Dean&Francis
ISSN 2959-6149

The Mechanism and Educational Application of Visual Support Strategies in the Learning and Development of Children with Autism Spectrum Disorder

Huanxi Chen

James Cook University, Singapore, Singapore
corresponding author: CHxixiiiii@outlook.com

Abstract:

The role of providing support to the learning and development of children with autism spectrum disorders (ASD) has been a broadly discussed issue, yet an in-depth conceptualization of how the strategies of visual support may work and which theoretical framework is broader is still missing. The paper provides a systematic analysis of the logic and support structure of visual support strategies involved with the essence of ASD children core in terms of information processing, executive functioning, social interaction, and emotion regulation. Studies indicate that through congruence with the visual processing benefits of ASD children, visual support has a high role in light loading, predicting information, and fostering information stability and social insight, as well as emotional consistency and competence. ASD children can receive a clear, stable, and reusable form of external assistance through a structured visual environment and instructional visual product, as well as through communication and social visual tools, which can contribute to their participation and autonomy. This paper hypothesizes, based on the analysis suggestions, that Systematisms, consistency, and personal adaptation of visual support strategies need to be enhanced to facilitate learning and development of ASD children in a practical educational environment.

Keywords: Autism spectrum disorder; Visual support strategies; Information processing; Executive function; Emotion regulation

1. Introduction

Autism Spectrum Disorder points to a state that implies the process of development that demonstrates specific patterns of relating to others, repetitive types of response, and variation of perception of the world.

ISSN 2959-6149

With more children being identified by way of early assessment, these individuals are presented in environments where other children are also, and this poses some significant problems in the provision of support that facilitates development and learning to take place. Experiments conducted on children with this disorder show that they do not process information as other children do, handle various elements of thought, processing, and control of emotions. Such differences impact the ways in which they join the classroom, the results which they display during the learning process, and the way in which they associate with others in their social life. This implies that the methods of support must arise after having known these specific patterns of thought and reaction, and the generation of such methods is a considerable challenge that needs focus in the work that analyzes education among children manifesting various forms of development, and work that analyzes environments among all children.

Against this background, visual support strategies, due to their close alignment with the common visual processing strengths and intrinsic need for structure and predictability among individuals with ASD, are no longer merely an aid, but have become a potential cognitive ecological adapter. This paper aims to systematically explore the theoretical logic, supporting mechanisms, and practical pathways of this strategy, with the goal of providing an evidence-based framework for building truly inclusive and effective learning environments.

2. Characteristics and Teaching Challenges of the ASD Group

2.1 Core Characteristics of the ASD Group

Autism Spectrum Disorder (ASD) consists of a complex of major traits that influence how a child perceives the world, communication, and interaction [1]. Although there is a considerable variability at an individual level, three primary domains are usually considered in research and diagnostic models: impaired social communication, limited and repetitive behavioral patterns, and unique sensory perception and attention features.

2.2 Major Learning Difficulties for Children with ASD

To begin with, social communication problems are one of the essential features of ASD. Such children might have a delayed language development, reduced pragmatics competence, or they might have a problem with decoding social cues [2]. These problems impact their peer communication and the capacity to start and sustain interactions and perceive social situations, complicating interaction with peers. Second, children with autism have limited and repetitive behavioral patterns. They can depend on the use of repetitions, stick to certain patterns, or very specific attention to particular interests [1]. As much as these behaviors provide predictability, they may also minimize flexibility and restrict their involvement in new activities and social experiences. Third, the differences in perception and attention differ among many children. They are either hyper-reactive or hypo-responsive to auditory, tactile, or visual stimuli and fail to change their attention [3]. Those traits may influence their adaptation to the classroom so that environmental stimuli or transition activities have a high probability of causing discomfort and distraction.

2.3 Teaching Key Points and Challenges

In teaching children, there are unique key points and challenges according to the specifics of children presented concerning social communication, behavioral patterns, and perception. Not only do educators have to answer the learning needs that are brought about by these differences, but they also have to stand up to the complications of individual differences in a group teaching setup.

