Improving the Social-Behavioral Attributes of Children with Autism through Computer-Based Interactive Video Games

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ABSTRACT:

Autism Spectrum Disorder (ASD) is a condition that impacts neurological development, resulting in challenges with interpersonal interaction, socialisation, and behaviour. Children with ASD often have difficulties in these areas, which can lead to social isolation, academic underachievement, and other related problems. Despite recent advances in early diagnosis, interventions, and rehabilitation, the expected behavioural characteristics of children with Autism Spectrum Disorder (ASD) continue to have poor outcomes, with a significant number of children unable to live independently as adults. The use of ICTs and computer activities can positively influence the treatment and education of children with special needs. The multisensory stimulation provided by adaptive technologies can assist children with diverse learning styles and preferences to become active learners. Structured computer games can improve both mental and physical components, train specific skills, teach children with ASD about real-world events and their reality, investigate and comprehend typical human processes, and can be utilized for a variety of additional purposes This paper examines the impact of the 'autismgames.com', a free interactive video games portal on the social and behavioural development of five Children with ASD. This study's findings suggest computer-based interactive video games can be used as an effective tool for enhancing socio-behavioural characteristics of Children with ASD. However, it is imperative to use them as part of a comprehensive treatment plan that includes other therapies and interventions, such as speech and language therapy, occupational therapy, and behavioural therapy.

Keywords: Autism, Socio-Behavioural attributes, Video game, interactive learning

INTRODUCTION:

Autism Spectrum Disorder (ASD) is a condition that impacts neurological development, resulting in challenges with interpersonal interaction, socialisation, and behaviour. The disorder is characterized by a wide range of symptoms that can vary in severity from person to person (Porayska-Pomsta,2011). The Diagnostic and Statistical Manual of Mental Disorders (DSM-5 diagnostic manual), published in 2013, merged all autism disorders into one umbrella diagnosis of ASD, which replaced the previous subtypes, including autistic disorder, childhood disintegrative disorder, PDD-NOS, and Asperger Syndrome.

The American Psychiatric Association (2013) has identified a primary characteristic of ASD as a deficiency in social functioning. Early diagnosis and intervention can enhance preferred outcomes for children with ASD (Zwaigenbaum, 2015). The aforementioned deficit encompasses challenges in commencing or participating in social activities, challenges in comprehending alternative perspectives, engaging in unsuitable behaviours, and absence of eye contact, maintaining distance, non-pragmatic utilisation of language, and a deficiency in communicative gestures, eye contact, recognising social signals, and making friends among other related issues (Volkmar FR,2014).

There is no "typical" or "normal" presentation of Children with Autism Spectrum Disorder (CwASD), and they have a range of abilities and strengths. Various treatments and therapies are available to help manage the symptoms of ASD (Grynszpan et al., 2008). Early diagnosis and intervention can enhance preferred outcomes

for children with ASD. It is possible to enhance the social skills of CwASD through a variety of methods, including social skills training, psychological therapy, and parental education. Interventions may target a variety of skills, including interpersonal interaction, emotion regulation, cognitive functioning, and problem solving.

Empirical research has shown that Children with ASD benefit significantly from therapies that aim to improve their social skills and functioning. Improvements in academic performance, social connections, behaviour, mental health, and prospects may follow from implementing these changes to address deficits and increase social proficiency. The importance of social development in children with ASD must be recognised and appropriate aid and measures must be provided, for the sake of promoting the development of these skills and the eventual accomplishment of social proficiency (LaGasse, 2017).

COMPUTER BASED GAMES AS A LEARNING MODEL FOR FOSTERING SOCIAL COMMUNICATION

The challenges faced by Children with ASD in establishing peer relationships and their increased likelihood of being excluded from social settings have been documented in previous research (Chamberlain et al., 2007). Therefore, it is suggested that the acquisition of game-play skills could serve as a crucial mechanism for Children with ASD to enhance their social skills. Games are a suitable medium for customization and do not necessarily require excessive dependence on external assistance. Numerous children with ASD can engage in autonomous interaction via the game (Lancy and Grove, 2011).

Computer Assisted Instruction (CAT) approach can developed as a remediation technique (Powers et al. 2011). LaCava et al. (2007) likewise utilized the Mind Reading programming to prepare eight children with autism to perceive essential and complex feelings in PC introduced voice and face boosts. This study speaks to an expansion of Golan and Baron-Cohen (2006) on the grounds that the Mind Reading programming appeared to be compelling in children, and additionally in grown-ups, and there were huge enhancements from pre-to post-mediation in measures. As a useful symptom, the partaking children with autism observed the computer based games to be fun, engrossing, and showed great aptitudes.

