronic speech synthesis devices.

Robots with support for artificial intelligence functions are used to overcome the problems of social interaction. The use of virtual reality and augmented reality technologies allows the controlled practice of social skills with a minimum of “dangerous” environments.

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Chapter 8

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Software for kids with ASD

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Abstract

Children with ASD often have difficulties in their cognitive skills, social interaction as well as emotional expression and awareness. Education offered to children with ASD should address these difficulties and allow them to develop cognitive, social and literacy competences in order to be able to contribute in the society and have a more successful professional and social life in their later years. This chapter aims to explain how educational software can be incorporated in the digital learning of children with ASD in order to help them address their difficulties and develop skills and knowledge in an interactive and fun manner. Examples of six different educational platforms are given which address a range of different abilities including cognitive skills (i.e., Otsimo), emotional awareness and intelligence (i.e. Mood Meter), organizational skills (i.e. FTVS), mental health and anxiety (i.e. MindShift), mathematical skills (i.e. Sushi Monsiter) and social norm skills (i.e. Social Norm). A detailed

description is given for each of these applications as well as methodological details on how to use them and information about their effectiveness in helping children with ASD.

8.1 Introduction

Based on the latest figures of the World Health Organization, 1 child in every 100 lies on the autism spectrum (World Health Organization, 2022). Given the high prevalence of this condition amongst children, different types of interventions are constantly being designed to help these children deal with their difficulties and have a smooth integration in the society. Children with ASD often have problems in a range of different skills like cognitive, social and motor skills, while they also experience high sensory sensitivity and tendency for repetitive behaviors (Leekam, 2016). These characteristics make the educational experience a particularly challenging process for children with ASD as things like busy and noisy classrooms, switching between subjects and interacting with teachers and other students, can be particularly overwhelming for them decreasing the efficiency of their learning (Marshall & Goodall, 2015). In order to ensure a fruitful educational experience for all children with ASD, their teaching process should be especially designed and implemented particularly, when it comes to online education and digital learning which has its own challenges and difficulties as it is generally harder to keep the children focused, interested and motivated.

Different educational software can be used during digital learning to help children with ASD have an effective educational experience which can be personalized to their individual needs and abilities. This kind of educational software is especially designed by experts and professionals on special education, using the latest research findings and up-to-date

technologies. It aims to teach skills and knowledge to children in an interactive and fun manner using visual imagery, sounds, activities and exercises as well as digital tools like whiteboards, mobile phones, tablets, text-to-speech machinery etc. These digital tools are more likely to attract the attention of a child with ASD and therefore educators and parents can use it as part of the teaching experience of their child in order to facilitate learning and create a more inclusive and accessible environment (Staikou et al., 2008). Different types of educational software are usually built based on the common learning pathways of children with ASD (Odunukwe. 2019). These include:

- Visual learning: most of the children with ASD respond well to visual information and are therefore more likely to learn new skills and knowledge using relevant imagery and pictures.
- Modelling learning: children with ASD usually imitate other people, actions and behaviors well so if they are directly shown a specific task completed by someone else, they are more likely to learn it
- Haptic learning: due to their sensory sensitivity, children with ASD can learn well using their hands and tactile sense.
- Self-Talking learning: encouraging a child with ASD to self-talk while completing a task or while learning new information can facilitate the process as it can allow them to organize their thinking, improve their social and communication skills and stay focused.
- Step-by-step learning: children with ASD do not respond well to multi-tasking therefore their learning experience should include tasks and information one at a time so that the child will not feel overwhelmed, anxious or intense.

- Typewriting: since children with ASD have difficulties in handwriting due to their problems with motor action and movement coordination, their learning experience can rely more on typewriting to allow them to express themselves and develop their motor skills.
- Singing: another learning pathway for children with ASD is singing as they can usually respond to it better than to simple verbal speech.

Educational software used to facilitate the learning of children with ASD is based on one or more of these pathways and aims to help children address their difficulties through their strengths. This chapter aims to present detailed *examples* of software used to support education of children with ASD and offer a practical advice to educators and parents on how can this software be incorporated in the learning process of children with ASD both in an online and in-person learning context. This chapters supplements theoretical information given in Chapter 4 of this handbook regarding the provision of remote assistance services to children with ASD during their distance learning. While that chapter offered a theoretical insight into the cognitive and learning needs of children with ASD, the current practical chapter further explains how can these needs be met using educational software.

possible software platforms which can be used for digital but also for in-person learning by parents, educators, caregivers and therapists. The examples of software

8.2 Examples of software platforms

This section now aims to offer a list of platforms presented here address the development of basic skills and concepts like development of cognitive skills, emotional awareness, organization skills, mathematical skills, social norm skills as well as improvement of metal health and reduction of anxiety levels. We
are providing a description of each software platform, methodology information on how to use it and information about its effectiveness in facilitating the learning process a child with ASD. Lastly, we provide resources of where you can find more help and information if you are interested in using any of these software platforms.

8.3 Otsimo

Children with ASD generally face difficulties in completing different cognitive tasks including matching, sorting, numbering etc. It is therefore critical that education offered to these children addresses these difficulties and helps them develop their cognitive capabilities in order to acquire the basic knowledge and skills needed for their later teenage and adult life. Otsimo is an educational software developed by special education teachers and therapists, aiming to help children with different communication and cognitive deficiencies, like children with ASD, improve their skills and knowledge. It offers a wide range of interactive and fun games through which children can learn while it also allows for a large degree of personalization regarding its functions and capabilities.

Here you can access the website of the software.

Here you can watch a video with introductory information about the software.

Methodology: Otsimo is addressed to children from one to eight years of age but considering the variation in the learning difficulties of children with ASD it is also highly appropriate for children as old as 15. This educational software can be used for both digital and in-person learning due to the large variation and flexibility in the activities it offers. Otsimo is based on the principles of applied behavioral analysis according to which reward and reinforcement are used to teach a child desirable behaviors, skills and knowledge. Otsimo software is divided into two applications:

- Otsimo Special Education:

This is a mobile application aiming to offer special education to children with developmental disorders and learning difficulties through the provision of more than 100 educational games which can be personalised to meet the needs and abilities of every child. The different activities offered include different everyday tasks like numbering, sorting, matching, colouring etc. Otsimo Special Education aims to address the cognitive, reading and writing difficulties faced by children. This application is available in a range of different languages like English,

Spanish, French, Turkish and German. It is advisable that Otsimo Special Education is used as a complementary method to traditional special education offered by teachers or therapists as it offers an excellent chance for children to develop apart from their social and cognitive skills, their independence as well since they can learn to easily use this application on their own.

- Otsimo Speech Therapy:

This is a speech therapy application which is directly concerned with improving speech difficulties in children, and in particular, speech production and pronunciation, through the use of more than 200 fun and interactive games. Due to its in-build functions of recognizing spoken language, this application can offer personalised assistance to every child. Apart from improving language and speech skills of children, Otsimo Speech Therapy also has the potential to improve social skills of a child as it encourages communication and interaction through the different activities and exercises it offers. This application is currently provided only in English however specialists are working towards incorporating other languages soon. Otsimo Speech Therapy offers a highly accessible form of support which can be accessed anywhere at any time and can be used together with traditional support sessions offered by professional speech pathologists.

Set the Clock

Match Weather Conditions

Learn Weather Conditions

Match Occupations

Professional Tools

Match Fruits/Veggies

Effectiveness: Otsimo educational software has received a lot of positive feedback by professional teachers, therapists and parents, regarding its effective use in improving cognitive skills of children with ASD. In particular, positive comments were received regarding how much children enjoyed playing the games and completing the different activities. Otsimo Speech Therapy has been characterised as one of the most successful applications in improving speech problems in children with developmental disorders and learning difficulties. Here you can find more detailed reviews for this educational software.

8.4 Mood Meter

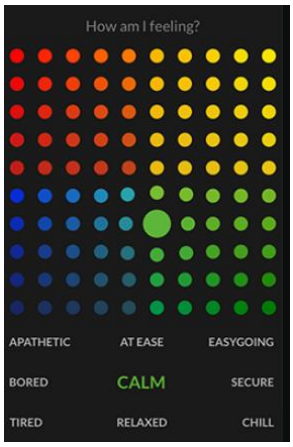
Children with ASD often struggle to understand, let alone describe, emotions of other people and of their own as well. Holistic education offered to these children should help them address this difficulty in order to improve their social communication and interactions. Mood Metering is a technique used to help children with emotional and communication difficulties which has also been described in the educational material found on DiLASD platform in Topic 2. Here we offer more details about how the particular educational software called Mood Meter can be used to help children with ASD. This is a mobile application designed based on the research conducted from the Yale Centre of Emotional Intelligence (AutismApps, 2022). It offers children with ASD the chance to understand their emotions, explore the origin behind them, find ways to deal with them and express them. This educational software improves emotional intelligence skills of children and facilitates their social communications.

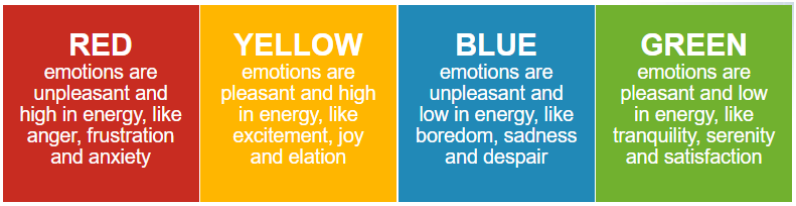
Methodology: Mood Meter is addressed to children with ASD from the age of twelve until the age of eighteen. This software is in the form of a mobile application which can be used both in a digital and in an in-person learning environment. It initially offers the chance to the user to watch a tutorial explaining all the functions of the application and then create an account so that all their data is saved. Mood Meter also offers the chance for personalizing some settings regarding preferences for specific strategies to be used.

