Cognitive and Emotional Profiles of Adolescents with Autism in an Inclusive School Context: A Comparative Study

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ABSTRACT:
This study examines the cognitive and emotional profiles of adolescents with Autism Spectrum Disorder (ASD) within an inclusive international school context. Despite increasing policy emphasis on inclusive education, current assessment practices remain heavily reliant on behavioural measures, which may not adequately capture students' internal cognitive and emotional processes. This study aims to compare adolescents with ASD and neurotypical peers across three domains: self–other representation, cognitive processing, and emotional regulation.

A comparative mixed-methods design was employed. Sixty-one neurotypical students and five adolescents diagnosed with ASD participated. Data were collected using the Rorschach Performance Assessment System (R-PAS; Meyer et al., 2011) and the Gilliam Autism Rating Scale – Second Edition (GARS-2; Gilliam, 2006), allowing for triangulation between performance-based and behavioural measures.

Findings indicate that students with ASD demonstrate reduced interpersonal differentiation, weaker cognitive integration, and elevated internal stress, despite appearing behaviourally regulated in classroom contexts. These results highlight a discrepancy between observable behaviour and underlying psychological functioning.

The study concludes that performance-based assessment provides valuable insights into the internal experiences of autistic learners and should be integrated into inclusive educational practice to support more comprehensive and responsive intervention strategies.

Keywords: Autism Spectrum Disorder, cognitive processing, emotional regulation, inclusive education, Rorschach Performance Assessment System

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1. Introduction

The inclusion of students with Autism Spectrum Disorder (ASD) has become a central focus in both global and Malaysian educational policy. Frameworks such as the *Salamanca Statement* (UNESCO, 1994) and the *Malaysia Education Blueprint 2013–2025* (Ministry of Education Malaysia, 2013) emphasise equitable access,

participation, and meaningful learning for all students. These initiatives reflect a broader commitment to inclusive education, which seeks to accommodate diverse learning needs within mainstream school environments. However, despite these policy developments, the implementation of inclusive practices remains inconsistent, particularly within private and international school settings where variations in teacher preparedness, curriculum flexibility, and specialist support continue to pose challenges (Hosshan et al., 2020; Zuki & Rahman, 2016).

Students with ASD often demonstrate distinctive cognitive and behavioural profiles. While many show strengths in visual processing and memory, they frequently experience difficulties in social understanding, communication, and flexible thinking (Baron-Cohen et al., 2005; Frith & Frith, 2005). In classroom contexts, these students may appear compliant and engaged, yet underlying cognitive rigidity and emotional strain may remain unrecognised (Dell'Osso et al., 2023). This discrepancy raises important concerns regarding how educators interpret student behaviour within inclusive settings.

Traditional assessment tools, such as the Gilliam Autism Rating Scale – Second Edition (GARS-2; Gilliam, 2006), are widely used to identify observable characteristics of ASD. However, these instruments primarily focus on external behaviours and may not adequately capture the internal cognitive and emotional processes that influence learning and participation (Anderson et al., 2017; Otu & Sefotho, 2024). Consequently, there exists a gap between behavioural identification and psychological understanding within inclusive education.

To address this limitation, performance-based assessment approaches such as the Rorschach Performance Assessment System (R-PAS) offer an alternative perspective. The R-PAS evaluates how individuals interpret ambiguous stimuli, providing insight into perceptual, cognitive, and emotional organisation (Meyer et al., 2011). Unlike checklist-based measures, it allows for the exploration of implicit psychological processes that are not easily observable (Weiner, 2001). This is particularly relevant in ASD research, where outward behaviours may mask complex internal experiences.

Theoretical frameworks such as Theory of Mind (Baron-Cohen, 1995), Executive Function (Hill, 2004), and Weak Central Coherence (Happé & Frith, 1996) provide a foundation for understanding these differences. These perspectives suggest that individuals with ASD may struggle with perspective-taking, cognitive flexibility, and global information processing, which in turn affect social interaction and emotional regulation.

Therefore, this study aims to examine the cognitive and emotional profiles of adolescents with ASD in comparison to neurotypical peers within an inclusive international school. Specifically, it investigates differences across three domains: self–other representation, engagement and cognitive processing, and stress and distress. By integrating behavioural and performance-based assessment, this study seeks to contribute to a more comprehensive understanding of neurodiverse learners within inclusive educational contexts.