Virtual reality (VR) is currently utilised as a tool for providing training in social situations that individuals with Autism Spectrum Disorders (ASDs) may find challenging, such as navigating a crowded canteen to locate a seat or engaging in shopping activities (Mitchell P,2007; Lanyi CS, 2004). Digital play environments have been used to provide affect-free, audio-visually stimulating digital play environments, which are extremely popular with children with ASDs (Keay-Bright WE, 2007).

REVIEW OF RELATED LITERATURE

Autism is characterised by deficits in social interaction and communication, as outlined in the DSM-5 and ICD-II. The literature suggests that there exist multiple associations between the aforementioned categories of disabilities (APA, 2013; Hansen et al., 2014). According to Miller et al. (2015), children diagnosed with autism spectrum disorder frequently encounter challenges in the domain of pragmatics, which pertains to social language. According to Tierney et al. (2014), challenges in the field of pragmatics can be exhibited through a range of behaviours, including but not limited to maintaining eye contact, engaging in reciprocal conversation, adhering to turn-taking norms, sustaining topics of discussion, appropriately initiating and responding to greetings, demonstrating proficiency in speech prosody, comprehending figurative language, and interpreting non-verbal cues related to emotions. According to Miller et al. (2015), deficiencies in social communication can increase the probability of experiencing social isolation and diminish opportunities for social involvement.

Kasari and Patterson (2012) found that autism-related impairments in cooperative tasks negatively affect social interactions. Many children with Autism Spectrum Disorder (ASD) have trouble noticing others' presence and emotions, which makes socialising harder. Multiple research (Calder et al., 2013; Reichow et al., 2012) have shown that as children with Autism Spectrum Disorder (ASD) go through academic years and grade levels, social expectations increase, causing social difficulties to worsen. Cidav et al. (2012) noted that young children with autism who lack social and communication skills may face many challenges and missed opportunities throughout their lives. Social problems negatively impact academic achievement, school attendance, mental

health, and conduct (Munkhaugen et al., 2017; Rabiner et al., 2016; Denham & Brown, 2010; Silveira-Zaldivar, 2019).

Kasari et al. (2011) found that children with Autism Spectrum Disorder (ASD) are more isolated and lonely than non-ASD children with autism. Schreibman et al. (2015) found that ASD children often feel isolated. This is due to social skill inadequacies, not a lack of interest in social engagement. Magiati et al. (2013) observed that children with autism are less satisfied with their social functioning and interpersonal interactions. Autism is associated with social rejection and bullying, according to Hebron et al. (2015).

Mordre et al. (2012) found that socially competent children with autism who have ordinary to above-average cognitive abilities are more likely to succeed in life. Makin et al. (2017) found that children with milder social difficulties transition to middle school more easily. Fulton et al. (2014) also observed that children with lesser social difficulties are more likely to be mainstreamed. According to Baron-Cohen (1995), children with ASD struggle with perspective taking. According to Baron Cohen (2001), inability to understand another's perspective can lead to cognitive insensitivity or compassion deficit.

Sorayya Rezayi's 2023 investigated the efficacy of computerised cognitive games as interventions for children with autism. The review revealed that the implementation of appropriate computerised game-based solutions has the potential to improve cognitive indices in this population.

The utilisation of Information and Communication Technologies (ICTs) has the potential to provide support and motivation for the management of children with special needs and Autism Spectrum Disorder (ASD), as suggested by Plichta in 2018. These technologies provide a variety of sensory experiences, predominantly visual, to users (Desideri L, 2020). According to Mohd CK (2020), these technologies facilitate self-regulation and foster independent work. As a result, the utilisation of computer games, whether played offline or online, has demonstrated a symbolic increase amidst the widespread use of computers and the Internet (Rahman MR, 2011].

Due to advances in personal computer and mobile phone capabilities, the rise of personal mobile systems like tablets, and the availability of computer games on these platforms, Vallefuoco E (2017) claims that computer games have transcended temporal and spatial limitations. Modern rehabilitation and cognitive empowerment strategies can improve cognitive abilities in children with Autism Spectrum Disorder (Mercado J's, 2021). This may promote adulthood and reduce socio-psychological problems. According to de Vries M (2015), game-based cognitive rehabilitation is expanding its boundaries in enhancing academics, social skills and psychological wellness of children with or without disabilities.

