



SCIENTIFIC EVENTS GATE

The International Innovations Journal of Applied Science

Journal homepage: <https://ijas.eventsgate.org/ijas>

ISSN: 3009-1853 Online



WEB-SITE DESIGN (BEHAVIORAL + EDUCATIONAL) TO HELP AUTISUM CHILDREN DISORDER

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ARTICLE INFO

Article history:

Received 19 Aug. 2024,

Revised 5 Sep.2024,

Accepted 9 Sep. 2024,

Available online 15 Sep. 2024

Keywords:

Autism

ASD

Web technology languages

Children with autism

ABSTRACT

Autism is a condition in which children have difficulties interacting with others or exhibit differences in how they interact with people. Children with Autism Spectrum Disorder (ASD) may respond well to web-based learning because computers can offer features such as repetition, visual stimuli, and independent interactions that appeal to them. However, there have been limited studies on websites (behavioral and educational), especially outside of institutional settings. The aim of this research is to assess the effectiveness of interactive digital programs used to teach individuals with learning difficulties, tailored to their capabilities and needs. Modern technology has provided interactive and educational opportunities through picture books. This research involves designing an educational website for children with autism, including a program to teach them basic concepts necessary for daily life, such as the Arabic alphabet, to enable them to form complete words and, consequently, complete sentences. Additionally, the program teaches numbers, enabling children to count and perform arithmetic problems such as counting money and telling time. The main interface page displays eight images that change every seven seconds automatically or via navigation links on the right and left sides of the image. A six-page website was designed, covering topics such as what autism is, symptoms, diagnosis, and more. Web technologies were utilized in the website design, with HTML as the primary language. To analyze some aspects of this study's results, the use of the computer screen is intended to capture the autistic child's attention, helping them remain in one place and stay focused on the screen for as long as possible. If a mother or female teacher can keep a child engaged with the screen for 5-10 minutes, it is considered a significant achievement.

1. Introduction

Autism, or Autism Spectrum Disorder (ASD), is characterized by challenges in social communication and the presence of repetitive and restrictive behaviors, with varying degrees of severity among individuals (Lord, 2018). It can be diagnosed as early as 18 to 24 months, when it becomes possible to distinguish the hallmark symptoms from typical development, delays, or other developmental conditions. Research on autism has seen significant advancements, coinciding with important

developments in international policies. In addition to the political responses driven by increased awareness and global advocacy, autism has also benefited from progress in complementary areas such as human rights, maternal and child health, and mental health (World Health Organization, 2013)(World Health Organization & UNICEF, 2018). This progress heavily relies on the United Nations Convention on the Rights of Persons with Disabilities, which outlines key principles such as respect for dignity, freedom of choice and independence, non-discrimination, full

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participation and inclusion in society, and acceptance of persons with disabilities as part of human diversity. Based on the research findings and discussions, web-based video modeling has been identified as an effective tool for teaching social skills to autistic students in inclusive elementary schools in Surakarta. Assessments from media experts, material experts, IT specialists, and users yielded scores of 83.7%, 87.47%, 88.5%, and 89.01%, respectively. These scores, when averaged, indicate that the tool is highly suitable for this purpose. The implications of this research suggest that web-based video modeling can be implemented on a broader scale. Future researchers are encouraged to expand the development of web-based video modeling to include behavioral aspects beyond just social skills (Wulandari et al., 2024).

The rise of mobile technologies has introduced a new approach to healthcare delivery, patient self-management, data collection, and health research. These technologies include powerful portable devices like smartphones, tablets, and smartwatches, along with mobile operating systems (primarily Android and iOS) and a variety of mobile applications. This new platform is more accessible to the general public due to the lightweight and user-friendly nature of mobile devices and apps. Additionally, wearable devices may be used alongside mobile applications to gather physiological data (such as heart rate, body temperature, and skin resistance) or to offer visual guidance (like Google Glass) and tactile feedback (such as wristbands). This area of research and practice is known as mobile health, or mHealth, which is a subset of smart healthcare (Liu et al., 2023).

