

PROFILING AUTISTIC TRAITS IN MALAYSIAN BOARDING SCHOOLS: A DESCRIPTIVE ANALYSIS

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ABSTRACT

Autism Spectrum Disorder (ASD) is characterized by distinct neurological and behavioural traits that can influence learning adaptation and social interaction. Understanding autistic traits (ATs) in structured educational settings such as boarding schools, is crucial for developing effective support strategies. This study provides a descriptive analysis of ATs patterns among boarding school students in Malaysia using the translated Malay version of the Autism Quotient Short (AQ-28). A total of 966 students from various boarding schools across Peninsular Malaysia participated in the study. The findings revealed a mean AQ-28 score of 62.66 ($SD = 6.94$), indicating varying levels of ATs among students. The descriptive analysis highlights notable patterns in ATs distribution, suggesting that autistic characteristics may influence students' academic engagement, peer relationships and overall adaptation to the boarding school environment. Given the structured and socially immersive nature of boarding schools, students with higher ATs levels may face unique challenges in both academic and social contexts. These findings underscore the importance of implementing inclusive educational practices such as differentiated instruction, social skills development and tailored support systems to enhance student well-being. By providing a comprehensive overview of ATs prevalence, this study contributes to a deeper understanding of neurodiversity in Malaysian boarding schools and informs proactive educational strategies. Recognizing and addressing the diverse needs of students with ATs can help create a more supportive and inclusive learning environment. Overall, giving them the opportunity to grow academically, socially and emotionally, it will help to increase their self-confidence, motivation to learn, and their interaction skills in the school community and society.

Keywords: Autistic Traits, Boarding School, Inclusive Education, Malaysia, Malay AQ-28

INTRODUCTION

Autism is a neurodevelopmental disorder that presents with a diverse spectrum of symptoms, including challenges in social communication and repetitive patterns of behavior (American Psychiatric Association, 2022). In the educational context, students with autism spectrum disorder (ASD) are not necessarily fully diagnosed but may exhibit characteristics that can impact their ability to adapt to learning and social life at school (Constantino & Todd, 2003). These characteristics may include difficulties with peer interactions, adapting to routine changes, or engaging with typical classroom expectations. The highly disciplined and competitive environment of boarding schools makes this issue more complex. Students with high autistic traits (ATs) may find it particularly challenging to adjust to the rigid structure and high expectations often associated with residential educational settings. Although the Malaysian education system is increasingly moving towards inclusive education, there are still gaps in the provision of appropriate interventions for students with ASD, especially in boarding schools (Ministry of Education Malaysia, 2019). As such, these environments may not yet be adequately equipped to identify and support students who present with autistic characteristics. Autism is a neurodevelopmental disorder characterized by rigid behavioral patterns, difficulties in social communication, and a tendency towards restricted interests or activities (American Psychiatric Association, 2022). In the context of education, students who show high of ATs often face challenges in adapting to complex learning environments, especially in environments with strict social and academic structures such as boarding schools. Boarding schools, as elite educational institutions that house outstanding students from all over the country, have a highly structured environment and demand high emotional, social, and academic resilience. For students with certain levels of ATs, the pressures of this environment can lead to unique challenges in terms of self-adjustment, peer interaction, and emotional and psychosocial balance (Samson, 2014).

According to the Malaysian Education Development Plan 2013–2025 (Ministry of Education Malaysia [KPM], 2013b), the main goal of inclusive education is to ensure that students with special needs are given fair access to quality educational opportunities. In line with the PPPM target of placing 75% of special education students in mainstream programs by 2025 (KPM, 2021), a deeper understanding of the characteristics of autism among boarding school students is essential. This is not only to encourage teaching practices that are more responsive to the needs of neurodivergent students, but also to develop holistic support policies at the systemic level.

However, research on ATs among boarding school students is still very limited. Most existing studies focus on the context of daily primary or secondary schools, while boarding school students operate in a unique learning landscape, including living in dormitories, intensive involvement in co-curricular activities, and high academic achievement (Youssef et al., 2024; Darmawati et al., 2024). Accordingly, this study was conducted to descriptively profile autistic characteristics among boarding school students across Peninsular Malaysia using the Malay-translated version of the Autism Quotient Short instrument (AQ-28). By providing a comprehensive picture of ATs patterns in boarding school, this study is expected to contribute to a deeper understanding of neurodiversity in Malaysian education and to support more proactive and inclusive strategies.