OBJECTIVES:

The aim of this study is to investigate the potential of computer-based video games to improve the socio-behavioural characteristics of children diagnosed with autism spectrum disorder in specific domains.

1. Adapting to change
2. Transactions
3. Emotional matching
4. Nonverbal actions
5. Grouping objects
6. Schedules
7. Determining a route
8. Achieving eye contact

METHODOLOGY

The methodology employed in this study's research design is a fusion of Action Research (AR) from the field of Education and Participatory Design (PD) from the domain of Human-Computer Interaction (HCI).The aim of action research is to integrate the processes of observation, analysis: change planning, and change implementation into a unified framework. This approach is mutually reinforcing with the development of

theory. Purposive sampling method was adopted for selection of sample. Five children with autism spectrum disorder were selected for the study.

The aforementioned games were utilised to achieve the stated objectives. The digital games utilised in this research were sourced from the website http://www.autismgames.com.au. The utilised games were:

I. ADAPTING TO CHANGE

Difficulty: Ritualistic and compulsive behaviour are common among children with Autism, and include things like stacking objects or following strict schedules (Baron-Cohen & Wheelwright, 1999). Child with autism, in an effort to cope, may try to focus on familiar things, and may experience significant distress if, for example, the routine route from home to school is altered, the furniture is moved, or the child is forced to wear unfamiliar clothing. When faced with even minor disruptions, people on the autism spectrum may react with increased ritualistic or obsessive behaviour, physical displays of aggression, vocal outbursts, or withdrawal (De Caluwé et al., 2020).

Game:

a.   The video game "Ron Gets Dressed" is designed to assist children on the autism spectrum in adapting to different climates. In addition to educating children about clothes, this game may be used to educate them how to adapt to new situations and deal with disruptions to their routine. The game underlines the practicality of the words "hot" and "cold," which are used frequently throughout play.

b.   "Rufus Goes to School" helps those with autism spectrum disorders adjust to their surroundings. The game achieves this goal by focusing on a typical school setting and daily routine, but adding modifications like carpooling, communicating with other children, and unexpected events like Rufus's car breaking down and his father having to take public transportation to school. "Change" and "different," as well as the idea that change is necessary and fun, are emphasized. To help children adjust to schedule changes, educators and caregivers ought to employ this terminology.

II. TRANSACTIONS

Children with ASD often struggle to recognise others as people. They believe they are the most important thing in the world, hence they act very self-centred. Children with ASD need to learn how to consider their others feelings and views (Reichow B,2013).

Game:

a.   Children with autism are encouraged to practise transaction skills by playing this 'A day spent shopping' game. These consist of how one might handle communication, information exchange, and financial transactions. By helping the children with autism make sense of the world around them, this game aims to lessen the occurrence of conflict and stress. The following terms that can be used to real-world situations are reinforced by the game: "hello," "goodbye," "thank you," "no thank you," "help," "helped," "shop," "shopping," "shopkeeper," and "shopping list."

b.   Children with autism learn how to wait in line by playing this game **'Eric departs for the airport'**. The story and game illustrates proper behaviour, such as sharing and how to pass the time while waiting in line. The Researcher anticipated that children who participate in this game will connect this allusion to good line-waiting habits. The game repeats the terms "turn" and "good waiting," which educators and parents can use as a tool to promote excellent behaviours in everyday circumstances.

III. EMOTIONAL MATCHING

Many children with autism struggle with self-awareness, social awareness, and expressing appropriate emotions in themselves and others (Grossman et al., 2000). Many CwASD have problems reading facial expressions, body language, vocal tone, and responses. It's easy to overreact in certain situations, such as laughing at the expense of someone who is in pain. These traits might cause social issues and anxiety (Hobson, 1986).

Game:

a.   'Robbie the Robot' helps Children with ASD recognize emotions. The game uses 3D movements and a real person's face to communicate emotion. Robbie the Robot seeks his hat. Mechanical devices fascinate many children with ASD, so integrating them with a real human face helps them learn recognizing emotions in a pleasant, non-threatening way. The game promotes "happy," "sad," "angry," and "surprised," which parents and teachers can use to promote positive behaviour.

b.   This game 'Icky icky' helps Children with ASD recognize and match emotions. Modern, friendly animal creatures populate the game. The game links the character's emotion to its source. The children should connect these dots in real life. The game reinforces "happy," "happier," and "sad," which parents and teachers can use to encourage positive behaviour in daily life.