The main objective of the work in (Rathod et al., 2024) is to develop effective e-learning strategies for individuals with Autism Spectrum Disorder (ASD). These individuals often struggle with communication, focus, emotional regulation, and social interactions, all of which can impact their learning experiences. Acknowledging these challenges, the aim is to tailor e-learning approaches to meet the unique needs of those with ASD and improve their

educational experiences. Experts from various fields agree on the critical role of early detection in alleviating these challenges. They also stress the importance of learning technologies in this context, highlighting that early intervention is essential. By utilizing suitable e-learning tools, it is possible to implement interventions sooner, leading to better outcomes and addressing the difficulties faced by individuals with ASD.

Evaluating websites for their suitability for individuals with Autism Spectrum Disorder (ASD) using HTML style properties and image data as objective criteria allows for a comparative analysis. Websites that received higher scores (indicating they are less user-friendly) typically featured more animation, a greater variety of font types and sizes, and more complex images. In a multiple linear regression model, the two most significant factors influencing the website scores were font and animation. Although the average ASD ratings across different website categories did not show significant differences, the categories Autism Focused, U.S. Federal, Google Autism Search, and Alexa Rating were ranked from most friendly to least friendly, respectively (Yu et al., 2018).

By measuring reactions to design changes in autistic and neurotypical individuals, applying statistical methods, and asserting hypotheses, HCI practitioners have successfully produced heuristics to reduce the impact of changes in software interface design on autistic users, making software updates more accessible for this user group. These heuristics, alongside the presented method for design change impact testing, including the introduction of the statistically verified comfortability score, are the contributions of this study to the HCI discipline (Sawyer et al., 2024).

In 1943, a phenomenon was identified in young children and termed "autistic disturbances of affective contact," where children suffered from a lack of social interaction and difficulties with speech (Kanner, 1943). In the early days of website design, the results were merely black screens; the design was conducted using

symbols and scheduling. The first step in website design involved creating browsers capable of displaying images. The nearest option for organizing information was the tables available in HTML. At that time, nested tables were commonly used, with cells overlapping one another. These tables had valuable characteristics, such as the ability to organize content vertically and specify dimensions using pixels or percentages, making them resemble grids. Designing a website for children with autism could provide them with an opportunity to learn life skills independently by engaging with themes that interest them, such as animals and games (Ravana et. al, 2014). JavaScript emerged as a solution to HTML's limitations. For example, if you needed a pop-up window or needed to rearrange elements, JavaScript was the answer. Nowadays, it is preferable to avoid using JavaScript when the same functionality can be achieved with CSS (Cascading Style Sheets). However, JavaScript remains a powerful tool. To overcome the constraints of website design, a new technology was introduced that offered unprecedented freedom. Designers could create images and animations and use any font, all with a single tool—Flash. The final output was a single file sent to the browser for display. Users only needed the latest version of Flash and a short wait for the content to load; it was like magic. This marked the golden era of splash pages, animation, and all kinds of interactive effects.

During the era of Flash, the best approach for structuring and organizing design emerged—CSS. The basic idea behind CSS is the separation of content from presentation, allowing the form and formatting to be specified

in CSS while the content is managed in HTML. Early versions of CSS were not very flexible, but the major issue was the slow adoption and support by browsers. It took a few years before the first browsers fully supported CSS. At that time, there was only one browser with the most advanced CSS capabilities, while others lagged behind. This presented a challenge for CSS, not as a programming language in the traditional sense like C, but as a style sheet language. CSS is not a programming language as commonly understood, such as C, as it does not include control structures or loops. When such functionality is needed, codes from other languages like Java, CGI, or JavaScript are required. CSS does not need a special interpreter or compiler and is not tied to any specific operating system, as it is processed directly by internet browsers, regardless of the system used. Therefore, CSS is a very simple language, easy to understand and learn, and does not require prior knowledge of programming or markup languages. All it requires is some logical thinking and organization of ideas.

It has been suggested that children with autism can benefit from visually-aided designs to help them recover as quickly as possible (British Columbia Ministry of Education, 2000). CSS is used as a design language that defines the appearance of an HTML document, focusing on elements such as fonts, colors, margins, widths, heights, backgrounds, and layout. CSS offers many options and is more precise and scientific. Moreover, it is supported by the major browsers today. CSS is considered a revolution in the world of web design, offering numerous fundamental benefits.