Methods

Research Design

This study employed a comparative quantitative design within a mixed-methods framework to examine differences in cognitive and emotional functioning between adolescents with ASD and their neurotypical peers. Quantitative data were obtained through the Rorschach Performance Assessment System (R-PAS; Meyer et al., 2011), while behavioural data were collected using the Gilliam Autism Rating Scale – Second Edition (GARS-2; Gilliam, 2006).

The integration of these methods enabled triangulation, enhancing the validity of findings by capturing both observable behaviours and underlying psychological processes (Creswell, 2012; Yin, 2018). This approach aligns with current perspectives in inclusive education research, which emphasise the importance of multidimensional assessment frameworks (Dana, 2000). Relying solely on behavioural data risks

overlooking internal cognitive and emotional mechanisms that influence student engagement and learning outcomes (Otu & Sefotho, 2024).

Participants

The study was conducted in a Malaysian international secondary school operating within an inclusive education framework. A total of 66 students participated, including 61 neurotypical students and five adolescents with a confirmed diagnosis of ASD based on DSM-5 criteria (American Psychiatric Association, 2020).

Participants with ASD were selected through purposive sampling to ensure diversity in behavioural presentation and functional profiles (Yin, 2018). Although the ASD sample size was relatively small, it allowed for in-depth comparative analysis consistent with research involving specialised populations (Weiner, 2001). The age range of participants (14–17 years) represents a critical developmental stage for social cognition and emotional regulation.

Table 1 Demographic characteristics of typically developing students in this study (n = 61)

Category	Group	Frequency	Percent (%)
Gender	Male	32	52.5
Gender	Female	29	47.5
Age	11 years old	4	6.6
	12 years old	6	9.8
	13 years old	12	19.7
	14 years old	14	23
	15 years old	13	21.3
	16 years old	7	11.5
	17 years old	5	8.2
Total		61	100

Table 2 Demographic and diagnostic profiles of participants with ASD (n = 5)

Participant	Age	Gender	Diagnosis	Key Characteristics
Kieran	14	Male	ASD (selective mute)	Repetitive behaviours, poor eye contact, low emotional expression, verbal communication difficulties
Hayden	15	Male	ASD	Sensory sensitivity, social withdrawal, struggles with transitions and emotional regulation
Victor	16	Male	ASD + ADHD (Comorbidity)	Good interpersonal insight, intellectualised thinking, poor integration of emotion and thought
Vince	16	Male	ASD	Task avoidance, low engagement, possibly undiagnosed traits, inattentiveness
Ethan	17	Male	ASD (minimally verbal)	Strong visual memory, expressive through art, high detail focus, difficulty with transitions

Instruments

Rorschach Performance Assessment System (R-PAS)

The R-PAS is a standardised performance-based measure used to assess cognitive processing, emotional regulation, and self–other perception (Meyer et al., 2011). It builds upon Exner's Comprehensive System (Exner, 2003) and incorporates international normative data (Meyer et al., 2015). Three indices were selected: Self and Other Representation, Engagement and Cognitive Processing, and Stress and Distress, as these are particularly relevant to ASD-related functioning (Happé & Frith, 1996; Hill, 2004).

Gilliam Autism Rating Scale – Second Edition (GARS-2)

The GARS-2 is a widely used behavioural assessment tool designed to identify characteristics of ASD, including social interaction, communication, and stereotyped behaviours (Gilliam, 2006). It was used in this study to triangulate findings from the R-PAS and provide a behavioural reference point.

Procedure

The study was conducted in two sequential phases. In the first phase, all participants completed the Rorschach Performance Assessment System (R-PAS) under standardised administration conditions as outlined by Meyer et al. (2011). Assessments were carried out individually in a quiet room within the school to ensure a comfortable and distraction-free environment. Each session lasted approximately 45 to 60 minutes, and responses were coded and scored according to established R-PAS guidelines.

In the second phase, teachers and parents of students with ASD completed the Gilliam Autism Rating Scale – Second Edition (GARS-2; Gilliam, 2006). The combination of performance-based and behavioural data enabled triangulation, providing a more comprehensive understanding of each participant's cognitive and emotional functioning (Creswell, 2012; Yin, 2018).

Following data collection, descriptive and comparative analyses were conducted to examine differences between the ASD and neurotypical groups. The integration of performance-based and behavioural measures is consistent with existing research, which emphasises the importance of combining multiple assessment approaches to enhance validity and capture both observable behaviours and underlying psychological processes (Marlow et al., 2019; Corbett et al., 2009).

