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CASE REPORT

Praxis as a Framework for Intervention: The Case of Alan

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ABSTRACT

This article presents the case of Alan, a six-year-old boy with autism spectrum condition (ASC), global developmental delay, possible attention-deficit hyperactivity disorder (ADHD), and intellectual difficulties, examined through the framework of praxis. Praxis, the ability to conceptualize, plan, and execute purposeful actions, is explored in two domains: basic core skills (Praxis I) and socio-emotional and behavioral praxis (Praxis III), while excluding advanced academic praxis (Praxis II). Alan has a history of limited gains in occupational and speech therapy but has made gradual progress in an early intervention program, particularly in problem-solving, fine motor abilities, balance, and social awareness, though communication remains a key challenge. He demonstrates difficulties with sensory processing, motor planning, and adapting to new routines, yet responds well to structure and familiar cues. Intervention strategies include sensory diets, visual supports such as PECS, role-play with picture cards and video modeling, handwriting practice, and functional math activities. Emotional regulation can be supported with Zones of Regulation visuals, fidget tools, and positive reinforcement. This article highlights the importance of individualized, flexible approaches and family-school collaboration to enhance Alan's developmental progress and daily functioning.

Keywords: *praxis, attention-deficit/hyperactivity disorder, autism spectrum disorder, early intervention*

1. INTRODUCTION

Praxis is a skill that enables individual to interact effectively with the physical environment [1]. It supports the capacity to plan, organize, and perform unfamiliar actions. The cycle of praxis consists of three key stages: reflection (ideation), theory (planning), and action (execution).

a. Reflection (ideation): the individual generates ideas about the appropriate action

b. Theory (planning): the individual plans and organizes the response that involve motor and sensory systems
c. Action (execution): the individual carries out the chosen movement

Ayres [1] suggested ideational, motor and oral praxis as the foundation of praxis. Later research in occupational therapy expanded this concept by including social and emotional praxes as integral to daily functioning [2,3]. Together, the five types of praxis are:

a. Ideational praxis: the ability to conceptualize actions that need to be performed
b. Motor praxis: the ability to coordinate body movements effectively
c. Oral praxis: the ability to organize speech movements during communication
d. Social praxis: the ability to demonstrate socially accepted behaviours while interacting with others
e. Emotional praxis: the ability to modulate one's emotional responses

These five praxes are essential for daily living and the acquisition of new skills. In educational therapy, three domains of praxis are commonly emphasized to better understand and support the functional abilities of neurodivergent individuals.

The researchers highlighted that praxis challenges are often associated with autism spectrum condition (ASC), developmental coordination disorder (DCD), and other neurodevelopmental conditions, which can affect social participation, flexibility, and adaptive behaviour in neurodivergent individuals [4,5]. While praxis is usually linked to motor coordination, individuals with praxis difficulties may also experience challenges in cognitive processes and emotional regulation, which can indirectly influence school readiness and peer interactions [6]. From a clinical perspective, interventions that specifically address praxis challenges through sensory integration and structured motor activities have been found effective in enhancing social participation and functional independence [7,8]. Taken together, these findings suggest that praxis is not only a foundation for child development but also a critical target for intervention, as strengthening praxis skills can promote self-regulation, social interaction, and academic achievement.

1.1 Praxis I – Basic core skills

Praxis I refers to the foundational skills essential for both daily living and academic achievement. It requires an individual to notice sensory information and generate ideas for action [1]. This stage encompasses motor planning and sensory-motor coordination, which are necessary to successfully complete an action. The key processes include:

a. Sensory registration
b. Ideation
c. Motor planning
d. Execution

Examples of tasks within this domain include throwing a ball or brushing teeth. In educational therapy, these processes are applied to support the development of skills such as handwriting, reading, spelling, and arithmetic.