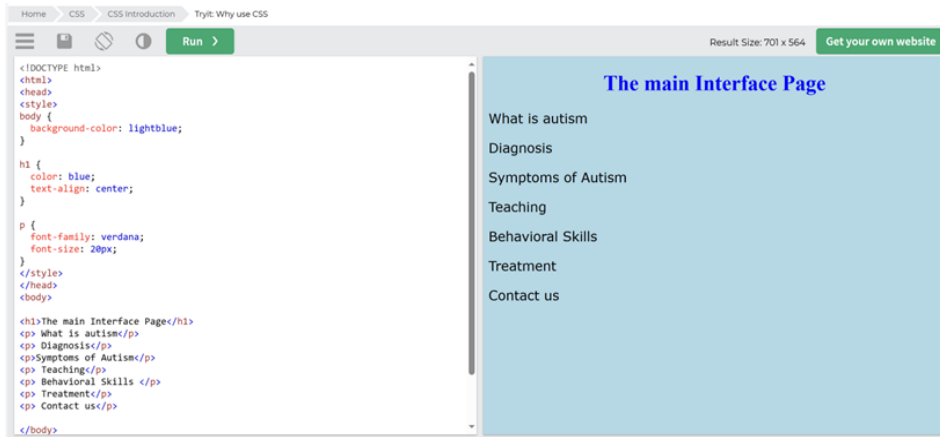


Figure 1. Example of CSS Language

The language PHP is used in the website in a simplified form, depending on the diagnosis results and other relevant factors. PHP is a scripting language specifically designed for web development, programming, and applications. It can also be used to produce standalone programs that are not related to the web. PHP is an open-source language developed by a team of experts.

The present study attempts to address multiple gaps and, in doing so, makes important contributions:

1. The study extends research on the primary goal of the website, which is to assist children with autism. Through the educational program, it is expected that children will be able to distinguish between shapes and backgrounds, learn the Arabic letters in both form and pronunciation, and acquire some behavioral skills. It is anticipated that the method of teaching using a computer will be more effective than manual methods due to the flexibility of the computer, the ability to repeat activities multiple times according to the child's needs, and the possibility of adding elements that capture the child's attention, making them more receptive to learning. These aspects are particularly essential for children with autism.

2. Many studies have shown that children with autism can respond to education through computers at a higher rate. For instance, linguist Boul Talal demonstrated in her 1991 research that children who used the program she

designed gained the equivalent of two years of language skills in a short period. The concept of this program involves placing headphones on the child's ears while they sit in front of the computer screen, playing and listening to sounds from these games. Since children with autism tend to avoid interaction with people, the computer screen helps them steer clear of social contact and alleviates feelings of embarrassment when making mistakes.

3. The website also aims to increase parents' knowledge about the disorder, making it easier for them to interact with children with autism. Lack of awareness about the disorder and not knowing the best ways to support these children can lead to negative outcomes. Additionally, the website provides a platform for parents to communicate with each other, allowing them to share information and experiences. A significant goal is also to help this group of children keep pace, even if only slightly, with typically developing children and to discover the talents they possess over time.

2. Literature Review

Autism is defined as "a developmental disability characterized by severe deficits in social interaction and communication, and the presence of repetitive-ritualistic behaviors" (Amirrudin, 2021). It has also been noted that autism is associated with sleep problems. The most frequently reported issues include

difficulty falling asleep, restless sleep, not falling asleep in one's own bed, and frequent awakenings. This study highlights a high prevalence of sleep problems reported by parents of children with autism. It also underscores the urgent need for more systematic research as an initial step in developing treatments suitable for children with autism. According to a study conducted in 2003, no statistically significant differences were found between children with and without intellectual disabilities (ID) concerning the prevalence of depressive disorders, eating disorders, or psychosis (Lonnie et. al., 2004). Furthermore, the increased risk of psychopathology among children and adolescents with autism is influenced by factors such as age, gender, social deprivation, family composition, stressful life events, and the mental health of the family. Children and adolescents with autism are at significantly increased risk for certain forms of psychiatric disorders (Emerson, 2003). Those concerned with children's health are strongly urged to pay close attention to the social and economic adversities facing families, as children in such families will be affected. It has been revealed that there has been a remarkable rise in the number of autism cases over the past ten years, with many parents sharing their pain and challenges through hundreds of letters sent from across the country (Brian et. al., 2001). Autism has become more widespread since it was first defined by Leo Kanner in 1943. Initially estimated to occur in 4 to 5 per 10,000 children, the current incidence of autism is 1 in 110 in the United States and 1 in 64 in the United Kingdom, with similar rates observed globally (Ratajczak, 2011).