Mood Meter works in the 6 stages:

1) Rating of feelings

As a first step, Mood Meter give you the chance to rate your feelings based on a design of four quadrants which are colored in the following way such that each color represents a different emotional category. Each quadrant has one word for 25 different emotions so Mood Meter has a total of 100 different listed emotions.





2) Give a possible reason why you are experiencing a specific feeling

As the second step, the Mood Meter applications requires users to offer a potential explanation for their reported emotional stage. This is for their own reference so it can be done in the form of keywords, notes or sentences. This stage aims to offer children with ASD the chance to explore potential reasons for their feelings in order to improve their emotional awareness.

3) Choose a strategy to deal with a feeling, if needed

The next step is concerned with finding ways to deal with different emotional states if needed. These strategies can be personalized and can include any quotes, images or practical information the user might find helpful to help them face a potentially negative emotional stage and shift to a more positive one. This is a really useful step for children with ASD as practicing ways to deal with their feelings can really help them develop emotional awareness and independence. In case the child is struggling at this stage, a parent, teacher or therapist can help them develop potential ways to deal with their feelings until they are able to do that independently.

4) View your progress through reports of your feelings

Mood Meter allows you to view a progress report of your feelings over a specific period. This can be a really important function for reflection to see the general emotional state of a person with ASD and can certainly be used by their parent, teacher or therapist to channel their approaches and practices accordingly after considering what feelings the child is experiencing.

5) Set-up reminders to update your emotional status

A really useful aspect of Mood Meter is that it offers the chance to the user to set up reminders to record their emotional state and feelings to ensure frequent and consistent monitoring. It can be particularly useful to report feelings during the same time each day in order to explore any potential patterns in behavior and improve the understanding of ones' self.

6) Communicate your feelings with other people through social media

One of the aims of Mood Meter is to encourage social interaction. This can be particularly useful in the case of children with ASD who have difficulties in their social skills and need help in order to improve them. Sharing feelings and thoughts is certainly a way in which children with ASD can learn to communicate and build relationships with friends and family to foster a more balanced adult life.

Here you find the webpage of the software.

Here you can watch a video with introductory information about the software.

Effectiveness: Mood Meter has been described as an effective tool in helping children with ASD develop emotional intelligence and awareness (Trevisan et al., 2021). It also allows children to develop emotional vocabulary to be able to better express and describe what they are feeling and improve their social communications and interactions. During the first times a child is using the software some guidance or supervision by a parent, teacher or therapist might be needed to help them navigate around the application and familiarize themselves with the set-up until they are able to use it independently. Here you can find more detailed reviews for this educational software.

8.5 First Then Visual Schedule (FTVS)

Children with ASD often have difficulties in self-management and in regulating their schedule which is a skill highly important for both educational and professional attainment in adult life. It is therefore critical that their education addresses this difficulty and allows them to develop some skills in time-management, organization and planning, especially during the teenage years when children start taking more responsibilities. The educational platform FTVS is a mobile application which helps children organize their work, set-up their to-do lists and follow their schedule in order to meet their responsibilities in an interactive and fun way (Educational App Store). Through the use of different imagery for many real-life tasks and activities, this software increases independence and improves organization skills for users while it also reduces anxiety.

Methodology: FTVS is addressed to children with communication difficulties like children with ASD from five to eleven years of age. This application allows you to personalize your profile

regarding a variety of different features, ranging from sounds and recordings to viewing templates and images. There are three different ways in which this application can be used: the 'Full-Screen' format in which the images of the different tasks are presented one by one and the user can swipe left or right to view them all; the 'First-then-Screen' format in which two images are shown next to each other and an arrow between them indicates the order in which the tasks should be completed; and the 'List Screen' format in which all images are presented in a checklist structure and the user can record which of them they have completed. A user is given the option to print their schedule or share it online, improving apart from their planning and organization skills, their social and communication skills as well (Good Karma applications). Supervision by a parent, teacher or therapist can be helpful for the first times the child is using the application in order to aid them in familiarizing themselves with the context and function of the application. This software can also be used for monitoring the progress of children with ASD regarding their independence in completing different routine tasks.

Here you can find a video explaining how the FTVS application can be used by teachers, parents or therapists to help children with ASD.

Effectives: FTVS has been described as a really useful tool by parents or professionals working with children with ASD. It successfully attracts the attention of the child and improves their understanding of different routine tasks in a clear and simple manner. As a result of the active role of the child in their learning experience, their knowledge and skills are able to get transferred to other contexts and tasks and not just the ones practiced through the application. Here you can find more detailed reviews of this educational software.

8.6 MindShift

It is often the case that children with ASD have higher anxiety levels than typically developing individuals while especially adolescents with high functioning autism are at an elevated risk of developing anxiety disorders (van Steensel & Heeman,2017). The educational environment, whether it is online or in-person, can often increase anxiety levels in children with ASD due to the amount of information they are exposed to or to the level of visual or

sensory input they are experiencing. As a result, it is critical that parents, teachers or therapists are prepared to deal with such cases and know how to help children with ASD huddle their anxiety. One way this can be done is through the MindShift software which is a mobile application especially designed to help people with ASD deal with their increased anxiety levels and learn how to relax. MindShift application is based on the principles of Cognitive Behavioral Therapy (CBT). Instead of avoiding the problem CBT helps individuals change the way they are thinking or stop unhelpful patterns of behaviors in order to deal with the negative symptoms they are facing.

Here you can watch a video explaining why people with ASD have increased anxiety levels.

Methodology: MindShift is addressed to individuals of more than twelve years old who experience anxiety problems like a lot of children, adolescents or adults with ASD. This software helps the users relax and reduce the amount of panic, worry or discomfort they might be experiencing. This application teaches individuals with anxiety problems, like people with ASD, helpful CBT strategies (e.g. writing thoughts in a journal, listen to calming music,

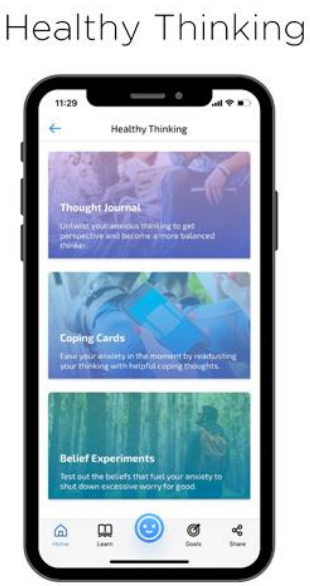
challenging their comfort zone, creating fear maps) in a simple and easy way for them to understand using an interactive format with different images. MindShift also has a range of other useful features like tracking your progress, creating goals which you want to achieve, setting up reminders for practicing your activities or recording your feelings, sharing your data with anyone you want as well as offering you tips for a healthier lifestyle both physically and mentally. MindShift can certainly be used by parents, teachers or therapists, in order to track progress of their children with ASD and view their anxiety levels at different times of the day or during different activities in order to channel their practiced accordingly, find the most stressful situations for the child and help them deal with them.

Here you can find the website for this software.

Here you can watch an introductory video for the MindShift app and its different functions.

Effectiveness: MindShift application is a widely used software for anxiety management which has received a lot of positive feedback regarding its effectiveness in helping the user deal with negative emotions and stress, specifically in the case of individuals with special needs (Dodek, 2015). MindShift is really useful in improving user's vocabulary and in helping them to better identify their emotions, something which is really important for individuals with ASD who have communications difficulties and struggle to express their feelings and thoughts. MindShift is supported by international organizations like the University of British Columbia, the University of Waterloo and Simon Fraser University. Here you can find more detailed reviews about this software. It is also important to note that this kind of educational software

can only be used as *complimentary* to other anxiety therapies. If a child with ASD is experiencing severe anxiety problems, teachers or parents need to seek professional advice by a specialized therapists for proper treatments and do not solely rely on the use of this kind of educational software.



8.7 Sushi Monster

One of the learning difficulties that children with autism face has to do with understanding mathematical concepts and performing calculations (Bae et al., 2015), although when mathematical concepts are thought effectively from a young age, there are cases of individuals with autism who later develop exceptionally good mathematical skills (Iuculano et al., 2014). Ensuring that children with ASD properly develop some basic mathematical knowledge from a young age is vital for their later adult life for both personal and professional development. Sushi Monster is an educational software which can help children with ASD grasp different mathematical concepts like

addition and multiplication (MentalUp, 2022). Using fun and interactive games this application aims to develop a basic understanding of mathematical facts to the users and allow them to practice their knowledge and skills by aiding the monsters of the different games in making calculations in the context of a sushi counter.

Here you can find the website for this software.

Here you can find an introductory video for this software and its functions.

Methodology: Sushi Monster is addressed to children with autism who need to develop their mathematical skills and it was primarily designed for children at the ages of six to eleven. This application includes different difficulty levels (i.e. 7 for addition and 5 for multiplication) to meet the individual needs of children at different ages and with different abilities. Users are taught through the principles of reinforcement learning as they are assigned points, rewards and trophies for giving correct answers in order to stay motivated and engage with the task.