IV. NONVERBAL ACTIONS

Children frequently rely on the audience's prior knowledge to correlate new information to the task at hand when delivering information (Tager-Flusberg & Kasari, 2013). It is advantageous to add or embed "extra" nonverbal gestures with the primary spoken information for young children with autism, as they are less likely to do so spontaneously. This would mean adding visual cues and symbols to everyday spoken conversation, like using the palms-forward gesture for "stop" instead of just saying the word (Plesa Skwerer et al., 2015).

a.   **'**Kody's World' is an enjoyable and simple educational game that emphasizes repetition and imitation, helping children with autism learn to read nonverbal clues. The game enables the child to recognize non-verbal cues, use newly-learned gestures in real-world situations, and convey themselves using both verbal and non-verbal cues. The game accentuates "no," "yes," "like," "likes," "does not like," "nods," and "shakes," which can be applied to real-world situations.

b.   'Marty the Mime' teaches children with autism to interpret numerous body language signals and facial expressions. Using common gestures, Marty the Mime interacts with the children in a plain and entertaining manner. The purpose of exposing children to these gesturers is for them to be able to recognize these cues in others and convey themselves through nonverbal gestures. The game places a focus on the words "need," " requirements," desire, "wants," "choose," "sad," "excited," "feel," and "emotion," all of which have real-world applications.

V. GROUPING OBJECTS

Object categorization is a crucial skill, especially for children with ASD who have impaired functioning. The capacity for taking turns and waiting can be linked to the capacity for organising objects (Gastgeb HZ,2006). Additionally, categorising objects facilitates comprehension of qualities or attributes. Frequently, the ability to organise and classify objects is a skill required for work-readiness activities in school and vocational training for postsecondary opportunities. Numerous children with ASD may develop an obsession with ordering or arranging items (Rodriguez et al., 2012). Before acquiring a skill, children with autism must frequently generalise it in a variety of contexts.

Games:

a.   **'**Panda climate' game teaches the concept of object grouping by requiring players to select the appropriate group of apparel for different environments. The plot of the game revolves around Panda, the protagonist who must dress adequately for the weather. As they dress Panda, the child is assembling a set of appropriate apparel, including a raincoat, gumboots, scarf and gloves. The game advocates the terms 'Match' and 'Group', which can be applied to real-world situations.

b.   Children with ASD can use this game 'Forming groups with shaky' to match 2D and 3D objects and learn that some objects can belong to multiple categories. Categorising with Sketchy uses 3D animation to teach the concept of categorising objects, and an interactive flash game allows children to practise their newly acquired skills. Using common materials, the lesson can be applied to "real-world" situations such as preparing a school lunch. The game emphasises phrases such as "Put with same" and other terms applicable to daily life.

VI. SCHEDULES

Children with autism typically utilise routines to reduce apprehension (Iannaccone et al., 2018). Picture Exchange Communication System (PECS) graphic representations of significant occurrences may be utilised to convey the sequence of a particular activity, lesson, or daily or weekly schedule. The majority of schedules consist of two columns: the schedule column and the "finished" segment. Sequences are utilised to reinforce knowledge and prepare for a change in behaviour. One way to account for variation in a schedule is to utilise the "special activity" PECS symbol, which denotes an unplanned or unexpected event in a larger sequence of events.

Games:

a.   Using 3D models of actual objects and the Picture Exchange Communication System, this 'Robot cat Daniel' game teaches children with autism about schedules. The game helps children learn to understand schedules by guiding them through the process of going from concrete descriptions of activities to more abstract graphics and finally to symbols. This is done by presenting a succession of actions, such as making toast, which a children with autism could encounter in their actual daily lives. The notions of "first" and "correct order," which have real-world applications, are repeated throughout the game.

b.   Children with autism can better understand the practical applications of timetables and the Picture Exchange Communication System through Rabbit's Birthday. The storyline and gaming mechanics are based on the social script of a birthday party. Fox is invited to Rabbit's birthday celebration where he encounters numerous things that typically occur at birthday parties. The objective is to assist the children with autism in comprehending how schedules can be used to lessen anxiety and assist them in adjusting to change. The game emphasises the terms "play" and "special activity," which parents and teachers can use as a tool to promote healthy behaviours in everyday situations.