Autism is also defined as a serious psychological disorder with onset in early childhood. Children with autism often display "minimal emotional attachment, absent or abnormal speech, retarded IQ, ritualistic behaviors, aggression, and self-injury" (Lovas, 1987). Additionally, it has been highlighted that over the past ten years, several studies have revealed significant improvements in very young children with autism following intensive,

comprehensive treatment (Rogers, 1998). While many experts have sought to uncover the causes of autism, no definitive answers have been found to date. Without identified specific causes, developing effective strategies to combat autism remains challenging (Smith, 2005). Autism continues to be a severe condition and is arguably the most widely researched of all child psychiatric disorders. Consequently, many studies have been initiated to gain a reliable understanding of its causes, consequences, and treatments (Wolff, 2004). It has been evident in recent decades that research on parents of autistic children has largely focused on families from Western countries, despite autism being a global condition. The current study provides data on initial symptom recognition, help-seeking, and the initial diagnosis of developmental disorders among 95 families of children with autism in India. The findings indicate a relationship between the speed with which families receive a diagnosis and the salience of symptoms, which may be influenced by cultural factors. Another study examined loneliness and friendship in 22 high-functioning children with autism and 19 typically developing children. Children aged 8 to 14 were asked to report on their understanding and feelings of loneliness and the quality of their friendships. The study found that children with autism were "both lonelier and had less complete understandings of loneliness" compared to typically developing children (Bauminger et. al., 2003).

Murrietta Yu, B. et al. stated that assessing websites for ASD friendliness using HTML style properties along with image data as objective criteria can provide a basis for comparison. Websites that received higher scores (indicating they are less friendly) typically had less animation, fewer font types and sizes, and less complex images compared to those with lower scores (indicating they are more friendly). The two most important metric categories that explained the website scores in the multiple linear regression model were font and animation. The average Website ASD Ratings across different website categories were

not significantly different. However, these categories—Autism Focused, U.S. Federal, Google Autism Search, and Alexa Rating—ranked from most friendly to least friendly, respectively (Yu et. al., 2018).

Susan Mary Zachariah, in her article, emphasized that with the increasing prevalence of ASD, it is crucial for every doctor to recognize the red flags and clinical features of ASD for early identification and referral. ASD should be suspected in every child presenting with speech delay. Not all children with ASD have intellectual disabilities; some possess remarkable talents that may facilitate their integration into mainstream schooling. Comorbidities associated with ASD should be identified and addressed to improve the quality of life (Zachariah et. al., 2017).

Tuedor, M. et al. concluded that to effectively use computing technologies to support learning in children with ASD, it is essential to understand how to present information and how to impact children and adults with autism who have varying abilities and disabilities as a result of the syndrome. Although more challenging, this understanding is even more urgently needed for low-functioning individuals, who represent $\geq 70\%$ of the ASD population (Tuedor et. al., 2019).

Amsbary, J. et al. reported that children with autism struggle with social-communication and play skills. Therefore, targeting these skills at school and at home is crucial to maximize intervention and treatment benefits and to improve skill generalization. Gathering parent perceptions provided valuable insights into the feasibility of the ASAP at Home website and highlighted the supports that were important to parents when working with their children (Amsbary et. al, 2022).

Jeekratok, K. et al. reported in their paper on the testing of open, web-based games and social stories for children with autism. The web-based learning system, accessible to parents, teachers, health professionals, and children in both institutional and home settings, included four

social stories and seven games hosted on a website. Pre- and post-testing of the web-based learning took place over a three-month period with 10 children with ASD enrolled in a special education center in North-Eastern Thailand (Jeekratok et. al., 2014).