Effectiveness: Sushi Monster is found to be a really fun and engaging software application for improving mathematical skills in children, including the ones with ASD. Sushi Monster is also effective for improving time management, planning and working memory skills. This is because the rewards in the games increase as the speed of the user increases, encouraging fast but also accurate responding. Also, in order for the user to progress to next levels in the game, they need to remember what they have learned and be able to apply it in new settings, further improving their critical thinking skills as well. Here you can read more detailed reviews for this software.

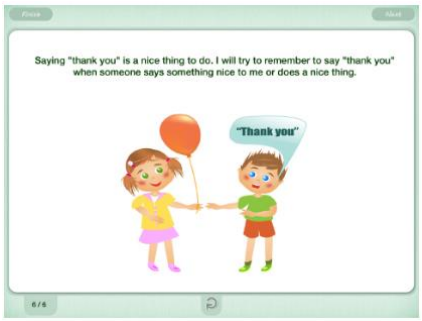
8.8 Social Norms

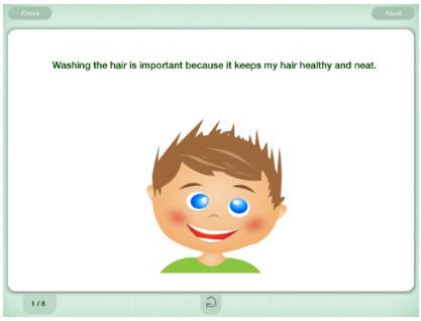
It is often the case that children with ASD struggle to understand the different norms of the society or usual habits of people due to their difficulties in social communication and in understanding thoughts and intentions of other people. Nevertheless, it is important that they practice this skill in order to better integrate in the society and achieve meaningful social interactions with other people. Social Norms is an educational software created by language specialists which teaches children with ASD the different rules of the society and different types of usual behaviors through story telling.

Methodology: Social Norms is addressed to children with ASD aged four and above. This application uses a range of more than fifty stories with fun imagery to teach users different social rules or patterns of desirable behavior. These stories are divided up in the following categories:

- Manner stories (e.g., saying thank you, hello, sorry, goodbye etc.)
- Health and hygiene stories (e.g., wash hands regularly, having a healthy diet, exercise regularly, brushing teeth etc.)
- Safety stories (e.g., using their bike safely, crossing the road, wearing seatbelt in the car, not talk to strangers etc.)
- Daily routine stories (e.g., eating breakfast, tidying up room, getting dressed etc.)
- Community stories (e.g., behave properly in the classroom, helping people in need etc.)

Here you can find the website for this software.





Effectiveness: Social Norms has received a lot of positive feedback regarding its effectiveness in teaching social skills and desirable behavior to children with ASD. In particular teachers and parents found the personalization functions of this application particularly useful as they had the chance to choose their own imagery of real people and use this application with older kids as well. Here you can find more detailed reviews for this software.

8.9 Concluding remarks

Children or adolescents with ASD often have difficulties in a range of different social and communication skills. In order to offer them inclusive education which will prepare them for their adult life we need to address these difficulties. One way to do so is by incorporating different educational software in teaching which has been especially designed by specialists of the field to help users address different social, cognitive or learning difficulties as well as different mental or psychological problems. This chapter first gave an introduction of the criteria which we need to consider when developing an educational software for children with ASD as well as the criteria for choosing one in order to best address the specific difficulties

phased by a child. This kind of software can certainly be incorporated during teaching of the child both in a digital and in an in-person context but can also be used alongside the traditional treatments they might be given by therapists. This chapter offers particular examples of six different educational software which can be used by children with ASD to help them develop their cognitive skills (i.e. Otsimo), their emotional awareness and intelligence (i.e. Mood Meter), their organizational skills (i.e. FTVS), their mental health by reducing anxiety levels (i.e. MindShift), their mathematical skills (i.e. Sushi Monsiter) and their social norm skills (i.e. Social Norm). A detailed description is given for each of these applications as well as methodological details on how to use them and information about their effectiveness in helping children with ASD. This chapter aimed to provide an insight to the reader about how educational software can be used to develop a range of different skills of children with ASD, always bearing in mind the unique personality, needs and abilities of every child in order to ensure inclusive and accessible education for every individual.

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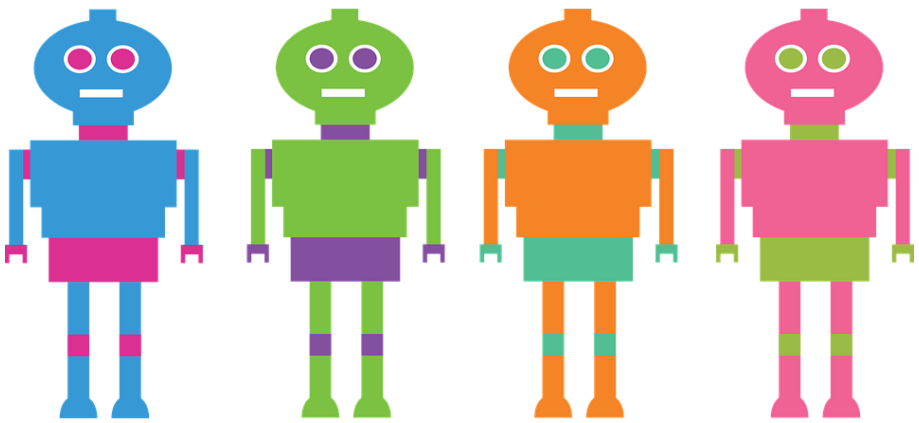
Chapter 9



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Using programmable social toy robots in ASD

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Abstract

In recent decades, technological development has enabled robots as an efficient tool in the rehabilitation field. Several studies have highlighted those behavioral interventions mediated by social robots, including programmable social toy robots, are highly effective in children with autism. This chapter illustrates the positive effects of Programmable Toy Robots in autism interventions programs and provides indications for their use in promoting social and communication skills.

Key words: autism spectrum disorders, social robots, programmable toy robots, social communications skills

9.1 Introduction

In the last decade, advances in technology have highlighted robot therapy as an intervention tool for the rehabilitation programs of individuals with autism. Several studies highlighted its efficacy in different individual functioning areas such sensory, cognitive, emotional, communication and social development (Alabdulkareem, Alhakbani & Al-Nafjan, 2022).

Existing literature confirms that autistic children are particularly involved in interactions with robots (Van Straten, Smeekens, Barakova, Glennon, Buitelaar & Chen, 2018; Marzano, Zorzi & Tambato, 2021). It reports a greater preference of children with ASD for robots, rather than non-robotic toys as well as a tendency to respond faster to cues emitted by robotic partners rather than their human counterparts. Studies demonstrate that robots produce in children with ASD high enthusiasm and an increase of probability of engaging them in social activities and interaction (Begum, Serna, & Yanco, 2016; Amran, Gunasekaran& Mahmoud, 2018).

In fact, children with autism tend to engage more easily in activities when their nature is predictable, consistent, regulated by stable rules and free of social demands. Robot ensure these expectations since they can deliver predictable interactions and responses over and over (Van Straten et al. 2018). Therefore, in these situations children with ASD are able to exhibit those attentional and social performances that are usually quite demanding for them. This engagement can open a door towards having a productive teaching time especially in order to promote social communications skills.

There are various types of educational robots that can be used to promote social communication skills in persons with ASD. Pennisi et al. (2016) proposed a classification of robots based on structural characteristics, dividing them into: non-humanoid robots, with no resemblance to humans and humanoid robots, which have a structure capable of recalling

human appearances. Some of the main advantages of humanoid robotic tools concern the human similarity of behaviors performed (Cabibihan, Javed, Ang, & Aljunied, 2013). In these categories Programmable toy robots (PTRs), in their humanoid versions, can also be considered as efficient tool for rehabilitation programs of children with ASD. This chapter focus on the social robots, and in particular on PTRs interventions in promoting social communications skills in children and adolescents with ASD.

9.2 Using social robots to promote social communication skills

As already point out in the other chapters, people with ASD have a spectrum of characteristics, among which the most represented are the impairment of social and communication skills, restricted interests and repetitive behaviors. The emphasis placed in the intervention programs is therefore on target objectives that can improve social skills and reduce stereotyped behaviors.

Such programs traditionally make use of strategies and materials, such as toys, or even people who are familiar with the child, to create an effective learning environment in order to build these gaping social repertoires.

In these programs, pioneering work has highlighted the increased effectiveness of socially assistive robotics (SARs) in modifying social behaviors in children with ASD (Robins, Dautenhahn, Boekhorst & Billard, 2005; Scassellati 2005). The target behavioral repertoires of these studies are manifold from eye contact to complex social behaviors of collaboration and affection. The use of robots for the construction of these social repertoires has produced

preliminary results differentiated by the following areas:

Eye contact is a feature of social interactions that is often impaired in the spectrum-disordered population. Although it does not constitute a social behavior per se, it is a pivotal skill for both the construction of communication and imitative skills. Research contributions on robotics that used eye contact as a target behavior report promising results: eye contact was observed to be increased when a robotic partner was used (Wainer, Robins, Amirabdollahian & Dautenhahn, 2014; Pop, Pintea, Vanderborght, & David, 2014; Conti, Di Nuovo, Buono, Trubia & Di Nuovo, 2015; Costa, Lehmann, Dautenhahn, Robins & Soares, 2015). These results highlight the increase of this repertoire in children with ASD due to the greater simplification and predictability of facial expressions and reactions of the robot (Amran et al. 2018). The literature has produced many examples of using robots to increase eye contact. The Nao robot (Fig. 1) and Kaspar robot (Fig. 2) have given promising results (Conti et al. 2015; Costa et al. 2015, Wainer et al. 2014).