VI. DETERMINING A ROUTE

Children diagnosed with autism spectrum disorder may require multiple prompts to effectively complete tasks and exhibit challenges in comprehending and adhering to instructions (Rieser J,2007; Smith et al., 2013). A significant number of children experience difficulties in adhering to rules. The aforementioned challenges are discernible during the process of transportation from one location to another. Various standard directives for navigating a path include "halt," "pause," "accelerate," and "decelerate." A significant proportion of children diagnosed with ASD exhibit a keen interest in computers. The audiovisual components of games are highly appreciated by them. A game featuring easily recognisable images and stimulating audio could aid children with autism in developing their ability to comprehend instructions and navigate pathways.

Games:

a.   Children with ASD can learn to follow and locate directions with the aid of this 'Fire canine' game. The game requires the young participant to follow instructions and locate the shortest route between two points. To obtain his firefighting supplies, he must traverse the fire station from left to right and ascend and descend ladders and poles. Throughout the game, you'll hear a lot of phrases like "way," "down," "shorter way," and "longer way," all of which are useful in everyday life.

b.   The utilization of a recreational activity named Florence the Frog has been found to enhance the ability of children diagnosed with Autism Spectrum Disorder (ASD) to effectively navigate and adhere to instructions. Our objective is to achieve this goal by utilizing child-friendly characters and concepts. Florence, an amphibian, is required to navigate through the aquatic environment to reach a delectable insect. In order to reach his destination, the individual is required to skillfully navigate through a series of lily pads, carefully selecting only the fresh ones while avoiding those that have become decayed and deteriorated over time. As the individual progresses through the various stages, the level of difficulty in the game increases. The video game places significant emphasis on directional commands such as "ascend," "descend," "move left," and "move right," which can be readily extrapolated to real-life scenarios.

VII. ACHIEVING EYE CONTACT

Despite the commonly held belief that children with Autism Spectrum Disorder (ASD) exhibit a preference for visual learning, they often experience challenges in establishing and maintaining appropriate levels of eye contact or gaze with communication partners (Moriuchi et al., 2017). This phenomenon could potentially be attributed to their heightened capacity for visual processing. Based on anecdotal evidence, it has been suggested that children diagnosed with Autism Spectrum Disorder (ASD) may experience difficulty in sustaining eye contact with their communication partner due to the simultaneous processing of speech and facial expression, which may lead to sensory overload. Consequently, one should refrain from assuming that the lack of eye contact from an individual with Autism Spectrum Disorder (ASD) implies a lack of auditory reception and cognitive processing of the spoken message.

Games:

a.   'Ted's ice cream exploration' game serves as an educational tool for young children, highlighting the importance of visual contact as a prerequisite for effective communication. It emphasizes the reciprocal nature of visual communication, whereby children has to acknowledge and respond to the gaze of others in order to establish meaningful interaction. The game promotes gradual eye contact rather than abruptly demanding attention by saying, "Look at me." The anthropomorphic Teddy bear characters with large ocular organs exhibit a high degree of cuteness and lack any aggressive tendencies. The aforementioned game employs the repetition of the terms "look," "looking," and "eyes," that can be utilized by educators and guardians in real-life scenarios.

b.   'Bob and his pals' game have been found to be effective in teaching children diagnosed with autism spectrum disorder the skill of making eye contact. A considerable number of children diagnosed with Autism Spectrum Disorder (ASD) exhibit a preference for the reliability and consistency of mechanical objects, particularly locomotives. The narrative chronicles the journey of labor instructs Bob and his associate Nick as they convey small stones to the harbor station. In order to engage in a dialogue and establish a suitable location for the disposal of the rocks, the children involved must establish visual contact with one another. The game serves as a mechanism to reinforce the usage of the phrases "looking" and "look," that can be employed by parents and educators as a means to encourage positive conduct in various everyday contexts.

The games were administered in a controlled environment with the monitoring of teachers.

PROCEDURE:

Children were allowed to play the games for three months of the study as reinforcement for doing the tasks they were given. Individual IEP's was created and maintained for the targeted goal and every progress was recorded.

ANALYSIS:

Table I denotes the overall socio-behavioural skill acquisition of children with ASD.