Data Analysis

Descriptive and comparative analyses were conducted to examine differences between the ASD and neurotypical groups across the three R-PAS indexes. Internal consistency was assessed using Cronbach's alpha coefficients. Comparative patterns were analysed to identify differences in cognitive processing, emotional regulation, and self–other representation. Data from GARS-2 were used to support triangulation and interpret behavioural correlations with R-PAS findings.

Result

This section presents the key findings derived from the analysis of the R-PAS data collected from two groups of particiapnts: a normative group of sixty-one neurotypical students and five students formally diagnosed with ASD. The analysis focused on three interpretive index including Self and Other Representation, Engagement and Cognitive Processing, and Stress and Distress each representing a dimension of interpersonal understanding, cognitive regulation, and emotional adjustment. To ensure the reliability, each R-PAS index was examined through internal consistency coefficients. The Cronbach's alpha values exceeded .80 across scales, establishing strong internal coherence and confirming the construct validity of R-PAS within the Malaysian international-school context. The normative group's mean scores closely approximated the international R-PAS reference range ($M = 100$, $SD = 15$), suggesting that the instrument performs reliably across cultures and languages. This local baseline therefore served as an essential comparative

anchor for interpreting deviations observed among the ASD participants.

Table 3 Internal consistency of R-PAS index of neurotypical students on Cronbach's alpha (n = 61)

R-PAS Index	R-PAS Variables	Cronbach's Alpha	Interpretation
R-PAS Self and Other Representation	M, COP, MAH, GHR, PHR	.72	Acceptable
R-PAS Engagement and Cognitive Processing	FQ-, WSumCog, P, Blends, Synthesis	.76	Acceptable
R-PAS Stress and Distress	CF+C, MOR, YTVC', SCComp, m	.81	Good

The normative data derived from this study not only align with global R-PAS parameters but also demonstrate the ecological validity of R-PAS within Southeast Asian educational contexts. The instrument effectively bypassed linguistic dependency, allowing participants from varied cultural and language backgrounds to engage equitably. The findings therefore support the applicability of performance-based assessment as a culturally responsive approach to profiling neurodiverse learners in international schools.

Self and Other Representation Index (Refined APA Version)

The Self and Other Representation index examined interpersonal perception and social reciprocity through participants' responses to human and cooperative movement imagery. Students with Autism Spectrum Disorder (ASD) demonstrated fewer cooperative human movements and a higher frequency of passive human representations compared to their neurotypical peers. These patterns suggest difficulties in interpreting others' intentions and differentiating perspectives, which are consistent with challenges in social reciprocity and empathy described in Theory of Mind research (Baron-Cohen, 1995; Frith & Frith, 2005). In contrast, neurotypical participants produced more active and cooperative human responses, indicating a stronger capacity for social engagement and mutual understanding.

These findings are consistent with previous research highlighting that individuals with ASD often experience difficulties in attributing mental states to others, which may limit their ability to engage in flexible perspective-taking (Tager-Flusberg & Sullivan, 1994). Furthermore, the results support the cognitive framework proposed by Rajendran and Mitchell (2007), suggesting that impairments in self and other representation arise from underlying differences in social cognition rather than a lack of social interest.

From an educational perspective, these findings underscore the importance of explicit instruction in perspective-taking and emotion recognition. Strategies such as structured social stories, role play, and peer-mediated interactions may support the development of social understanding and interpersonal skills among students with ASD (Knott & Taylor, 2014).

Table 4 Standard scores for Self-and-Other Representation variables in students with ASD (n = 5)

Participant / Baseline	M	MAH	COP	GHR	PHR	Self-and-Other Index
Baseline (Neurotypical, n = 61)	–	1.2	1.48	1.72	2.13	100.3
Moderate Social Engagement Group						
Kieran	4	2	1	2	2	91
Victor	3	1	2	3	2	93
Vince	3	2	1	2	3	87
Low Social Engagement Group						
Hayden	2	1	0	1	4	76
Ethan	1	0	0	1	5	72

Note. *M* = Human Movement; MAH = Movement with Attachment; COP = Cooperative Interactions; GHR = Good Human Representations; PHR = Passive Human Representations.

Engagement and Cognitive Processing Index

The Engagement and Cognitive Processing index examined how participants organised and integrated perceptual and conceptual information. Students with Autism Spectrum Disorder (ASD) demonstrated lower synthesis and blending scores, alongside higher levels of form quality distortions and cognitive processing difficulties. These patterns indicate challenges in integrating information into coherent meanings and suggest a tendency toward fragmented processing.