Figure 1: Children eye contact with Nao Robot (https://www.aldebaran.com/en/support/nao-6/3-interactions)

Figure 2: Children eye contact with Kaspar Robot (https://robots.ieee.org/robots/kaspar)

Communication. Another ability commonly found lacking in children with autism is verbal behavior and in particular requesting behavior. In the training session on request behavior typically, the clinician encourages the children to ask for toys, object, edible items that they want expecting to initiate those interactions themselves. People with ASD find it extremely

difficult to initiate interactions themselves, and this lacking ability can often resort to inappropriate behavior. Some robots have also been designed for use in training of this type. The robot is designed to perform an action only after the child has pressed a button or made a sound. The action of the robot becomes the consequence of a spontaneous behavior of the child, serving as reinforcement.

Imitation. A common way to teach imitation is to have the person respond to the adult's request: "Do the same" giving the model of the target behavior. The imitative response is initially emitted with prompts. Prompts are then gradually reduced in the continuation of the learning sessions, from total physical prompt to partial and finally gestural prompt.

The feasibility of these technological tools to improve imitation skills have been also studied. A significant relationship between imitation and other social behaviors in people with autism is confirmed. The ability to imitate both gross motor skills and more subtle behaviors such as facial expressions were evaluated with positive results in using robots (Mazzei, Billeci, Armato, Lazzeri, Cisternino, Pioggia & De Ros, 2010; Salvador, Silver, & Mahoor, 2015). Conti and collaborators (2015) used the dance with harmonic movements of the Nao robot to increase the child's attraction to the robot, and on the basis of the attention evoked, they requested imitative tasks from the child. Mazzei and collaborators (2010) used the FACE robot and evaluated three types of behaviors: spontaneous behaviors, eye contact and imitation of emotional expressions. FACE is an android used as an emotion transmission system. It looks like a female face with a silicone-based rubber that reproduces human skin patented by Hanson Robotics. It is a system equipped with motor and cables that act as tendons moving the skin of the face. In this way, human facial expressions are recreated. Also, in this case the intervention was preceded by a first part of exposure to the robot. Subsequently, twenty-

minute sessions were implemented in which interaction was coded through eye traking and video cameras. The results of the intervention were evaluated through some items of the CARS Scale, which allowed to highlight a significant improvement in particular of imitation behavior.

Joint attention is a synchronous action of two people looking at the same target. This sharing can take place through the gaze or through pointing. The ability to maintain concentration on a single object is naturally inhibited in children with ASD, causing joint attention activity to be particularly difficult for them. During child-robot interactions, the robot is used to guide the child's attention to a specific object. The possibility of following the direction of the robot's gaze is facilitated by its physical characteristics. In a second step of teaching the person is taught to guide the attention of the robot. Finally, the expression of this competence in the interaction with the therapist and in the natural environment, are generalization element that are taking in to account at the end of the training (Kozima, Nakagawa, & Yasuda, 2007).

Play is a fundamental activity in a child's life, in accordance with the World Health Organization (WHO, 2001) it is an important element in promoting quality of life in developmental age. Children with ASD have difficulty engaging in collaborative and symbolic play, in addiction quality of play is often affected by repetitive behaviors and restricted interests. Improving playing skills is therefore a crucial goal at this stage of the life of the person with autism spectrum disorder. Taking advantage of the attractiveness that technological objects exert and the simplifying characteristics typical of interaction with robotic partners, some programs went to investigate this topic. Results of studies with the robot Probo and the robot Aibo were positive (Stanton, Kahn, Severson, Ruckert, & Gill, 2008,

Pop, Simut, Pintea, et al. 2013).

Complex social behaviors. SARs, especially humanoid ones, can be used as a model of discrete behaviors but also more complex social ones. The robot is often perceived as an attractive and interesting toy. Such a feature allows them to attract interest and support the maintenance of eye contact, prerequisite skill in imitation and social abilities. At the same time these characteristics make it possible to achieve another purpose: mutual attention. Mutual attention is also another aspect of social skills that is lacking in children with ASD, and robotic partners seem to help in its development. Wainer et al. (2014) higlighted the positive effect of robots in promote the engagement of ASD children in the classroom triadic interaction. In this study, authors used KASPAR in children's play sessions. The robot was programmed to operate completely autonomously using information about the state of play and children's behavior. The robot engages, motivates, encourages and advises pairs of children playing an imitation game. Some studies have combined and compared the application of robots with modeling and social stories. These studies show that interventions based on social stories (Marzano & Zorzi, 2022) are more effective when combined with social robots (Leyzberg, Spaulding, Toneva, & Scassellati, 2012; Pop et al., 2013). Furthermore, the use of a social robot as a narrative agent of a social story appears to have significantly greater levels of efficacy than those achieved with a therapist.

9.3 Programmable Toy robots as educational robots for children with autism spectrum disorders

PTRs are commercial robots intended for entertainment and gaming. They can be set in a humanoid version and designed to perform sequences of behaviors generally using a simplified drag-and-drop software interface such as Lego Boost, Robotiky. They combine sensors, computation, and motors to interact intelligently with their environment. In recent years, programmable toy robots (PTRs) have been experimented in the scope of helping individuals with ASD to improve their social skills and communication abilities. The implementation of PTRs with autistic children has received considerable attention. Several studies have demonstrated that they can be an efficient, cost-effective and easy-to-use tool to promote social skills in children with ASD (Diehl, Schmitt, Villano & Crowell, 2012; Cabibihan et al. 2013; Scassellati, Admoni & Matarić 2012; Begum et al. 2016).

These research results highlight that the implementation of applied behavioral intervention combined with PTRs is more effective than standard intervention (Ghiglino, Chevalier, Floris, Priolo & Wykowska, 2021). Their attractiveness and accessibility make them a particularly effective tool for involving individuals with ASD and their families in educational and functional activities. In addition, the minimally expressive design also seems to prevent sensory overload perceived by children with ASD during interactions with other humans.

9.4 Promoting social communications skills through social programmable toy robot interventions in autism spectrum disorders

This paragraph illustrates application procedure and examples of PTRs-mediated interventions for the promotion of communications skills in children and adolescents with ASD.

The use of PTRs in rehabilitation practice has many further application possibilities. Possibilities that respond to different educational needs and that, depending on these, use robots in different ways.

For example, robot as a therapist can be used to develop repertoires of verbal behavior, or social or adaptive behaviors.

Whatever the specific objective, there are some characteristics of the interventions that are common to each other.

The first point is that every intervention asks is certainly the definition of the target objectives. Their definition must include the selection of the target behavior(s). These repertoires are defined operationally and clearly, in order to be intersubjectively collected. Avoiding hazy labels, describe repertoires that can be easily observed intersubjectively by multiple observers. For example, a non-operational goal might be "improve communication," an operationalized goal is "number of times in an hour that the person requests preferred game by verbal request". Once you have defined what you would like to teach, there are a number of other specifics of the learning context that need to be defined. First of all, the definition of the setting: each training is structured in a place and time that can maximize the learning possibilities. For example, it is much more likely that a person can manifest the repertoire of request during the activity that is motivating and in which there are effective reinforcers.

Another important characteristic of PTRs intervention is that training involves programming the robot. PTRs are tool with many options, each robot option is selected and programmed with reference to the specific objective.

For example, in an imitation task the robot will have to be programmed to perform the target behavior (it provides the model) and encourage the person to imitate it "do the same". It is also important to define the types of support that are planned to be implemented. Each support that is used must also have a precise planning of how it can then be removed in order to encourage the autonomous acquisition of skills. Following the previous example, it could be that a physical prompt is planned in the task of imitation, which is then faded over time, gradually removing the intensity of the physical prompt: from the hand to the wrist, to the forearm. In order to understand if the support plan is working or not, it is also necessary to have a measurement system. System that can outline what the skills are before training, during and after it. The evidence of the acquisition of the skill can therefore be derived from the comparison with the baseline data.

Finally, before start any robot-mediated interventions, it' fundamental programming a structured or semi-structured robot exposure activity of children with autism who have never interacted with the robot in order to investigate their reactions, their approach behaviors and types of interactions for the definition of the specific rehabilitation objectives and robot-mediated intervention strategies.

9.4.1 Semi-structured observation procedures of children with ASD interactions with social toy robots

This paragraph illustrates semi-structure observation procedure of the first's children with ASD interactions with PTR. It's part of an exploratory research conducted in an Italian Day care center for adolescents with ASD of the Public Social Health Authority for persons with

disability of Udine. It's the first step of a larger investigation process whose objective is to define an integrated project aimed at developing PTR-based solutions for children and adolescents with ASD.

The experience was carried out through the low-cost LEGO® BOOST PTR (Fig. 3), in its humanoid version of Vernie. LEGO® BOOST is a PTR that can be programmed to perform sequences of interactive tasks: moving (forward, backward, right, left, in a circle), speaking, moving arms, moving head. It has a color and distance sensor capable of detecting 6 colors and objects at a 5- 10 cm distance. Vernie is programmable using an icon-based drag-and-drop coding interface application (Benedettelli, 2018; Bundschuh, 2019) through smartphone or tablet device (Fig. 4).

9.4.1.1 Participants

The study involved six adolescents with ASD. All subjects were able to speak, but they presented significant verbal communication and social interaction difficulties. All of them used Alternative Augmentative Communication System - Pictures exchange communication system (PECS).