Sensory registration is the initial stage in which the brain detects input from the environment or the body [1]. Ineffective registration may cause the individual to overlook important sensory cues [9]. Once sensations are detected, ideation follows, where the individual generates ideas for possible actions [2]. This step draws on creativity and imagination, supported by body senses such as tactile, proprioceptive, and vestibular input, to form ideas about how the body and objects should interact [1]. The third step, motor planning, refers to creating an action plan, organizing and sequencing movements to respond

appropriately based on the ideas formed [10]. The final step, execution, involves carrying out the planned actions through coordinated body movements, which can be challenging for individuals with motor coordination difficulties [11].

1.2 Praxis II – Complex planning and sequencing

Praxis II builds on foundational skills by emphasizing more advanced sequencing and organization of actions. It requires individuals to manage multi-step tasks while coordinating timing, force, and rhythm [1,2]. This level of praxis focuses on structured, higher-level skills commonly learned in school and beyond, particularly within academic and specialized domains. Examples of these skills include:

a. Mastering school-based academic subjects
b. Using technology effectively
c. Playing musical instruments
d. Conducting science experiments

The abilities developed in Praxis II are often evaluated through examinations, competitions, or within occupational contexts, as they represent advanced competencies that go beyond basic daily living skills.

1.3 Praxis III – Sensory, socio-emotional, and behaviour praxis

Praxis III represents the most complex and abstract level of praxis, as it requires individuals to interact meaningfully with their environment and adapt their behaviours across different contexts. Aryes [1] described this praxis as the integration of sensory processing with social, emotional, and behavioural outcomes. The core skills in this domain include:

a. Interpreting and responding to social cues
b. Regulating emotions and behaviours
c. Adapting behaviour in various settings
d. Self-awareness and interaction timing

These abilities are often the most challenging for neurodivergent individuals, particularly when engaging in social situations.

The first skill, interpreting and responding to social cues, involves detecting and making sense of sensory input during interactions such as recognizing facial expressions and body language. Individuals who demonstrate strong ideation and motor planning are often able to generate appropriate responses to different social situations [1]. In contrast, those with praxis difficulties may overlook important cues and respond inappropriately, which can negatively affect relationships [2]. Regulating emotions and behaviours relies on using physiological feedback to manage emotional arousal and choose appropriate responses [12]. For instance, a child with effective regulation can pause and apply coping strategies when faced with frustration, rather than experiencing a meltdown or avoiding the task.

Adapting behaviour in various settings refers to the ability to modify actions and responses when circumstances change [13]. Examples include transitioning between activities or adjusting to unexpected changes in routines. Children who struggle with adaptability may appear rigid or become easily frustrated, as flexibility in both motor planning and behaviour is required [9]. Finally, self-awareness and interaction timing allow an individual to remain aware of themselves and their surroundings while estimating the appropriate timing for actions and responses [1]. In social contexts, this may involve joining a conversation at the right moment. When praxis difficulties are present, individuals may misjudge timing and inadvertently interrupt, disrupting the flow of interaction [2].

In this article, we examine the case of a client (anonymously designated Alan), a 6-year-old child, through the lens of praxis, with the aim of identifying his challenges and outlining appropriate treatment strategies. Alan was selected as the subject because his complex condition provides valuable insights for study, as he experiences significant difficulties across multiple developmental domains. Praxis offers a comprehensive framework for analyzing Alan's performance in relation to his developmental profile and for designing individualized intervention strategies to support his growth and functioning. Figure 1 summarizes how Alan's observed profile is considered across the praxis domains addressed in this article and how those observations inform the proposed intervention strategies.