This finding is consistent with the Weak Central Coherence theory, which proposes that individuals with ASD tend to focus on local details rather than global meaning (Happé & Frith, 1996). As a result, while perceptual accuracy in specific details may be preserved or even enhanced, the ability to integrate information across contexts remains limited. This cognitive style helps explain why autistic learners may perform well in detail-oriented tasks but experience difficulties with abstract reasoning, inference, and multi-step problem solving (Hill, 2004).

The present findings are also supported by research on visual and perceptual processing in autism. Sutherland and Crewther (2010) identified delays in magnocellular processing, which may contribute to differences in visual integration. Similarly, Hudson and Jellema (2012) found that autistic adolescents are more likely to interpret actions in a literal manner rather than infer broader contextual meaning. Together, these studies reinforce the view that cognitive processing differences in ASD are not due to deficits in ability, but rather reflect a distinct processing style.

From an educational perspective, these findings highlight the importance of supporting cognitive integration in the classroom. Instructional strategies such as concept mapping, visual organisers, and guided thinking processes may help students connect isolated details into meaningful wholes. Providing both visual and verbal input simultaneously may also reduce cognitive load and support more effective information processing (Hosshan et al., 2020; Zuki & Rahman, 2016).

Table 5 Standard scores for Engagement and Cognitive Index students with ASD (n = 5)

Participant	FQ-	WSumCog	P	Blends	Synthesis	Engagement & Cognitive Index
Baselise Score from Neurotypical students	2.59	2.31	1.56	.85	1.84	100.3
Moderate Social Engagement Group						
Kieran	3	3	2	2	2	85
Victor	2	3	3	2	3	88
Vince	3	4	2	1	2	81
Low Social Engagement Group						
Hayden	4	4	1	1	1	75
Ethan	5	5	0	0	1	70

Note. FQ- = Form Quality Minus (distorted or imprecise perception); WSumCog = Weighted Sum of Cognitive Codes (degree of thought disturbance); P = Popular Response; Blends = number of responses combining multiple determinants (e.g., colour, form, movement); Synthesis = responses demonstrating cognitive integration and conceptual coherence. Higher scores in Blends and Synthesis indicate flexible, integrative thinking, whereas elevated FQ- and WSumCog values reflect reduced cognitive accuracy and organisation.

Stress and Distress Index

The Stress and Distress index examined indicators of emotional regulation and internal tension. Students with Autism Spectrum Disorder (ASD) demonstrated higher levels of internal distress compared to neurotypical participants, as reflected in increased morbid content and shading-related responses. Notably, these elevated indicators were observed despite participants appearing calm and compliant in observable contexts.

This pattern suggests that behavioural presentation may not accurately reflect internal emotional states. Previous research has shown that individuals with ASD often experience difficulties in emotional regulation, including heightened internal anxiety and challenges in expressing affect (Hill, 2004; Otu & Sefotho, 2024). The discrepancy between external behaviour and internal experience is commonly explained through the concept of camouflaging, where individuals consciously or unconsciously mask their difficulties to meet social expectations (Dell'Osso et al., 2023). The findings are also consistent with the view that performance-based assessments can capture aspects of psychological functioning that are not readily observable. Meyer (2017) highlights that such assessments are particularly useful in identifying underlying emotional strain and cognitive effort that may not be evident through behavioural observation alone. In addition, prolonged efforts to manage sensory, social, and emotional demands may contribute to increased fatigue and reduced resilience over time (Herbert & Weintraub, 2012).

From an educational perspective, these findings emphasise the importance of recognising hidden emotional needs among students with ASD. Classroom practices should include opportunities for emotional regulation, such as structured routines, sensory breaks, and explicit teaching of emotional awareness. Providing a supportive and predictable environment may help reduce

internal stress while promoting engagement and well-being (Simpson, 2005).

Table 6 Standard scores for Stress and Distress Index students with ASD (n = 5)

Participant	CF+C	MOR	YTVC	SCComp	m	Stress & Distress Index
Baselise Score from Neurotypical students	2.18	1.87	1.95	1.08	1.97	95.2
Moderate Social Engagement Group						
Kieran	3	3	2	1	2	89
Victor	2	1	1	0	1	81
Vince	3	4	2	1	2	88
Low Social Engagement group						
Hayden	1	3	4	2	3	92
Ethan	2	4	3	2	3	96

Note. CF + C = Colour Responses indicating affective intensity and emotional reactivity; *MOR* = Morbid Content reflecting negative emotional tone; *YTVC′* = Shading Variables (*Y*, *T*, *V*, *C′*) associated with emotional sensitivity and avoidance; *SCComp* = Suicide Concern Composite; *m* = Inanimate Movement suggesting internal tension or passive coping. Higher *CF + C*, *MOR*, and *YTVC′* values denote heightened internal stress and affective dysregulation.