9.4.1.2 Setting

The study was conducted in the occupational room of the day care center. Each session was conducted by an educator who directly managed the procedure, assisted by a second educator who independently observed and filmed each session. The subject sat in a designated chair beside his companion, while the experimenter stands behind him up. The educators who conducted the experiment was well-known by the subjects. The space of the room was organized, before every session, as showed in Figure 5.

Figure 5: setting for the realization of interventions through social stories with the PTR Lego BOOTS (own source)

A shelf unit divided the room in two parts. The PTR was positioned on the table in the “part a” of the room immediately visible to the subjects just when they entered in the room. During the sessions in the “part a” of the room the educator (responsible for the session) was present. In the “part b” of the room another educator, not immediately visible to subjects, observed and videotaped the sessions by a mobile video camera. In the room there was adequate space for placing and operating the PTR freely on the floor.

9.4.1.3 Procedure

The study following these phases:

1. The educator built two Vernie robots together with one of the autistic adolescents involved in the in-field activity.
2. The autistic adolescents freely played with Vernie under the supervision of the educator.
3. The educator programmed Vernie for simple social communication interactions for semi-structure experimental trials.

Seven semi-structure experimental trials per subjects were completed during two weeks. Each session lasted 10 minutes, during with the participants were allowed to interact with the PTR. The sessions combined the use of the robot with the implementation of ABA based

techniques (Cooper, Heron & Heward, 2020). The procedure followed these steps:

a) Engagement: before starting each session, the subject was engaged by the operator through a verbal anticipation ("Now let's go to meet Vernie!") along with the presentation of a discriminatory stimulus: Lego Boots pictogram prepared for the daily visual agenda according to the TEACCH system.

b) Demonstration and modelling: Then educator presented PTR positioned at the table and connected to the relative device (Android tablet): "Look at Vernie! Look what Vernie does!". The educator sets the tasks on the tablet and starts them one at a time. After the PTR has performed a task then the educator imitates its behavior e.g. "Vernie goes on" and the educator move one step ahead; "Vernie Turn Right" and then turn right; "Vernie turns around" and the educator turns around; "Vernie stops and says hello!"

c) Direct exposure: the educator proposes the tablet and the robot to the subject and says: “Have you seen what Vernie does? … now try to do it by yourself with Vernie! Let’s show to (name) what Vernie does!”. The initiative is then left to the participant. The educator interventions are limited at:

- Modelling repetition: after the demonstration, if the subject following Vernie model does not execute it, the educator repeats the sequence.
- Prompts: after 30 seconds of inactivity, a prompt is provided in order to encourage the subject to interact with the robot (e.i. “Try to do it with Vernie”). If the subject does not interact with the Lego Boots, after 3 prompts the session is interrupted.
- Physical supports and fading: following the procedure errorless during the session the educator provided support to help the correct using of PTR only when the subject has

already started a spontaneous interaction with the robot and encounters some difficulties.

The supports were systematically reduced and faded in correspondence with the gradual learning to carry out the task autonomously.

- Positive reinforcement: educator provide a social positive reinforcement to all positive initiative and interaction behaviors with Lego boots acted by the subjects. Figure 6 illustrate some of the procedure steps. Figure 6: Participants interact with the PTR Lego BOOTS (own source)

9.4.1.4 Coding and registration of social behaviors

The sessions were entirely filmed to facilitate the processes of codification of the frequency of occurrence of the interaction target behaviors of the participants. The interaction behaviors were operationalized into the Verbal behaviors, Social behaviors categories reported in the registration sheet illustrated in table 1. The duration of activity with PTR was also measured and reported.

Participant		**Verbal behaviour**			**Social behaviour**			**Duration of activity**
Session date		Name the robot	Repeat the expressions given by the	Answer the robot or educator	Collaborate or perform tasks on	Ask to the educator information /	Talk to his companion about activity	
1								
2								
3								
4								
5								
6								
7								

Table 1. Coding sheet for the coding and registration of social behaviors.

9.4.1.5 Findings

Data was collected and then analyzed for each subject. They confirmed that PTRs represent a powerful means for engaging with children and adolescents with ASD, as well as for improving their social communication skills. All the six autistic adolescents involved in the in-field experience showed empathy towards Vernie, interacting with it as a pair and they were motivated to repeat tasks with him.

9.5 Programmable toy robot social communication interventions

With reference to what illustrated in the paragraph introduction, the exposure and sensitization of the child with autism to the robot is the first step to the definition of robot-mediated intervention for the promotion of social communications skills. Application examples of those possible robot mediated rehabilitation interventions are shortly reported below.

Imitation

Target behavior: The child mimics the behavior of moving the hand (say hello) within 30 seconds of the model provided by the robot.

Baseline: The person is shown the robot waving three times and is measured if the person moves their hand.

Setting: the robot is placed in front of the person on the therapy room table. Learning sessions are structured 3 times a week for 3 minutes.

Prompt: If the person does not imitate the robot model within 30 seconds, the therapist from behind physically guides person to perform the movement.

Prompt fading: after 3 sessions of successful execution with physical prompt, the prompt is gradually removed. It is moved from the hand to the wrist and finally also removed from the wrist.

Verbal behavior (Intraverbal – answer questions)

Target behavior: The child answers the question "how are you?" asked by the robot within 30 seconds.

Baseline: The person is shown the robot asking that question three times and is measured if the person speaks.

Setting: the robot is placed in front of the person on the therapy room table. Learning sessions are structured 3 times a week for 3 minutes.

Prompt: If the person does not respond to the robot within 30 seconds, the therapist from behind provides written support with the answer to the question "I'm fine".

Prompt fading: after 3 sessions of successful execution with written prompt, the prompt is gradually removed. The writing is gradually printed more and more clear: from black, to gray, to white.

Verbal behavior (Mand – ask questions)

Target behavior: The person selects the button within the application to make Vernie sing.

Baseline: The person is shown the application and Vernie and is given free access to all buttons. The number of times you click the "sing" button is measured.

Setting: the robot is placed in front of the person on the therapy room table. The iPad with

Vernie's control application is on the table within 20 cm of the participant. Learning sessions are structured 3 times a week for 3 minutes.

Prompt: The therapist from behind provides physical support in order to click the "play" button.

Prompt fading: after 3 sessions of successful execution with physical prompt, the prompt is gradually removed. The support is removed through the time delay procedure. A time interval of 5 second is inserted between the presentation of the iPad and the delivery of the physical support.

Complex social behavior (Social adaptive skill: "order breakfast at the bar")

Target behavior: The person makes the purchase at the bar, after viewing the model provided by Vernie. The target behavior includes: saying "good morning", ordering the brioches "I would like a brioche"

Baseline: The person is observed at the bar and the presence or absence of the two target behaviors is signed. No support is provided.

Setting: the robot is placed in front of the person on the therapy room table. The robot runs the model inside a paper model of the bar. Learning sessions are structured 3 times a week for 3 minutes.

Prompt: If the person does not respond at the presence of the barman within 30 seconds, the therapist from behind provides written support with the script "Good morning, I would like a brioche".

Prompt fading: after 3 sessions of successful execution with written prompt, the prompt is gradually removed. The writing is gradually printed more and more clear: from black, to gray, to white.

9.6 Programming a robot-mediated rehabilitation intervention

In order to increase applicability for clinical professionals, Begum et al. (2016) propose a set of procedure, which can guide the definition of robot-mediated interventions. The essential elements contained in the guideline include:

1. *Objective of the intervention*: The goal of each clinical intervention should be clearly defined. It should promote socially meaningful repertoires of behavior. This means defining therapeutic goals that can improve the necessary life skills or eliminate/reduce behaviors that interfere with functioning.

2. *Participant description*: The description of the participants contains first of all the definition of diagnostic and demographic characteristics (age, sex, diagnosis). Established diagnostic tools and established observational procedures should be used to assess how a participant performs on that specific skill class prior to intervention. This observation is called baseline and describes the state of competence of the person before treatment. These data will then be compared with those of the treatment and through this operation the clinician can evaluate whether the intervention was effective or not.

3. *The definition of independent variables*: The independent variable in any robot intervention is the robot itself. In general, the common goal of all these interventions is to show how the use of a robot can improve therapeutic outcomes. It is important to define what the robot's role is: a co-therapist, therapist, or simply as an intervention tool. In the design of this part, it is important to describe what type of tool is used both with respect to hardware and software characteristics. The setting envisaged for the intervention and the actions that will be implemented must also be specified. The actions implemented by the

robot and the therapist should be described with such precision that they can be replicated.

4. *The definition of dependent variables*: The dependent variables concern the set of behaviors that are assumed to be modified by the intervention. This change will increase in the case of learning skills and instead it is assumed that behaviors will be reduced in case of problem behaviors. Taking the previous example, the dependent variable will be the number of requests made to Vernie in an hour of free play.

5. *The intervention design*: The definition of the type of experimental design is important in order to demonstrate evidence that the results obtained are actually due to the introduction of the robot and not to other variables.

6. *Generalization training.* The purpose of the generalization training in an intervention is to verify that the new skills acquired can be demonstrated over time, in different settings, stimuli and responses or people. Planning this part is an essential element of the intervention in consideration that the repertoires demonstrated with robots must then be manifested even when the robot is not there. The robot is a learning aid. Proof of learning is given only when all external help has been removed and the person demonstrates that ability independently. In the previous example, the generalization will be programmed by gradually replacing Vernie with a human partner. Verifying that the person can make requests with the same response rate even with people, in different environments and even for different other games.