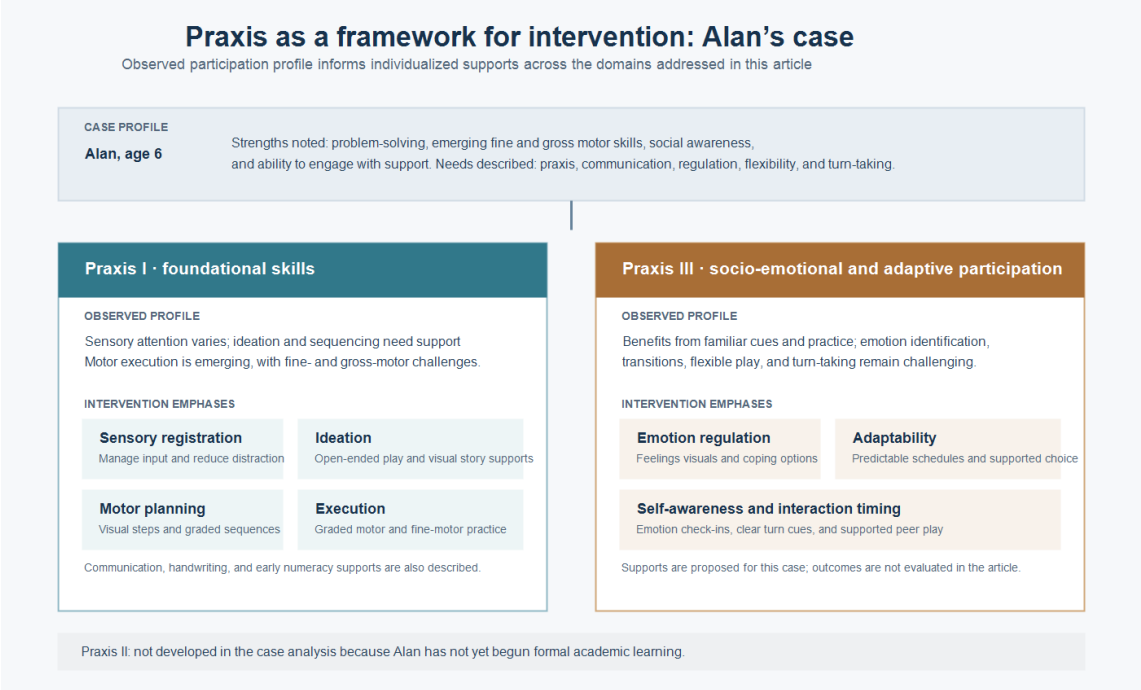


Figure 1. Praxis-informed case map linking Alan's observed profile with proposed intervention emphases. Praxis II is noted as outside the present case analysis. The strategies shown are proposed; intervention outcomes are not evaluated in this article.

2. CASE BACKGROUND AND PERFORMANCE

2.1 Background information

Alan is a 6-year-old Chinese boy from Malacca, Malaysia. His mother tongue is Mandarin, although he understands both Mandarin and English. Alan is having autism spectrum condition (ASC) and global developmental delay, with a high likelihood of intellectual difficulties and attention-deficit hyperactivity disorder (ADHD). Previously, Alan attended occupational therapy once a week for about a year, as well as speech and language therapy once a week for less than six months. However, both services were discontinued due to limited progress and financial constraints. According to his mother, the strategies used in these therapies were not well suited to Alan, as he showed minimal improvement in motor development and speech.

At present, Alan is enrolled in a special class within a mainstream kindergarten that adopts a Montessori-inspired approach, emphasizing play-based learning rather than traditional academics. In addition, he has been attending one-on-one Early Intervention Program (EIP) sessions at our centre for the past two years. The program primarily targets developmental milestones across domains such as personal-social, communication, cognitive, fine motor, and gross motor skills. Recently, his therapy schedule was increased from two one-hour sessions per week to three two-hour sessions per week, in

order to maximize progress through more frequent practice. Alan lives in a large household with his single mother and four elder sisters. He is frequently cared for by his grandparents due to his mother's busy schedule. Because his family members have limited time to support his learning, Alan often engages in solitary play. However, during parent-teacher conference each semester, his mother is provided with strategies to reinforce intervention goals at home.