To start with, the fundamental issue of teaching is guaranteed personalization and differentiation. Autistic children are really heterogeneous in terms of their cognitive peculiarities and learning styles, so it is the duty of teachers to organize the content and learning rate based on their level of development. An analogous difficulty is that the standardized procedure of group education cannot be capable of completely address specific variations, and the maximization of suitable adaptability within the alliance system and the encouragement of the involvement of each child a long-term problem.

Secondly, there should be a high level of clarity in the task understanding and behavioral requirements in the teaching process. Having irregular paces of comprehension, most of the children with ASD will deal with abstract rules, multitasking, or transitions of activities; thus, clear structures of learning and expectations are key factors in participation, attention maintenance, and task completion. Nonetheless, when there is no predictability in activities, and the classroom arrangement is too loose, the participation can decline at a high rate, posing serious implementation pressure.

Moreover, processing and information guidance have been important parts of instruction. Children with ASD tend to demand a delay or overload on understanding verbal instructions, situating the sequence of activities, or processing sequential information, and as such, the teaching context would require clarity, sequential, and traceable information presentation [4]. The common change of activities and the intricate auditory and visual stimuli in

the early childhood educational settings, however, render consistency and stability of information in various settings one of the most problematic issues in practice.

Last but not least, it is also important to provide the children with an emotionally safe learning environment. Anticipated classroom organization may help lessen anxiety, enhance learning preparedness. However, the dynamic and evolving nature of the early childhood classrooms tends to heighten the challenge of maintaining security [5]. In this respect, balancing between the orderliness and swiftness to the particular variations in everyday endeavors turns out to be one of the most empirically difficult in ASD instruction.

3. Underlying Logic and Support Mechanisms of Visual Support Strategies

3.1 Visual Processing Advantage Theory

The visual processing advantage theory assumes that, in contrast to temporal auditory data that depends on immediate processing, visual data, by virtue of its stability, concreteness, and reusability traits, is more suited to the cognitive processing tendencies of numerous people with autism spectrum disorder (ASD). Studies have shown that children having ASD tend to have comparative strengths in terms of visual memory, pattern recognition, and detail processing [6].

The three levels of this advantage mechanism occur in information acquisition, the visual stimuli persistence level decreases the stress of processing in the short term; in the information processing level, visual presentation is more organized and is more visual allowing people to understand the series and relationship; in the emotional and cognitive loading management, the predictability of visual information reduces the stress of the uncertainty.

3.2 Support Mechanisms

3.2.1 Information processing and executive function support mechanisms

The implementation premise of visual support strategies is that these strategies allow the executive functions to be compensated externally. Studies indicate that several people with autism spectrum disorder (ASD) have certain problems with working memory, task organization, and attention control aspects, which makes them more dependent on stable, visual, and repeatedly available external information frameworks [7]. The distinctiveness and continuity of visual information fulfill such a requirement perfectly.

ASD persons are commonly faced with excessive loads in direct language processing, teaching memory, and internal sequence arrangement. The working memory can be helped to retain visual information, which is then used as a source of external memory, making working memory less reliant upon itself. Its spatial representation and organization are also in line with the cognitively oriented features of ASD individuals that like to receive tangible and unambiguous input, thus enhancing the effectiveness of cognition and the tracking of steps.

The ASD individuals tend to be highly sensitive to ambiguous hints, uncertainty, and verbal information that changes quickly. Information processing stress can be alleviated through visual cues because of their predictability and stability, and they can provide individuals with clear situational cues. According to the desire of the ASD community to lead a structured and predictable life, visual assistance can somewhat ease emotional pressure and make the sense of control over space more rational.

3.2.2 The role of visual support in social and emotional regulation

Visual support is also very useful in enhancing the social interactions and emotional control of children who have autism spectrum disorder (ASD). Based on the common visual processing advantages and difficulties in understanding social cues in children with ASD, visual strategies can present social and emotional information in a more stable, predictable, and manageable form [8].

Tools such as social stories, visual scripts, and emotion cue cards transform complex social steps such as “how to join a game” or “how to respond to a peer” into clear and followable action sequences, helping children with ASD feel more directed and secure when practicing social behaviors.

Regarding emotional control, emotive thermometers, emotive charts, and calming cards are some of the visual tools employed to control emotions using concrete formats that children with ASD like to manage, select strategies, and receive instructions before the emotions spiral out of control [9]. Moreover, the visual timetables and transition aids enhance the predictability of activities, reduce anxiety, and enable children, through the use of transition aids, to remain consistently engaged in the classroom.