9.7 Conclusions

Through social robots and PTRs, children with ASD can practice new skills in a similar human interaction way, in a facilitate context that is less complex and dynamic that the natural one. Using social robots in educational interventions sessions has a positive impact in the participation of learning activities since they: enhance engagement, reduce anxiety and stereotypical behaviors, promote collaboration and interaction, increase joint attention with partners and educators and determinate a general improvement of educational and rehabilitation outcomes.

Anyway, in defining interventions with social robots, it is important to consider two crucial elements.

The first concerns the competence of educators involved in social robotics. The practitioners (e.g. educators, teacher, psychologist…) have to master a framework of competences that includes knowledge in basic computer science, robotics and in rehabilitation programs. The use of PTRs should be contextualized; appropriate social communication situations should be designed, based on the available functions of the robots.

Another central element is the possibility of representing evidence of the robots-mediated interventions. The definition of specific educational and rehabilitation strategies, their definition and replicability contribute to the demonstration of their effectiveness.

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Chapter 10

Co-funded by the Erasmus+ Programme of the European Union

Distance learning practices for Individuals with ASD Tips for social educators, social workers or social volunteers

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Interdisciplinary Network for Special and intercultural education, "Include"

Abstract

It is a given that technology can in no way replace the physical presence, contact and relationship of teachers with children and their families especially, for children with ASD. But under extraordinary circumstances, like COVID-19, distance learning tools and methodology proved important irreplaceable tools that we believe can be used in order not to waste time. Dilasd is here to provide good practices and suggest steps based on Covid-19 experience; to facilitate distance learning practices and to improve the effectiveness of the continuation of the provided Special Education at home by familiarizing teachers, social and special educators, therapists and families with the new data.

10.1 Introduction

Although distance learning methodology had been developed since the start of the new century, the universal use of it only in the previous years was realized. This universal use created new challenges and emerged new data that led to the recreation of concepts and methodologies, especially for the inclusion of children with disabilities. Of course, new data comes to reshape the previous definitions.

Several definitions have been formulated for distance education, scientific or general ones, which highlight either its technological or pedagogic dimension. One of the most basic conceptual approaches to distance education is that of Keegan (2001), who defined five key characteristics, which formed a comprehensive and comprehensive definition of distance education and are the following:

- There is a separation of teacher and student.
- The educational institution influences the design and preparation of the material, and the provision of support services to teachers.
- New technologies are used to support the course.
- There is two-way communication between teacher and student.
- The absence of the learning group, so that the learner functions as an individual and not as a team

According to Simonson et al. (2015) distance education is divided into four key elements:

- Distance education is based on an institution. Many institutions that offer distance education should be recognized in order to ensure their reliability and improve their quality.
- In distance education, there is a geographical distance between him teacher and the learner.
- Distance education uses interactive telecommunications. The interaction can be synchronous or asynchronous. However, interaction should not be the primary feature of teaching.
- Distance education involves learners, resources and teachers. In this way, teachers are connected with learners and there are resources that enable learning. For this reason, the resources should be subjected to pedagogical design processes to be organized into learning experiences that promote learning.

The introduction of new technologies in distance education, either as a basic form of education or as a supplement, can contribute significantly, to shaping a new era of learning and education (Toki & Pange, 2010; Toki & Pange, 2011; Pange & Pange, 2011; Garrison, 2011). However, teaching methods have not kept pace with technology, particularly in Primary education (Altan & Karalar, 2018). This fact is due to an increased rate of technology development, in relation to the rate of application of methods. Also, the skills of teachers are limited when it comes to technology, while in some areas there is also low socio-economic development, as is the case of Greece (Oliver et al., 2010).

In the context of distance learning of children with Autism new disciplines and territories are important to be taken into consideration. In Greece, the pandemic has led most of the country's educational systems to operate ex-distance. However, this abrupt introduction did not allow for adequate training of teachers, so that they can apply it in education. These concerns:

1. Parent's involvement
2. Enhancement of participation, inclusion and learning in the educational processes

10.2 Parents involvement

The concept of parental involvement concerns equality between the contracting parties, teacher and parent, which includes "mutual respect, exchange of information, feelings, as well as joint participation in school management and reception decisions across the spectrum of education" (Tsibidaki, 2016: 78; Gioka and Salmond, 2015: 375).

In parent involvement, parents focus and care about the whole school and the children who attend it. For this, it is necessary to determine the rights and responsibilities of the school and parents as well as procedures and joint accountability, which will ensure an active and dynamic action of the parents in administration and decision-making. At the same time, parents and the school interact in the same space, aiming to improve their performance in skills and attitudes. Therefore, parental involvement harmonizes with the systematic approach to parents' views in relation to the school (Tsetsos, 2015: 170). Teachers expect parents to help them create a positive collaborative learning environment that has no hard school–home boundaries. Such a family–school *partnership* may involve (a) parents discussing school matters with their child, (b) direct help with homework, (c) supervising the child's progress, (d) communicating with school staff, (e) participating in school decisions and (f) getting involved in activities (LaRocque et al., 2011).

However, remote learning during the COVID-19 pandemic has been a forced activity that requires spontaneous and often random action, and which has a global character evoking various reactions from national education systems. In the face of the risk of successive waves of the disease, which might lead to continued social distancing and limitations in the operation of schools, it is justified to study in detail the strategies of parental involvement in remote education and to define the role of parental approaches and perceptions of difficulties and potential benefits of online education.

10.3 The committed teacher

The first cluster of 219 people includes parents who were very involved in the remote education of their children, both substantively—by explaining difficult or new issues and by

encouraging the child to study—and logistically—by assisting in mailing worksheets, managing the deadlines for school tasks or assistance in technical matters. Parents with this approach helped and motivated their children to study but did not do assignments for them. They spent about three hours and 23 min a day on average (*M* = 3.35; *SD* = 1.71) supporting the remote education of their children.

10.4. The autonomy-supporting coach

The second cluster of 106 people refers to parents who were relatively less involved in the remote education of their children than the rest of the respondents. Parents using this strategy spent the least time supporting remote education (almost two hours a day; *M* = 1.99 and *SD* = 1.89). These parents did not carry out school tasks for their children but emphasized the importance of independence in the learning process. Interestingly, they more often support their children emotionally and motivate them to complete school tasks than assist with sending worksheets or keep an eye on the calendar, thus supporting the child's autonomy.

10.5. The committed teacher-intervener

The third cluster of 96 people includes parents who—similarly to the respondents from cluster 1—explained new and difficult content, assisted and motivated the child to carry out school tasks; however, they additionally declared that they performed tasks and assignments for their children. This group of respondents spent about four hours and 20 min a day on average (*M* = 4.29 and *SD* = 2.34) on their children's remote education.

Some of the parents additionally provided general reflections on remote learning and its implementation. They were encouraged to articulate comments at the end of the questionnaire. Qualitative analysis showed that parent statements from clusters 1 and 3 were similar in their nature. The parents expressed remarks such as the following. *There are no remote lessons. I do everything for the teachers. We do 4–5 times more homework than before. The only plus point is that the teacher writes letters to the child* (online survey comment, parent to grade 2 remote learning students, 2020, Poland). *E-learning at primary school level is a mockery. The only thing teachers do is send unclear commands via online grade books (…). With new topics, young people are completely left to their own devices with YouTube videos* (online survey comment, parent to grade 7 remote learning students, 2020, Poland).

The above comments refer to parents having to take over the duties of teachers. This represents the two strategies of (1) committed teachers (first cluster) and (2) committed teacher-interveners (third cluster). Parents perceived that remote lessons did not take place or were too few and were not adjusted to student abilities. This brings some additional insight into potential reasons for strategy choices among parents.

Qualitative analysis of comments from parents who adopted the *autonomy-supporting coach* approach (second cluster) suggests that they supported their children in a different way, as demonstrated by the following excerpts. *I talk, praise independence and suggest inspirational sources, for example, in the case of presentations or art* (online survey comment, parent to grade 6 remote learning students, 2020, Poland). *I only get involved when my help is necessary. But every day we talk about what happened in the school online, what has been*

assigned, what the lessons were, etc. (online survey comment, parent to grade 8 remote learning student, 2020, Poland).

These parental comments indicated that they spent more time talking, trying to inspire the child, accompanying the child in the day-to-day and providing help *when* needed instead of performing school tasks for the child. The lack of intervention by such parents did not represent neglect. Parents in the second cluster engaged in a different form of support that left more space for independent student learning.[1]

TIPS 1

As there is a common perspective

A number of studies show that the more autonomous and less controlling parents are, the better their children perceive their cognitive and academic competencies (Sternberg & Grigorenko, 2000). These children are more internally motivated (d'Ailly, 2003) and show increased persistence after facing challenges, difficulties and failures (Moroni et al., 2015).

teacher live the kids alone

But how can this happen when the children are Autistic condition? How teachers could support the effective involvement of parents of children with autistic disorders?

- determine the most appropriate modality of distance learning real-time learning) or asynchronous instruction (independent learning on its own schedule), blended or hybrid instruction (a combination of online and in-person instruction), and

[1] Knopik, T., Błaszczak, A., Maksymiuk, R., & Oszwa, U. (2021). Parental involvement in remote learning during the COVID-19 pandemic—Dominant approaches and their diverse implications. *European Journal of Education*, 56, 623– 640. https://doi.org/10.1111/ejed.12474

offline instruction (learning activities that don't require a computer or internet access).