Amirrudin, S. concluded that various stakeholders can take action and make efforts to support children with special educational needs. There is no one-size-fits-all approach to teaching these students. Effective strategies are often simply good teaching practices that may be beneficial. The knowledge gained about communicative intent, utterances, and social stories should be used consistently and deliberately to achieve better outcomes. Furthermore, in educational settings, where the principal mediational tool for learning is language, emphasis should be placed on language development. Introducing special needs students to utterances and social stories is crucial for facilitating learning (Amirrudin, 2021).

The present study aims to address a list of gaps identified for the proposed research:

- Autism, referred to as Autism Spectrum Disorder (ASD), represents a diverse group of conditions related to brain development.
- Approximately 1 in 100 children is affected by autism.
- Characteristics of autism may be detectable in early childhood, but diagnosis often occurs much later.
- The abilities and needs of individuals with autism vary and can change over time. While some people with autism can live independently, others have severe disabilities and require lifelong care and support.
- Evidence-based psychosocial interventions can enhance communication and social skills, positively impacting the well-being and quality of life of both autistic individuals and their caregivers.

- Care for people with autism must be complemented by actions at community and

societal levels to improve accessibility, inclusivity, and support.

3. Materials and Methods

3.1 Designing a Website

3.2 The Goals of the Website

The primary tool used in designing this website is HTML. The website aims to assist autistic children through an educational program where the child is expected to differentiate between shapes and backgrounds, learn the Arabic alphabet letters, their forms and pronunciation, as well as numbers. Additionally, the program is designed to teach some behavioral skills. It is anticipated that the educational approach utilizing computers will be more effective than manual methods because computers offer flexibility, allow for repeated presentation of material according to the child's needs, and enable the incorporation of engaging elements to capture the child's attention. These features are particularly beneficial for autistic children. Many studies have demonstrated that autistic children respond positively to computer-based teaching. For example, Paula Talal's research published in 1996 showed that children who used her program for autistic children acquired linguistic skills equivalent to two years of classical instruction in a short period. Her program involved having the autistic child wear earphones while interacting with the computer screen and listening to sounds produced by the games. This method helps autistic children avoid social interactions and reduces feelings of embarrassment. The website also aims to increase parents' understanding of autism to facilitate better interactions with their autistic children. Lack of knowledge and effective strategies for dealing with autism can lead to adverse outcomes. Consequently, many studies have been conducted to improve understanding and treatment of autism.

3.3. Web Technology Features and Services

Web technology has become an interesting field of study and development for a wide

range of scientific and social applications.

Developers create web-based applications to be downloaded on any device and used with the Internet, or they create websites accessed via web browsers from any computer. Whereas, in the early 2000s, most of the tools developed were standalone pieces of software, the current trend is to build web-enabled software that runs within a web browser.

Therefore, there are many advantages to using web applications or websites:

- They are easy to access by end-users.
- Developers have access to many toolkits to help them develop, including flexible libraries that enable a wide range of styles and services to be easily created.
- They are easy to develop over time and can be easily edited and updated by the developer.
- Many users are familiar with interactive systems and know how to use them.
- They can be deployed on a range of different devices, with software libraries automatically adapting the screen size and commands for the device on which they are displayed.

Web-based applications and websites generally consist of two main parts:

1. Client-side techniques: This is also known as the front-end User Interface (UI). This side of web technology is responsible for creating and designing interfaces and manipulating the Document Object Model (DOM) for HTML documents. The DOM manipulation environment enables us to perform various tasks and functions, such as updating the content of the page, displaying new UI elements, or loading entire pages in response to user gestures and other events. There are many client-side technologies, but HTML, Cascading Style Sheets (CSS), and JavaScript are three very popular combinations.

2. Server-side techniques: This technique involves hardware and software on the server side, where "server-side" refers to the software

known as the web server. This software includes several files and protocols responsible for controlling how web users access hosted files. An important protocol on the web server is HTTP (Hypertext Transfer Protocol), which is used by browsers to view web pages. In constructing the CDS tool, we used a dynamic web server, which involves a web server application plus a database. It is called "dynamic" because the application server updates the hosted files before sending them to the browser via the HTTP server. Server-side scripts provide strong and secure connections between users (client-side) and servers (web database) to manipulate data, and this is the method used to process requests on the server. Well-known server-side languages include PHP, Python, and Ruby.