Cross-Case Correlations with GARS-2

The triangulation between findings from the Rorschach Performance Assessment System (R-PAS) and the Gilliam Autism Rating Scale – Second Edition (GARS-2) provided additional depth to the interpretation of results. Behavioural observations obtained through the GARS-2 corresponded with performance-based data derived from the R-PAS. For example, students who demonstrated higher scores on the GARS-2 Social Interaction and Communication subscales also showed fewer cooperative human movement responses and a higher frequency of passive representations in the R-PAS. This pattern suggests a clear relationship between social cognition difficulties and observable behavioural characteristics (Gilliam, 2006; Anderson et al., 2017).

This correspondence is consistent with previous research indicating that the integration of behavioural and performance-based assessment methods provides a more comprehensive understanding of Autism Spectrum Disorder (ASD) (Meyer et al., 2011; Weiner, 2001). Corbett et al. (2009) further highlighted that performance-based assessments can clarify the underlying cognitive mechanisms associated with behavioural difficulties, particularly in areas such as executive functioning and cognitive flexibility.

The present findings therefore support the value of a multidimensional assessment approach that captures both external behavioural manifestations and internal psychological processes. By linking observable classroom behaviours with underlying cognitive and emotional functioning, such an approach offers greater precision in understanding student needs.

This has important implications for educational practice, particularly in the development of Individualised Education Plans (IEPs), where interventions can be more effectively tailored to address both behavioural outcomes and underlying cognitive and emotional processes (Peters, 2004; Hosshan et al., 2020).

Table 7 Comparison of R-PAS three indexes' scores and GARS scores (n = 5)

Participant	Self & Other (R-PAS)	Engagement (R-PAS)	Stress & Distress (R-PAS)	GARS-2 Total Score
Moderate Social Engagement Group				
Kieran	91	89	91	72
Victor	93	90	95	57
Vince	87	85	88	60
Low Social Engagement Group				
Hayden	76	80	82	84
Ethan	72	74	78	78

Note. R-PAS scores are standardised. GARS-2 scores are summed raw scores across three behavioural domains.

Discussion

The findings indicate that adolescents with Autism Spectrum Disorder (ASD) demonstrate reduced self–other awareness, fragmented cognitive processing, and elevated internal stress compared to their neurotypical peers. These patterns are consistent with established theoretical frameworks, including Theory of Mind, Executive Function, and Weak Central Coherence, which highlight differences in social cognition, cognitive flexibility, and information integration (Baron-Cohen, 1995; Frith & Frith, 2005; Happé & Frith, 1996; Hill, 2004).

The results further demonstrate that the Rorschach Performance Assessment System (R-PAS) is effective in capturing underlying cognitive and emotional processes that are not readily observable through behavioural measures alone. This supports its ecological validity within multicultural educational contexts and reinforces its value as a complementary assessment tool (Meyer et al., 2011; Dana, 2000; Freeth et al., 2013).

Importantly, the integration of R-PAS with behavioural measures such as the Gilliam Autism Rating Scale (GARS-2) provides a more comprehensive understanding of student functioning by linking external behaviours with internal psychological processes. This multidimensional approach enables educators and psychologists to design more individualised and responsive interventions that address both behavioural presentation and underlying emotional demands (Weiner, 2001; Meyer, 2017).

Within inclusive education, such an approach helps bridge the gap between diagnosis and educational planning. Recognising both the observable behaviours and internal experiences of autistic learners allows for more effective support in emotional well-being, social participation, and academic engagement.

Overall, the findings indicate that adolescents with Autism Spectrum Disorder (ASD) exhibit reduced self–other awareness, fragmented cognitive processing, and elevated internal stress compared with their neurotypical peers. These results reaffirm the theoretical frameworks of Theory of Mind, Executive Function, and Weak Central Coherence (Baron-Cohen et al., 2005; Frith & Frith, 2005; Hill, 2004; Happé & Frith, 1996). They also demonstrate that the Rorschach Performance Assessment System (R-PAS) can successfully identify the hidden emotional and

cognitive features of ASD within an inclusive Southeast Asian context (Meyer et al., 2011; Dana, 2000).