Over the past two years of EIP, Alan has made some improvements in several areas. Cognitively, he has developed stronger problem-solving skills. In fine motor skills, he has progressed in drawing and cutting, though handwriting continues to require significant effort. In gross motor development, he is now able to maintain balance briefly and catch a ball from a greater distance. Socially, he demonstrates improved self- and environmental awareness, and can interact with others when play is initiated. Communication, however, remains his greatest challenge: he still struggles to follow instructions consistently and can only produce single words occasionally. Overall, Alan continues to develop more slowly compared to his peers.

The following section outlines Alan's present levels of performance as analyzed through the lens of the three praxes.

2.2. Praxis I performance

During the IEP sessions, Alan demonstrates the ability to notice objects placed in front of him. However, he becomes bored quickly when presented with tasks that involve only a single sensory input, and at the same time, he feels overwhelmed when exposed to too many sensory stimuli. As a result, he often ignores important inputs and becomes distracted by objects that capture his interest. At the ideation stage, Alan experiences difficulty imagining the actions required and usually depends on the therapist's demonstrations. His imaginative play is rigid, as he tends to repeat the same patterns of play. In pretend play, he is more focused on manipulating toys than engaging with puppets or enacting scenarios. All these difficulties could be explained by his poor verbal comprehension. In this case, difficulty understanding play scripts and instructions will make Alan struggles to follow the play sequence, perform assigned roles, or carry out suggested actions [14]. With the challenges of receptive language, it reduces the ability to link words heard to symbolic uses, and so Alan is more focused on manipulation of objects rather than the shared imaginative meaning [14].

In terms of motor planning, Alan sometimes struggles to sequence his actions correctly and often requires the therapist's guidance and correction. These challenges affect his ability to carry out appropriate movements, which in turn impacts his learning progress. Concerning to execution, Alan's gross motor skills also reflect areas of difficulty: while he can catch a ball effectively, he struggles to throw it at a target and shows poor balance, despite being active outdoors. Regarding fine motor skills, Alan tends to cut too quickly, leading him to go off direction. He also continues to face challenges with tasks such as buttoning and tying, largely due to limited exposure.

Within the educational therapy context, Alan shows difficulties in reading and writing, though he demonstrates some progress in arithmetic. In terms of Alan's language ability, he has difficulty vocalizing clear words as he could only mumbling or whining when he tried to communicate with the therapist. Therefore, he has difficulty to read when asked. He is able to imitate the sound "mama" on request but becomes frustrated when asked to imitate other words. Occasionally, he attempts to move his mouth to speak but is unable to produce sound. His limited vocabulary also affects his ability to follow two-step commands and contributes to difficulties with reading comprehension. In terms of his language receptive skills, he often requires the therapist to give commands together with non-verbal actions. For instance, he required the therapist to point to the whiteboard while providing the instruction of using the marker pen to tick the box on the whiteboard.

For writing, Alan shows good letter formation when provided with hand-over-hand support, but he lacks the confidence to write independently due to difficulties with strength control. In drawing, he can produce a circle on his own but requires assistance to create other shapes. In arithmetic, Alan demonstrates the ability to subitize numbers from 1 to 10 and understands finite number sequences. However, he struggles with the concept of comparing quantities.

2.3 Praxis II performance

Since Alan is currently attending a special class in kindergarten and has not yet acquired specific skills typically assessed in examinations or competitions, this section on Praxis II will not be discussed in detail and is therefore omitted from the article.

2.4 Praxis III performance

During the IEP sessions, Alan was able to recognize and respond to both verbal and non-verbal cues from the therapist. For example, when the therapist used the firm tone of voice to instruct him, he would become more compliance as he knows the therapist is angry. In the aspect of giving verbal instructions, although Alan has difficulty understanding some instructions, he is able to follow them with consistent practice. However, when presented with a new instruction, he sometimes becomes confused and requires the therapist to demonstrate it for him. He also shows difficulties in understanding emotions. In particular, when asked to identify his emotions using picture cards, he tends to select the ones he prefers rather than those that accurately represent his feelings. On some occasions, however, when he cried, he correctly chose the sad picture card. In general, Alan is a cheerful child who can shift from negative emotions to a more positive state rather quickly, and he only displays mild tantrums when his requests are not fulfilled. Only in some cases Alan will react strongly. For instance, when asked to imitate vocalizations, he often becomes frustrated and resorts to hitting his head. It mostly due difficulty making sound of the word spoken to him when he was trying so hard to imitate.