3.4 Components of the Website Design

In the 2004 study, it was highlighted that "limited human and physical resources are a major contributor to delayed diagnosis and likely delayed intervention" (Tuedor et. Al., 2019). Thus, there is a need to establish a website. The website consists of six main pages, which are divided into secondary pages, and a main interface page that is repeated on all other pages containing links to the web pages. The reason for this repetition is to reduce complexity and facilitate navigation from one page to another without returning to the main page. The main interface page features eight images that change automatically every seven seconds or through navigation links located on the right and left sides of the image (Figure 2).



Figure 2. The main Interface Page

3.4.1 The Main Page

The main page contains an image, which serves as a map of the website, allowing users to learn about the website and its pages at a glance. It also helps users understand how to navigate among the different web pages, making it easier to find what they need (Figure 2).

The website contains additional auxiliary links such as:

1. What is Autism?

This section introduces autism, describing the disease, its types, and its effects on the growth and development of children.

2. Causes of Autism

This section explains the potential causes of autism, which may include genetic factors, psychological influences, or exposure to certain heavy metals such as lead.

3. Symptoms of Autism

This section outlines the symptoms of autism, which can become evident within the first three months of a child's life or may not appear until the age of three.

4. Treatment of Autism

Treatment options may include behavioral therapy, medical interventions, educational support, or medication.

3.4.2 Diagnosis

1. Diagnosis for Children Aged 6 Months to 1 Year

Due to the difficulty of diagnosing autism in the first months of life, parents need to carefully observe any unusual behaviors in their children, which may indicate autism.

2. Diagnosis for Two-Year-Old Children

The diagnosis involves 14 questions, with answers being either (Right-most of them) or (Wrong-most of them). The answers are collected and graded to determine the result.

3. Diagnosis for Children Aged 3 to 18 Years

This diagnosis consists of 26 questions, with answers being either (mostly true) or (mostly false). The answers are collected to determine the result.

4. Diagnosis Using the Global Scale of Autism

This diagnosis consists of 28 questions, with answers being either (yes) or (no). The answers are collected to determine the result.

These tests do not replace a specialist's diagnosis and are not a form of treatment.

3.4.3 Teaching

The teaching page includes the following sub-pages:

Attracting the Child's Attention to the Computer
Getting the child's attention to the computer is crucial because autistic children are often characterized by difficulty remaining in one place. Teaching them using a computer requires keeping them seated in front of the screen. Therefore, attracting the child's attention to the screen is very important. If a mother or female teacher can keep the child seated in front of the screen for 5-10 minutes, this is considered a significant achievement. The following items, chosen according to the child's preferences, are used to engage them:

- **Watching Animation:** This includes four episodes of the cartoon series "Shaun The Sheep."

- **Listening to Songs:** This section contains six songs for children with autism.

- **Coloring:** This includes four coloring activities.

Distinguishing Forms & Background Teaching
children to distinguish between forms and backgrounds is the initial step in their education. Since autistic children often face challenges with visual communication, they must learn to differentiate between forms and backgrounds to advance to learning letters and numbers.

The child's learning depends on distinguishing between forms and backgrounds by displaying a picture of a shape against a single-color background, such as black, with a focus on the shape and a dot. By repeating this training with varying background colors and shape positions, the child is expected to improve their ability to differentiate between objects.

Learning Letters & Figures

This page employs a method to teach letters and figures using images, sounds, and pointing. The learning process consists of two phases: training and testing.

The method used to teach letters is the Structural Method, which involves teaching the child a word by breaking it down into its constituent letters, both in form and pronunciation, and then combining these letters to form the complete word. This word is then presented alongside other words on the same page and marked. This approach helps the child remember the word's image, aiding in distinguishing it from others.