- daily communication with your child's teacher about what is working and what is not working. child's teacher with feedback and requesting changes as needed.
- Help children distinguish school days from weekend days
- This means that children should engage in a typical school day routine such as waking up at a specific time each day, changing out of their pajamas and into school clothes, brushing their teeth, and eating breakfast before the day starts. Children should also have a consistent bedtime routine each night.
- Prepare the learning environment at home. Use visual and auditory supports: Many children benefit from visual and auditory supports including visual schedules, to-do lists, First-Then boards, and timers. Some children benefit from seeing pictures that outline their entire day or even a specific activity. Others may need a more simplified format that shows them first doing their work, then taking a break. The websites Autism Speaks and Do 2 Learn provide excellent resources to create your own visual support.
- Use rewards appropriately and effectively. Identify what your child is motivated by and consider offering rewards based on the amount of time you want them to engage in the school task/activity or specific behaviors expected during school time. For instance, if your child is only able to stay seated for about 12 minutes, you may want to offer your child a reward every 10 minutes they remain seated. Once they have success with this amount of time, you may want to reward them every 15

minutes they remain seated. The goal is to meet your child where they are, have realistic expectations and then gradually increase the amount of time that your child can stay seated for a lesson before receiving a reward.

- Provide high frequency positive attention for appropriate behavior. While your child is engaged in schoolwork, provide frequent positive attention by saying, "I like how you are sitting so nicely" or "Good job holding your pencil." It may seem repetitive as you will likely be praising your child for many of the same behaviors over and over. However, if you see something that you like they are doing and want to continue to see them do it, make sure to praise them!

- Build in planned breaks. Prior to observing your child engage in challenging behaviors in response to feeling restless, bored or challenged by a task, offer them some sort of brief movement break away from the schoolwork area. Make sure to let your child know that the break has an end time, such as 5 minutes, and feel free to use a timer to signal how much time they have left and when it's time to return to school work. Consider avoiding activities, such as screen time and going outside, which are activities that may be difficult to transition away from.

- If after you have implemented these strategies and the distance learning approach currently in use still does not seem to be appropriate for your child, consider having a discussion with your child's teacher and/or ARD team. For some students, depending on their age, cognitive/developmental abilities, communication abilities as well as behavioral challenges, certain distance learning modalities may not be an appropriate fit. If this is the case, it's important for families to discuss this with their child's school to discuss different options. Specifically, some students may benefit

from an offline or more hands-on teaching approach from their parents that does not involve engagement in any online instruction whatsoever. Therefore, they may benefit from ideas of how parents can incorporate learning objectives into the child's daily routine, rather than a scheduled online instruction session. For instance, if the child is working on counting, perhaps they can work on counting toys or counting food items during mealtimes. For other children, working on more adaptive skills like toileting or putting laundry away or cooking might be more appropriate.

- Parents are also encouraged to take planned breaks for themselves that may or may not involve their children. For instance, it might involve taking a walk outside with your child, but it also may involve going into another room and phoning a friend or listening to music. Taking time for self-care, even if there are brief scheduled moment during the day, is critical for everyone's mental health.

file:///C:/Users/inclu/Downloads/ijerph-19-08783-v2.pdf

TIPS for social Educators

In the research of Rice et al. (2016) the teachers stated that the strategies they had during distance learning were limited especially when they understood that their students cannot regulate their learning. After communicating with them they were trying to figure out what They also struggled to provide personalized support.

In Rice's (2006) research, experts emphasized that there is a great need to develop programs and special assistive technology to cover the special needs of the children and themselves to develop as much as possible

Exploring asynchronous teaching (Barbour & Hill, 2011) it was found that most of the time was not spent on providing instructions with the aim to complete the tasks by the students. These instructions were judged by students incomplete and ineffective. The students were not able to they study as they should

Although, utilizing distance education for children with autism is a challenge for special educators. Due to the special characteristics of the distance methodology, it can be beneficial for the inclusion and participation of children with autism in the educational process to everyone's surprise.

Why do special educators use distance learning methodology for children with autism?

- As it limits social interaction with physical presence, it also limits the factors that put at risk the social interaction of individuals with autism.
- Moreover, given their preference for digital tools, they are given the opportunity to utilize special software through which learning and skill development are promoted in various fields.
- Allows the selection of interacting or not through the meeting rooms
- Allows the selection of promote the interaction with specific peers
- Allows the differentiation of teaching, as the student with autism could have access to specific lessons as it’s peers work on different exercises

So why not?

Try to find ways to support children with autism to feel connected, stay engaged, and learn effectively in the virtual classroom and beyond.

10.6 Enhancement of participation, inclusion and learning in the educational processes

10.6.1 Create attractive presentations

Slideshow is central in remote classroom environments. They must be attractive and accessible to attract children's attention . Make sure your font style and size are legible, and add graphics (e.g. charts, photos, animations) to your presentations to make them appealing to everyone.

Easy to read content.

TIPS

- font size to at least 24 points
- for simplicity, choose sans-serif fonts, such as Arial and Verdana
- balance the text to visuals
- short phrases to avoid crowding your slides
- supplement text with relevant pictures, film clips, gifs, or comics that illustrate key concepts

- use plenty of high-quality images Search for images on Pixabay or Unspash or use the icons available to PowerPoint or Google Slides users.

10.6.2 Collaboration with teacher assistance

Assistant teachers could be supportive and it is really helpful to be on your team. TIPS

Think creatively about how to use their skills to support students in the inclusive virtual classroom.

- to support the learning process with co-teaching (e.g. model a breathing strategy as the teacher explains it, role-play a scene from a novel with the teacher),
- to use the chat box to message students who need clarification at key points or
- to offer guidance to one or more students during group work sessions and collaborative time.
- In some cases, it may even be appropriate for paraprofessionals to lead the class in a mini-lesson (e.g., lead the circle, play a Kahoot game!) to allow the teacher time to check in with individual students or manage difficult situations.
- in providing students with one-on-one check-in support. Some students will need a morning check in to review the day's events. Others will need a check in at the end of the day to ask questions and discuss homework. Check ins can also provide students with opportunities to practice skills (eg organizing materials) with adult supervision.

10.6.3 Record the virtual lessons with the permission of the parents

Teacher-viewed videos can be very powerful for students on the spectrum who enjoy repetition. For some students, watching a video once is enough, but for others, watching it multiple times should be helpful (Suskind, 2014).

Videos created by teachers (e.g., read alouds, mini-lessons) supplement in-class learning experiences and textbooks and often are being used in inclusive classrooms. These tutorial videos not only help students with disabilities, but they boost comprehension for other students. Additionally, are especially helpful for those who may need alternatives to auditory input (CAST, 2018).

Videos can also be used to "flip" instruction in hybrid or virtual environments and provide students with more opportunities to receive one-on-one instruction to connect students with the teacher and provide a bridge from school to home.

CAST (2018). Universal Design for Learning Guidelines version 2.2.

10.6.4 Accommodate them

During virtual learning accommodations update

Some students who were in physical classes during the school day needed access to noise-canceling headphones. They no longer need this support when learning from home.

There are many other supports, however, that will likely remain unchanged. Those who need end-of-day check-ins from a teacher or paraprofessional will likely still need this accommodation in virtual learning, and those who need multiple breaks to get through a day of instruction will likely need reminders to move, opportunities to participate in a preferred activity and scheduled time away from classroom work.

Accommodations specific to virtual learning may include

- allowing students to observe and listen in visiting rooms (vs. active participation),
- allowing them to have their camera on or off during class. and allowing them to sign during asynchronous work.

10.6.6 Give your students choices

Giving options is an easy way to make virtual education easier and more engaging for students with autism. Choices can pique students' interest in a lesson, increase motivation, and prevent challenging behavior (Reutebuch, El Zein & Roberts, 2015).

The choices can be small, as in

- "Do you want to work alone or with others?"
- "Do you want to read or write first?".
- Other options may be more substantive, such as in "What do you want to learn?"

A tool that can be used to organize and communicate choices in the classroom is the tic-tac-toe board. Tic-tac-toe boards are ideal for use in a diverse inclusive classroom because they allow each learner to study the material in a completely unique way while addressing the same unit goals or lesson objectives.

In virtual classrooms, tic-tac-toe boards can be especially useful for asynchronous learning. Allowing students to use materials and tools they prefer, access resources in different ways, and express themselves using different methods can not only increase students' interest in learning but also boost achievement. Need ideas for this proposal? Visit my Pinterest board dedicated to pick boards.

Tic-Tac-Toe Menu

Directions: Chose activities in a tic-tac-toe design. When you have completed the activities in a row—horizontally, vertically, or diagonally—or in the 4 corners, you made decide to be finished. Or you may decide to keep going and complete more activities. Star the activities you plan to complete. Color in the box when you finish the activity.

Collect Facts or ideas which are important to you. (Knowledge)	**Teach** A lesson about your topic to our class. Include as least one visual aid. (Synthesis)	**Draw** A diagram, map or picture of your topic. (Application)	**Judge** Two different viewpoints about an issue. Explain your decision. (Evaluation)
Photograph Videotape, or film part of your presentation. (Synthesis)	**Demonstrate** Something to show what you have learned. (Application)	**Graph** Some part of your study to show how many or how few. (Analysis)	**Create** An original poem, dance, picture, song, or story. (Synthesis)
Dramatize Something to show what you have learned. (Synthesis)	**Survey** Others to learn their opinions about some fact, idea, or feature of your study. (Analysis)	**Forecast** How your topic will change in the next 10 years. (Synthesis)	**Build** A model or diorama to illustrate what you have learned. (Application)
Create An original game using the facts you have learned. (Synthesis)	**Memorize** And recite a quote or a short list of facts about your topic. (Knowledge)	**Write** An editorial for the student newspaper or draw an editorial cartoon. (Evaluation)	**Compare** Two things from your study. Look for ways they are alike and different. (Analysis)

(48) Pinterest

10.6.7 Add toys and props

Want to breathe some life into a boring lesson? Do you notice that your students need a boost in understanding? Would you like to increase student engagement? If so, introduce a magic wand, stuffed toy, or even a houseplant into virtual learning experiences!