Alan also shows rigidity in his play, struggling to adapt when routines or play styles are altered. For example, he becomes upset when there are changes to his daily schedule and requires additional time and support to adjust. While he demonstrates self-awareness and awareness of his environment, he prefers solitary play and often needs the therapist’s encouragement to engage in interactive activities. Alan is able to estimate the distance between himself and others, as he does not sit too close or too far from them. While he does not resist joining group play when prompted, he often follows his own style rather than adhering to rules or turn-taking, which affects the experience of others. He frequently requires reminders from the therapist to take turns during group games. During table-top activities, Alan is generally able to regulate his activity level and focus on the task; however, after engaging in exciting activities, he sometimes continues laughing excessively, which makes it difficult for him to maintain attention on the task.

Additionally, Alan occasionally engages in self-stimulatory behaviors during sessions, such as holding in urine while shaking his legs when seated, and he becomes distressed when prompted to use the toilet. This behaviour serves as a compensatory sensory regulation function rather than solely looking it as a maladaptive conduct. Overall, these tendencies may cause less engagement with peers and show greater challenge participating in group activities.

3. INTERVENTION STRATEGIES FOR ALAN

In this section, the intervention strategies will focus only on praxis I and III, as Alan has not yet begun formal academic learning in school.

3.1 Praxis I

3.1.1 Sensory registration

A sensory diet approach is recommended to help Alan regulate sensory input. Activities combining only 2-3 sensory modalities can reduce both boredom and overstimulation [3]. One of the reasons for implementing a sensory diet is that Alan becomes easily overwhelmed when exposed to too many sensory inputs, yet loses interest when activities involve only a single input. Therefore, combining two to three sensory modalities is considered optimal for supporting his learning. For example, an activity such as cutting along colourful dotted lines that lead to a train image integrates both visual and tactile input. Additionally, structuring the environment is crucial to maintain Alan's focus. Providing a clear, uncluttered visual space helps reduce distractions [12], such as covering toy shelves with cloth prevents Alan from being distracted by them.

3.1.2 Ideation

To address Alan's rigid play style, object affordance play [1] can be introduced, where he is shown different ways to use an open-ended object before being encouraged to generate his own play ideas. Role-play supported by picture cards or storyboards with open-ended narratives can encourage Alan to expand stories while still maintaining a structured framework [15]. Additionally, video modeling of peers engaged in imaginative play could further enhance flexible ideation [16]. For example, after watching a video clip of cooking, Alan could be prompted to imitate the actions and then pause the video to generate and act out new steps.

3.1.3 Motor planning

Since Alan struggles with sequencing actions, task analysis combined with visual supports can break down activities into smaller, manageable steps [9]. Over time, cues can be gradually faded to encourage independence [3]. Aryes [13] also recommended using obstacle courses to strengthen motor planning through graded motor sequences of increasing complexity. For instance, Alan could be instructed to climb, jump, and then walk backward, requiring him to remember and plan the sequence of movements.

3.1.4 Execution

To support gross motor skills, balance training activities such as standing on a sensory balance disc can enhance proprioceptive integration [1]. In ball activities, progression should begin with throwing and catching a large ball at a close distance before advancing to smaller balls and farther targets to improve accuracy [2]. For fine motor skills, adaptations such as using thick pencils can make writing more comfortable and boost confidence [17]. Cutting games that include pauses at designated points can also train finger control and precision.