In teaching figures, a similar method to that used for letters is employed. The figure is displayed clearly with its pronunciation, and repetition is used to reinforce learning. A test is also included to assess if the child has learned the figure, both in form and utterance, by integrating the figure with other figures in the same picture and having the child distinguish it from the rest.

The child's education relies on image, sound, and pointing. Through these methods, the child learns words and letters by memorizing their images and hearing their pronunciations.



Figure 3. Drawing Attention of the Child to a Computer.

3.4.4 Behavioral Skills

The child can learn behavioral skills they may be lacking, such as how to sleep and how to use the bathroom. For the sleep training, pre-sleep storytelling is included as the final step, featuring three audio-video stories. The teaching page also includes methods for rewarding the child for positive behaviors, such as distinguishing forms from backgrounds, learning letters or figures, or practicing behavioral skills. Rewarding should follow similar methods used to draw the child's attention to the computer.

Children with special needs, especially those with autism, should be treated in a way that encourages and rewards their efforts rather than reprimanding or ridiculing them, even if they do not respond appropriately to teaching. Motivating words such as "good," "well done," "excellent," and "good boy" should be used, while avoiding negative comments like "wrong" or "not like this." Figure 4 shows examples of some behavioral skills.

3.4.5 Treatment (Therapy)

While not a full treatment, this section provides therapy options for autistic patients that can be implemented at home. One approach involves following a specific food program. Evidence suggests that dietary adjustments can significantly impact autism, leading to notable progress and positive results in many cases. Clicking on the "read more" link will direct you to a page outlining dietary recommendations for children with autism, specifying what to eat and what to avoid. Additionally, verses from the Holy Quran and certain supplications may have a positive effect on autistic patients,

contributing to psychological calmness and reducing some inherent violent behaviors.

4. Results and Discussions

This study focuses on assisting children with autism to lead a more typical life without disruption. The computer-based learning materials created in this study aim to offer effective treatment options. It was found that children with autistic challenges could achieve better outcomes through the use of the designed website. The website, consisting of six pages, covers topics such as what autism is, its symptoms, and diagnosis. The study highlights that using a computer screen can help engage autistic children, encouraging them to remain focused and stay at the screen for longer periods. It was also found that changing the color of the background and the placement of the form could assist children in distinguishing between objects. Children with autism could learn words and letters by memorizing their images and hearing their pronunciations. This learning was facilitated by technology-based materials such as computer screens. Additionally, designing a website helped children with autism acquire behavioral skills, such as how to sleep and use the bathroom, which serves as a good example of their recovery or partial recovery from autism.

Furthermore, it is recommended that parents and school teachers avoid scolding autistic children and refrain from using negative words and expressions such as "wrong" or "don't use this again." Instead, they should focus on rewarding children daily with positive reinforcement, using encouraging words and phrases like "good," "well done," "excellent," and "keep up the good work." Additionally, one of the study's

webpages highlighted the importance of nutrition and diet in the treatment of autistic children. This suggests that parents should rely

on such findings to establish effective daily treatment routines.



Figure 4. Behavioral Skills

Table 1: Summary Table of the State of Art

Article	Year	Focus	Result
(Wulandari et. Al., 2024)	2024	Web-based Video Modelling Media for Social Skills of Autistic Students in Inclusive Elementary School in Surakarta.	In the city of Surakarta, according to the assessment of media experts, material experts, IT experts and users. . Each gave an assessment score of 83.7% from media experts, 87.47 from material experts, 88.5 from IT experts and 89.01 from users.
(Liu et. Al., 2023)	2023	Mobile apps running on smartphones and tablets.	Perhaps due to the complexity of behaviour changes, there is no single universally accepted strategy. Many different theories and techniques have been proposed, and each has its followers.
(Rathod et. Al., 2024)	2024	E-learning (Electronic Learning) recommendation systems attempt to provide personalized recommendations	The work emphasizes the significance of the best available technological tools so that people with ASD can be effectively involved in society and have better daily functioning.
(Sawyer et. Al., 2024)	2024	Human Computer Interaction(HCI)	Through measuring reactions to design changes in autistic and neurotypical subjects, applying statistical methods and asserting hypotheses, we have successfully produced heuristics that HCI practitioners can use to reduce the impact of change in software interface design on autistic users, making software updates more accessible for this user group.