4. Practical Recommendations for Visual Support Strategies

4.1 Visual Structuring of the Learning Environment

An effectively structured learning environment through

ISSN 2959-6149

clarity and fixed, visually sensible arrangement is an essential component of learning with children with autism spectrum disorder (ASD). Considering these typical features of ASD children propensity to chaotic stimuli and high reliance on predictable patterns, a visually organized environment can minimize sensory load, create a sense of safety, and increase independent comprehension of situations and adherence to rules, tendencies of the affected person [10].

The functional areas in the classes, like reading corners, group tables, sensory areas, and quiet areas, should be properly defined with labels, color coding, and markers defining the boundaries. This allows the ASD children to move freely and minimizes confusion in the transitional process. The use of simple visual signals in each area, like sit down to get materials, to finish to clean up, or use gently one person one time in sensory areas, even when verbal directions are hard to absorb on the spot, gives children behavioral directions to follow.

ASD children are extremely sensitive to environmental consistency; therefore, the visual arrangement should be consistent. In case equipment must be moved or they must be added, the children should be given a preview of the visuals that will aid them to adjust beforehand and eliminate anxiety, which would ease the transition [11].

4.2 Visual Presentation of Teaching Content

Instructional aids in learning can be used to explain learning techniques and processes of performing tasks, and learning materials become more tangible, thus facilitating a better understanding of the subject in different fields. Since autistic children are challenged in processing abstract concepts and in multi-step tasks, visual aids, including photos, icons, charts, and concept maps, may change abstract forms of information into easily measurable ones. Pictures and flashcards can support vocabulary knowledge and reading comprehension in literacy work, number lines, color-coded blocks, and visual equations can be used to perceive relationships and patterns in mathematics, and in science or thematic lessons, labeled charts offer obvious points of point of entry.

By dividing the complex tasks into smaller tasks and giving easy images, task analysis and visual task cards can lower cognitive load, as well as, with the support of executive functions, they allow children to follow instructions on their own [12]. Visual schedules offer organization to the schedules or a single activity and help anticipate transitions, comprehend the order of events in time, and even develop self-reliance. Visual materials are to be drawn based on the stages of development of children, staying clear, concise, relevant, and symbolically consistent, not forgetting cultural or personal preferences as well [13].

4.3 Visual Support for Interaction and Communication

Communication and social interactions should always rely on the use of visual aids to make children with autism spectrum disorder (ASD) articulate their needs, learn to interpret social norms, and exercise emotional control. Children with poor language skills should use visual communication boards and assistive or alternative communication devices, which may be simple picture boards to complex electronic systems, and allow children to select symbols that reflect words, phrases, or actions, which would reduce frustration and promote communication with peers and teachers [14].

Complex social situations should be concretized and disaggregated using social stories and social scripts that help in predictable steps. As an example, social stories may explain the behavior in a queue, seeking assistance, or assembly. Social scripts give step-by-step instructions on how to meet or engage in a game, and children understand and adhere to the social norms more easily.

The elements of the visual application should be constant whether at school or at home [15]. Visual schedules, behavior cue cards, and mood charts can be transported to the home through the collaboration between a teacher and a parent. Training or provision of electronic resources can be used to ensure that one understands and skill transfer as well as emotional stability take place.

5. Conclusion

The paper is a systematic examination of the theoretical foundation and action of the visual support strategies in learning and development of children with autism spectrum disorders (ASD). The paper discusses reducing cognitive load, increasing situational comprehension, and facilitating classroom engagement and independence of children through visual means of offering reliable, consistent, and predictable information format, through the lenses of the benefits of visual processing, information processing, executive functioning, and social and emotional regulation. An analysis of the research findings reveals that the environments that are organized visually, instructional visual resources, as well as communication and social visual aids, are all coherent and specific in addressing the fundamental cognitive peculiarities of children with ASD. Their success is not the result of one tool, but a high level of conformity to the processing features of the individual, as well as a high level of systematization.