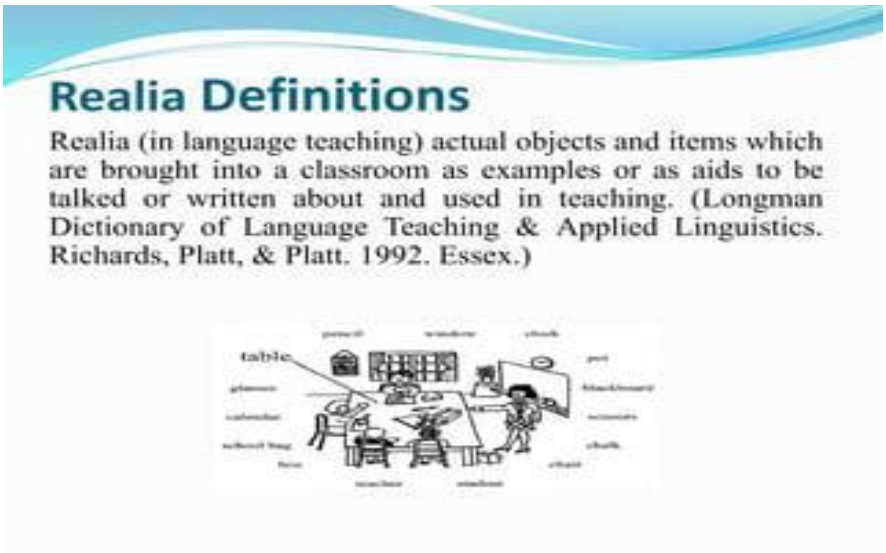
Use games and props

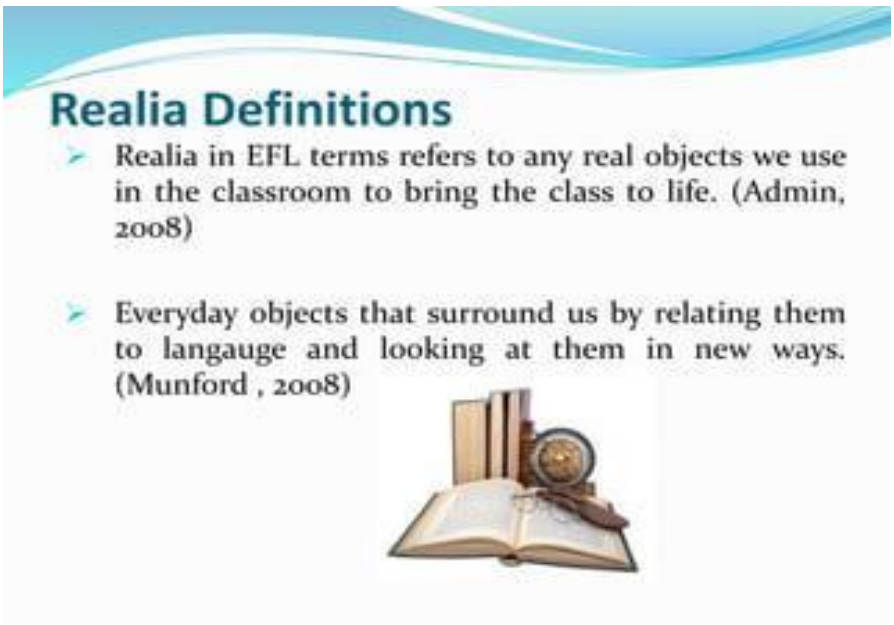
- to emphasize points,
- elicit responses from students,
- and add humor to lessons.

A classic choice is the rubber chicken. Use it to get the group's attention or to highlight them as an audience member during the story. Buy a "magic wand" from the dollar store and use it to tap the syllables in a word. Put on a cape to transform into a superhero capable of solving any problem or deciphering any word.

REALIA FIFTH SEMESTER (slideshare.net)

Realia is another tool you can use across all subject areas and grade levels.





Realia can help students learn vocabulary, but it can also make lessons more memorable. The use of realia in virtual classrooms is not uncommon but objects can and should be even more the norm in distance education.

When a house is a classroom, many concepts can be illustrated with a short trip to the basement or a tour of a closet. Introducing the vocabulary word parka? Grab one from the closet. Teaching measurement? Illustrate the gallon and pint by holding up different milk containers.

Are you reading about the desert? Put a cactus in front of the camera.

10.6.8 Give the kids a break

Movement is a key strategy to support learning, enhance engagement, promote retention, and prevent challenging behavior. Standardize movement breaks (eg drills, dances, quick games) during daily instruction and introduce students to online resources they can access during asynchronous learning experiences.

Students need to move. This applies to both face-to-face and distance learning. Consider starting your mornings with some exercises (eg arm circles, jumping jacks), giving students time to pace and think of questions before a discussion, or introduce a batch to a vocabulary lesson.

There are endless benefits to providing movement during daily lessons. Movement enhances academic achievement, engagement, and creativity (Norris et al., 2019; Oppezzo & Schwartz, 2014). It can also be a proactive behavioral support for students on the autism spectrum (Tarr et al., 2020).

Teachers of young children regularly add Go Noodle or YouTube dance videos to their teaching, but brain breaks are not as common in middle and high school. This doesn't have to be the case, as there are many ways to give students an opportunity to move before, during, or after a learning experience.

To earn money for recess, teach students the benefits of movement. Sometimes, students don't want to participate in a structured break with the whole class, but when they understand how a round of Simon Says or some yoga can help them learn or stay focused, they may be more willing to participate.

Teachers of young children routinely add Go Noodle or YouTube dance videos to their instruction, but brain breaks are not quite as common in middle school and high school. This does not need to be the case, as there are numerous ways to give students a movement opportunity before, during, or after a learning experience.

To gain buy-in for breaks, teach students the benefits of movement. Sometimes, learners do not want to engage in a structured break with the entire class, but when they understand how a round of Simon Says or a bit of yoga can help them learn or remain focused, they may be more willing to participate.

10.6.9 Be mindful

In recent years, mindfulness techniques have entered classrooms for many purposes. Educators use many strategies, from meditation to breathing to relaxation techniques, to empower students and calm nerves. These tools are beneficial (McKeering & Hwang, 2019; Romer et al., 2015; Zenner et al., 2014) regardless of context, of course, but may be even more powerful and necessary during virtual training.

Since distance learning is so new to many students and can initially pose several challenges, mindfulness techniques will help align their focus on the content and reduce anxiety. There are many mindfulness strategies that can be easily incorporated into daily virtual lessons. Invite students to reflect with an occasional journaling prompt (see Mindfulness Journal Prompts for ideas). Insert an animated breathing break into your slide deck (use Giphy and search for "breathing exercises").

Stop during class and remind students to drink water and stand still for a moment. Adopt a few techniques and use them regularly, or commit to exploring new strategies to see what works best for your students.

10.6.10 Add captions

Looking for a quick and easy way to make your lessons accessible to all students? If so, enable live captions in the tools and platforms you use and teach students to access captions in apps like YouTube and Flipgrid.

There are several ways to make virtual learning easier to understand. One of the easiest is to add live subtitles. PowerPoint has a live captioning feature and is a powerful tool for the inclusive classroom (Dello Stritto & Linder, 2017). Spoken words are transcribed in real time and can be displayed in many different languages.

There are many uses for live captions. Use them during presentations to reinforce students' understanding of the material. This support can be especially helpful for your students who are deaf or hard of hearing or English learners. Add captions to classroom discussions to support emerging readers and boost listening comprehension and word recognition. Finally,

you can support language and communication goals with subtitles. Activate them to encourage students to use an audible voice or speak in a target language, for example.

There are other ways to access subtitles besides PowerPoint, of course. Google Slides also has live captions, but as of this writing, this platform does not have a language translation feature. Zoom, Google Hangouts Meet, Flipgrid, and YouTube also have captioning features. Captions are now everywhere! Enable this feature and see the many ways they can increase access for students with and without disabilities.

10.6.11 Provide opt-in options

Some students with autism may feel comfortable unmuting their microphones to share comments and questions, but others will need other participation options. Teachers can provide options for certain students with identified needs or simply allow all students in the class to contribute in ways that feel most comfortable for them.

When students are on the other side of a computer screen, it can be a challenge to engage them creatively in lessons. Not only are some cooperative structures (e.g., turn and talk) a

little more difficult to design, but interacting via a screen also makes it a little more difficult to detect how (and if) students engage in whole-class response rituals; such as chanting, giving a "thumbs up" or raising their hands. Therefore, teachers need to use strategies that work well in virtual spaces and are accessible to students with different social and communication preferences.

One way to meet the needs of a wide range of learners in this context is to provide options for interaction. When asking questions, allow students on the spectrum (and potentially all of

your students) to respond in ways that feel most comfortable for them. Some may want to type in the chat box and others may want to share verbally. Still others may want to keep response cards (eg yes/no, agree/disagree) or pictures to express themselves.

Apps can also be used to support students. Use Jamboard to get answers from your team. Give students time to create Flipgrid video responses in a lesson.

https://youtu.be/PH_BqO9EGYM

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