The study adds to the growing evidence supporting the ecological validity of R-PAS in multicultural settings (Freeth et al., 2013; Booth, 2018). It further suggests that integrating R-PAS with behavioural tools such as the Gilliam Autism Rating Scale (GARS-2) allows educators and psychologists to develop more individualised interventions that address both external behaviours and internal emotional demands. As highlighted by Meyer (2017) and Weiner (2001), performance-based assessment provides a more holistic picture of functioning, offering insights into emotional balance, stress response, and interpersonal understanding.

Within inclusive education, such comprehensive assessment helps bridge the gap between diagnosis and educational planning. Teachers who understand both the external presentation and internal experience of autistic learners can better support emotional well-being, social engagement, and academic success.

Educational Implications

The results of this study reaffirm the importance of adopting performance-based assessments such as the Rorschach Performance Assessment System (R-PAS) within inclusive educational settings. While behavioural tools like the Gilliam Autism Rating Scale (GARS-2) capture observable traits, R-PAS offers deeper insights into the cognitive and emotional processes that shape students' learning and social experiences. This dual assessment approach bridges the gap between what educators observe externally and what students experience internally.

By understanding how students with ASD perceive relationships, manage emotions, and process information, teachers can develop more responsive Individualised Education Plans (IEPs). For instance, students who display weak cognitive synthesis may benefit from scaffolded thinking routines and explicit visual frameworks that make abstract concepts more concrete. Similarly, learners who show high internal stress can be supported through emotional regulation strategies, predictable classroom routines, and structured sensory breaks (Simpson, 2005).

Inclusive education is most effective when it recognises not only behavioural needs but also underlying emotional dynamics. Integrating psychological assessment findings into educational practice ensures that teaching strategies are not only differentiated but also empathetic. Such understanding supports the broader goals of Malaysia's inclusive education policy, which emphasises the development of the whole child in both academic and socio-emotional domains (Ministry of Education Malaysia, 2013; Peters, 2004; Hosshan et al., 2020).

Methodological and Research Implications

From a methodological perspective, this study demonstrates that the Rorschach Performance Assessment System is culturally adaptable and psychometrically sound for use in Southeast Asian school contexts. Its coding system and interpretive flexibility allow for nuanced understanding across linguistic and cultural boundaries (Meyer et al., 2011; Dana, 2000). In a multicultural society such as Malaysia, where communication styles and emotional expressions vary widely, this adaptability is particularly valuable.

The integration of R-PAS and GARS-2 also supports the feasibility of combining performance-based and behavioural measures to enhance diagnostic and educational precision. Consistent with previous research, such triangulated methods provide a holistic view of a student's functioning by linking cognitive style, emotional state, and behavioural expression (Weiner, 2004; Meyer, 2017). Future research could expand this approach through longitudinal designs that explore developmental changes in R-PAS indices over time, or through cross-cultural comparisons to evaluate applicability across different educational contexts.

Additionally, the case-based design used in this study demonstrates that in-depth qualitative interpretation remains meaningful even within

small samples, as it reveals unique profiles and intra-individual differences. This supports the argument that case study approaches can generate rich, contextually grounded insights when combined with quantitative evidence (Stake, 1995).

Limitations And Future Research

This study has several limitations. First, the sample size of students with Autism Spectrum Disorder (ASD) was small, which may limit the generalisability of the findings. Second, the study was conducted within a single international school context, and therefore may not fully represent variations across different educational settings. Third, the analysis relied primarily on assessment data and did not include classroom observations or perspectives from teachers, students, or families, which could have provided additional contextual insight.

Future research should expand the sample size and include multiple school contexts to enhance external validity. Longitudinal designs are also recommended to examine developmental changes in cognitive and emotional functioning over time. In addition, incorporating qualitative data, such as classroom observations and stakeholder perspectives, may provide a more comprehensive understanding of how cognitive and emotional processes are expressed in real-world learning environments. Cross-cultural studies may further examine the applicability of performance-based assessment across diverse educational systems.

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Declaration Of Interest Statement

The authors declare that there is no conflict of interest regarding the publication of this paper.

Ethical Statement

This study was conducted in accordance with the ethical standards for research involving human participants. Ethical approval was obtained from the Human Research Ethics Committee of Universiti Sains Malaysia (JEPeM Code: USM/JEPeM/PP/24040301). Written informed consent was obtained from parents or guardians, and assent was obtained from all student participants prior to data collection. All participants were informed of their right to withdraw at any stage without penalty, and confidentiality was maintained throughout the study.

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