Although this paper has highlighted the essence and real-life experience use of visual support strategies in children with Autism Spectrum Disorder (ASD), the paper also indicates the existence of significant gaps in studies,

which are worth investigating. First, the neurocognitive processes of visual support efficacy are not fully investigated, with the current literature sources focusing mainly on the use of visual tools as an activity that improves executive functions and lowers anxiety levels in children with ASD, whereas the neuroimaging or cognitive neuroscience data has not been reviewed to explain how visual processing of information influences the neural pathway of learning and communication in this group. In another, existing studies have unfairly concentrated on school-aged ASD children, with very little effort to early intervention cases of toddlers and pre-schoolers, a stage of child development in which the benefits of visual aids can be optimized. Also, the existing scholarly research on visual support approaches is very limited; most of it is carried out in western settings and the role that cultural values, education systems, and family care schemata play in the designing and efficacy of the approach in a non-Western environment is not well researched. Such research gaps not only restrict the applicability of the existing research but also indicate the definite directions of the further empirical research in the area of ASD education.

Empirical studies can be further employed on how various forms of visual support strategies report various outcomes in varied circumstances of educating children with ASD, and how they can be best modified to suit various levels of development and unique personalities in a bid to keep on enhancing the educational support system of children with ASD.

References

[1] Basit M, Sultan A N, Ahmed S, Iftikhar N, Ahmad W, & Hafeez M. Presentation of restrictive and repetitive behaviors in autism spectrum disorder. Pakistan Journal of Medical and Health Sciences, 2022, 16(4): 153–155.

[2] Yavuz H M, Selçuk B, & Korkmaz B. Social competence in children with autism. International Journal of Developmental Disabilities, 2017, 65(1): 10–19.

[3] Patil O, & Kaple M. Sensory processing differences in individuals with autism spectrum disorder: A narrative review of underlying mechanisms and sensory-based interventions. Cureus, 2023.

[4] Chapin S E, McNaughton D, Light J, McCoy A, Caron J, & Lee D L. The effects of AAC video visual scene display technology on the communicative turns of preschoolers with autism spectrum disorder. Assistive Technology, 2021, 34(5): 577–587.

[5] Zeedyk S M, Cohen S R, Blacher J, & Eisenhower A. Building classroom communities for children with autism spectrum disorder. International Journal of Inclusive Education, 2021, 28(7): 1093–1107.

[6] Petersson-Bloom L, & Holmqvist M. Strategies in supporting inclusive education for autistic students--a systematic review of qualitative research results. Autism & Developmental Language Impairments, 2022, 7.

[7] Azeem A, Shoaib A, & Naheed F. Autism spectrum in the classroom and special educationist: A panorama of challenges in facilitating the teaching-learning process. Global Social Sciences Review, 2019, IV(III): 415–420.

[8] Gates J A, McNair M L, Richards J K, & Lerner M D. Social Knowledge & performance in autism: A critical review & recommendations. Clinical Child and Family Psychology Review, 2023, 26(3): 665–689.

[9] Rutherford M, Baxter J, Johnston L, Tyagi V, & Maciver D. Piloting a home visual support intervention with families of autistic children and children with related needs aged 0–12. International Journal of Environmental Research and Public Health, 2023, 20(5): 4401.

[10] Maulidah W S, & Mufalakhah K. Instructional modifications in inclusive early childhood education: A case study of teaching strategies for children with autism in Yogyakarta. Global Educational Research Review, 2024, 1(2): 73–81.

[11] Martin R, & Wilkins J. Creating visually appropriate classroom environments for students with autism spectrum disorder. Intervention in School and Clinic, 2021, 57(3): 176–181.

[12] Dos Santos M P, & Salguero P. Early interventions in children with autism spectrum disorder (ASD). Neurodivergences, 2025, 4: 207.

[13] Fedotova K. Guidelines for designing effective language teaching materials. Общество и Инновации, 2023, 4(11/S): 242–248.

[14] Tatel H G. Assessing the effectiveness of visual supports in fostering communication and classroom engagement among elementary students with autism spectrum disorder. Psychology and Education: A Multidisciplinary Journal, 2025, 46(8): 1057–1083.

[15] Azad G, Eisler L, Taormina I, & Herrera V. The transition to kindergarten for children on the autism spectrum: A qualitative study examining the perspectives of caregivers and teachers on home-school collaboration. Journal of Research in Childhood Education, 2025, 1–26.