Table 1 OVERALL SKILL ACQUISION						
SKILL	Objective	Case analysis				
		Case I	Case II	Case III	Case IV	Case V
Adapting to change	*Ron Dons his Clothes*	√	√	X	√	√
	Rufus attends school	√	x	√	√	x
Transactions	*A day spent shopping*	√	√	x	x	√
	Eric departs for the airport	√	x	√	x	√
Emotional matching	*Robbie the robot*	√	√	x	√	√
	Icky icky	√	√	x	√	x
Nonverbal actions	*Kody's world*	x	√	x	√	√

	Marty the mime	√	√	√	x	√
Grouping objects	*Panda climate*	√	x	√	√	√
	Forming groups with shaky	x	√	x	√	√
Schedules	*Robot cat Daniel.*	√	x	√	x	√
	Rabbit's birthday	√	√	√	x	√
Determining a route	*Fire canine*	x	√	x	√	x
	Florence the frog	√	√	x	√	√
Achieving eye contact	*Ted's ice cream exploration*	√	x	√	x	√
	Bob and his pals	X	√	x	X	x

Case IV struggled to make eye contact, although he displayed strong reactions to change, emotional matching, and grouping things. Case I, a child with mild autism, performed extremely well across the board, with the exception of non-verbal communication, item grouping, and making eye contact. In these perspectives, he had finished 50% of the tasks on his timetable. Case II displayed modest responses in the areas of transactions, categorizing things, responding to change, and eye contact.

The results of Case III similarly revealed a mixed reaction in terms of social skill learning, with low results in emotional matching and choosing the route and moderate results in other domains. Case V demonstrated strong performance in most domains, with the exception of accomplishing eye-contact and communicating through non-verbal means.

Table II OVERALL CASE ANALYSIS

Case	Overall Dimension %	Adapting To Change	Transactions	Emotional matching	Nonverbal actions	Grouping objects	Schedules	Determining a route	Achieving eye contact
I	75	1.0	1.0	1.0	0.5	0.5	1.0	05	0.5
II	68.6	0.5	0.5	1.0	1.0	0.5	0.5	1.0	0.5
III	43.7	0.5	0.5	1.0	0.5	0.5	1.0	0.0	0.5
IV	56.2	1.0	0.0	1.0	0.5	1.0	0.0	1.0	0.0
V	75	0.5	1.0	0.5	1.0	1.0	1.0	0.5	0.5

The case studies showed that children's abilities to accept the idea of "Change," value the "opinion" and "feelings" of others, comprehend and show empathy towards themselves and others, recognize and respond to others' emotions, and enhanced eye contact have all significantly improved.

The games helped children understand and use non-verbal cues, and they learned how to arrange objects in a logical order.

DISCUSSION:

The utilisation of computerised games in rehabilitation activities can enhance engagement levels compared to traditional exercises. This is due to the replacement of reward and motivation systems with real-world

incentives, which serve as a supplementary component to the rehabilitation process. Immersion in the gaming environment allows players to gain experience and knowledge without risk. The utilisation of computer-based games has demonstrated efficacy in enhancing cognitive and social abilities in children diagnosed with Autism Spectrum Disorder (ASD). There exists substantial evidence supporting the effectiveness of this approach in children with ASD. The aforementioned games are designed to address cognitive impairments, including but not limited to attention deficits, short-term and long-term memory deficits, eye-hand coordination difficulties, executive function deficits, and impairments in activities of daily living, processing deficits, and learning difficulties. The present study has also highlighted that computer games can be used as a tool to enhance social skills of children with ASD.

CONCLUSION

The use of ICTs and computer games can indeed have a positive impact on the treatment and education of children with special requirements and ASD. By providing controllable and predictable environments, these technologies can help reduce anxiety and increase the sense of safety and security in children with special needs. Additionally, the multisensory stimulation provided by these technologies can help engage children with different learning styles and preferences.

Computer games can also promote self-control and independence by providing immediate feedback and rewards for positive behaviour and progress. This can help children with special requirements and ASD develop important life skills, such as self-regulation, problem-solving, and decision-making. Furthermore, the use of ICTs and computer games can break down the boundaries of time and place, making it possible for children with special needs to access educational and therapeutic resources from anywhere, at any time. This can be particularly helpful for children who may not have access to traditional therapies or who may have difficulty attending in-person sessions due to mobility or transportation issues.

It is important to note, however, that the use of ICTs and computer games should not be seen as a replacement for traditional therapies or human interaction. Instead, they should be viewed as complementary tools that can enhance the effectiveness of existing interventions and support the learning and development of children with special requirements and ASD.

Research reveals that carefully selected nonaggressive video games can motivate children with autism to acquire social skills. This study shows that children with Autism Spectrum Disorder (ASD) require more mindfulness and computer games to develop socially.

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