5. Limitations and Future Work

There are several limitations to this work. The primary difficulties encountered during the research were related to the complexity of the topic. Autism is a challenging subject, particularly when gathering comprehensive information. This required extensive study, analysis, and visits to psychological specialists at the College of Education, as well as to centers specializing in children with autism in Basra. Diagnosing the disorder accurately proved to be difficult. At the centers visited, which were intended for children with autism, many cases involved other conditions such as intellectual disabilities, Down syndrome, and hearing impairments. Consequently, it was challenging to find children who exhibited symptoms closely aligned with autism. Another challenge was interacting with this specific group. Autistic children often have unusual habits and traits that make interaction difficult. For instance, they may have difficulty staying in one place for an extended period. Given that the program requires children to sit in front of a computer screen for a short time, methods to capture their attention were essential. Engaging images, animated pictures, and sounds like music were used to draw the child to the computer. Getting them to sit in front of the screen for 5-10 minutes a day was considered a significant achievement. Repeating attention-grabbing activities multiple times was also necessary. Teaching children with autism letters, numbers, and color recognition differs from teaching typically developing children. Methods need to be adapted based on individual conditions. Autistic children may not tolerate changes in routine well. Thus, for color differentiation, a single shape with changing colors was used to minimize distractions from the main educational objective. A significant challenge was the lack of resources. Diagnosing autism is particularly difficult in Arab countries, which complicates obtaining accurate information. The website aimed to be comprehensive, addressing diagnosis, education, nutrition, treatment methods, and evaluation, which made the design

process time-consuming relative to the scope of the project. Additionally, survey respondents may have used more technologies than they reported, limiting the accuracy of the data. The study's limitations also include a relatively small sample size and regional constraints, as all participants were from Basra. The lack of representation from other cities and the exclusion of people with ASD are notable limitations. Future work should include discussions with older children and young adults with ASD about technology use. Additionally, while this study relied on participants' memory of software use, future research will include diary studies, where software will be loaded on iPads and participants will report their experiences via online surveys.

6. Conclusion

In summary, it is evident that children with autism, a psychological disorder, can benefit significantly from technology, such as website design, to enhance their learning both in and out of the classroom. When effectively implemented, such technological approaches can improve their communication skills. A well-designed website can yield positive outcomes for children with autism. The primary goal of these technological initiatives is to support these children and assist their parents in integrating into society, enabling them to lead more fulfilling lives. Essentially, technology-driven educational resources can help children with autism develop essential skills and motivate them toward successful engagement in life despite the challenges they face.

Computer technology has advanced rapidly, profoundly changing how people live. A significant impact of this advancement is seen in mobile communication devices, which provide easy access to up-to-date information across various sectors, including education. At the same time, the fast-paced development of information and communication technology has greatly influenced many areas, especially education, by enabling the swift sharing of learning materials online. The advantages of

internet technology, such as its constant availability and capacity to connect multiple users either individually or in groups, enhance its effectiveness. Its user-friendly design also makes the internet an excellent platform for improving educational experiences. Consequently, integrating information and communication technology in educational environments is expected to enhance the overall quality of education.

Here are some potential future work ideas that leverage modern technology and AI techniques to support children with autism:

1. **Teletherapy Platforms:** Develop specialized teletherapy applications that connect children with autism to therapists for remote sessions. These platforms can include interactive tools tailored to the child's needs, such as visual aids and gamified learning modules.

2. **Emotion Recognition Software:** Create AI tools that analyze facial expressions, voice tone, and body language to help children with autism better understand emotions in themselves and others. This could be integrated into therapy sessions or social skills training.

3. **Parent-Child Interaction Tools:** Develop AI applications that guide parents in effective communication strategies with their children, offering suggestions based on the child's responses and behaviors during interactions.

These ideas highlight the potential of AI technology to create innovative solutions that can enhance the lives of children with autism and support their development in various areas.

7. Recommendation

Having reviewed the use of modern technology to enhance learning in autistic children, the researcher recommends that further study should be carried out on the availability and utilization of modern technology in Iraqi schools to enhance the learning of students with autism spectrum disorder.

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