3.1.5 Communication and speech

Given Alan's limited expressive vocabulary, Dynamic Temporal and Tactile Cueing (DTTC) is suitable. This motor-based articulation approach emphasizes immediate imitation of therapist-modelled words, supported by tactile cues such as tapping his chin [18]. In addition, visual supports such as picture cards, specifically the Picture Exchange Communication System (PECS) [19], can be incorporated into speech imitation activities to help Alan better understand and associate spoken words. Strengthening receptive language is equally important. Linking words directly to objects, (e.g., saying "block" while building with blocks) can help Alan connect language with meaning, reducing frustration and supporting vocabulary growth [20].

3.1.6 Writing and fine motor skills

The Handwriting Without Tears program [21], an evidence-based, multisensory curriculum, can provide Alan with structured and accessible handwriting instruction. Using visual supports such as lined paper or tracing sheets can reinforce correct letter formation. To further develop finger strength and pencil control, activities like clothespin pinching and sponge squeezing are recommended.

3.1.7 Math and number concepts

To support Alan's understanding of quantity comparison, hands-on counting activities are beneficial. For example, he can be asked to match sets of items to a given number, then add or remove items and recount, reinforcing that each number corresponds to a specific amount and changes with addition or subtraction. Functional math within real-life contexts, such as comparing quantities of snacks, may also improve comprehension, as children with autism often learn more effectively through familiar and concrete experiences [13].

3.2 Praxis III

3.2.1 Regulating emotions and behaviours

Visual aids are particularly valuable for children with ASD, as they help them recognize emotions and understand expectations more effectively [22]. For Alan, the Zones of Regulation visuals can provide a framework to check in with his feelings. Building on this, sensory regulation activities such as using fidget toys or stress balls can help Alan release tension when experiencing negative emotions [23]. For example, instead of hitting himself when angry, Alan can point to a picture card to indicate that he is in the 'red zone' and then be given a fidget toy as a coping strategy. This approach provides a safe alternative to self-injurious behavior, allowing him to manage and release negative emotions without harming himself. Additionally, Applied Behaviour Analysis (ABA) techniques can support behaviour change by reinforcing positive responses. Providing rewards for adaptive behaviours, such as giving a "help" card instead of whining or engaging in self-injury, encourages Alan to replace negative behaviours with constructive ones [13].

3.2.2 Adapting behaviour in various setting

The Treatment and Education of Autistic and related Communication-handicapped Children (TEACCH) approach emphasize the use of structured visual schedules to enhance predictability and reduce anxiety, which is especially important for Alan given his difficulty adapting to change [22]. Preparing a list of activities allows him to anticipate what will happen next. Providing choices also promotes autonomy and reduces resistance. For instance, Alan can be given the option to choose between puzzles or drawing, helping him feel more in control during transitions.

3.2.3 Self-awareness and interaction timing

Developing self-awareness involves recognizing one's own emotions and connecting them to actions [24]. An emotions chart can support Alan in monitoring his feelings and building emotional self-understanding. To improve his turn-taking skills during play, explicit rules should be established through visual aids. For example, holding a green card could indicate whose turn it is. Using consistent visual cues across activities will help Alan practice waiting, sharing, and respecting others' turns, thereby improving his social interactions [25].

4. CONCLUSION

Praxis provides a valuable framework for understanding and supporting Alan by recognizing not only his developmental challenges but also his individual strengths. It allows educational therapists to carefully analyse his performance and design personalized strategies that directly address his needs. Since progress takes time, these evidence-based interventions must remain flexible and adaptable throughout the intervention period, as no single approach works for every child. Most importantly, Alan's growth in daily activities depends on consistent support and encouragement from both his family and school. Collaboration between these key environments is essential to overcoming his challenges and building on his skills.

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None.

6. COMPETING INTERESTS

The author has declared that no competing interests exist.

7. FINANCIAL DISCLOSURE

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8. ARTIFICIAL INTELLIGENCE DISCLOSURE

During the preparation of this work the author used Open AI to draw Figure 1. The author reviewed and edited the content as needed and take full responsibility for the content of the publication.

9. DATA AVAILABILITY STATEMENT

Not applicable. No primary data were generated or analysed in this study.

10. ETHICS APPROVAL

Not applicable. This study did not require ethics approval.

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