ATs components refer to a spectrum of behavioral and thought patterns that reflect the cognitive presence of autism, but do not necessarily lead to a clinical diagnosis of Autism (Baron-Cohen et al., 2001). Individuals with ATs may exhibit characteristics such as social communication habits, a tendency towards strict routines, high sensitivity, and difficulty understanding informal social norms. Among students, ATs can affect learning processes, emotional well-being, and peer relationships, especially in highly structured educational environments such as boarding schools.

LITERATURE REVIEW

A study by Low et al. (2023) found that ATs are more easily identified in adolescent students than in children due to the social and academic pressures that increase with age. Adolescent students with ATs often show difficulty in coping with changes in daily routines, social anxiety, and experience difficulties in interaction-based learning such as collaborative learning or class discussions (Low et al., 2023). According to DSM-5, it classifies the spectrum at levels 1, 2 and 3.

Level 1 refers to individuals with autism who require support because they experience difficulties in social interaction, lack of interest in communication and inflexible behavior. In addition, they also face challenges in adapting to change and difficulties in planning and self-management (Low et al., 2023). Next, level 2 refers to individuals with autism who require more significant support because they show an inability to communicate verbally and non-verbally and have more rigid behavior and difficulty accepting change. This condition can affect their ability to live their daily lives independently (Low et al., 2023). Meanwhile, level 3 is the highest level of severity, where individuals with autism in this category require very significant support because they experience severe communication deficits, very limited and repetitive behavior and a significant inability to adapt to changes in their environment (Cinque et. al 2021) The following is a table of levels 1 to level 3 according to the domains that are described in more detail.

Table 1: Levels of Autism

Levels of Autism	Social Communication	Behavioral Patterns
Level 1 (Requires support)	Difficulty initiating and responding to social offers from others.	Having repetitive behaviors that can seriously impair functioning. Refusing to be distracted from regular routines, lacking focus, and not allowing others to disrupt their regular routines.
Level 2 (Requires substantial support)	Has significant deficits in both verbal and nonverbal communication skills with limited ability to initiate social interactions and often deviates from social approaches to others. For example, speaks in few sentences and interactions are limited to specific interests.	Shows marked dissatisfaction when others disrupt their regular routine and has difficulty distracting themselves from interests.
Level 3 (Requires very substantial support)	Having a limited ability to initiate social interactions, and a lack of responsiveness to social offers from others, is related to a lack of verbal and social communication skills.	Having difficulty with flexibility in behavior, routines, and thinking leading to challenges with adapting to changes and unexpected situations.

In Malaysia, several studies have suggested that ATs among teenagers may be less well-known because students demonstrate high academic ability, but they still experience significant emotional and social stress (Palikara et al., 2024). This becomes more complex when students are in boarding schools that set high expectations for discipline, performance, and social engagement. Boarding school in Malaysia are known for their competitive learning environments and dense co-curricular activities. The strict time structure, constant social interaction, and high social adjustment requirements create additional stress on students, especially those with ATs. Tengku (2024) reported that boarding school students with

neurodivergent traits experienced higher rates of stress and emotional exhaustion than regular day school students.

The boarding school environment also creates a “closed” social space, where students live together in dormitories and have to adapt to peer groups. For students with high ATs, difficulties in reading social cues or adapting to group norms can lead to social isolation, relational aggression, or emotional withdrawal (Aubineau et al., 2020). However, the boarding school environment that provides a system of mentors, peers, and tutors also has the potential to support the social development of neurodivergent students if appropriate interventions are implemented.

The Autism Spectrum Quotient (AQ) and its short version AQ-28 (Hoekstra et al., 2011) have been widely used to assess the presence of ATs in non-clinical populations. This instrument allows researchers to identify behavioral patterns in five domains: social skills, attention to detail, communication, imagination, and routine change. A study by Melissa et al. (2024) showed that the AQ-28 has high validity and reliability in detecting ATs in adolescent and early adult populations. In Malaysia, local studies such as those by Aubineau et al. (2020) have begun to adapt the AQ into the Malay language and test its use among secondary school students. This study states that early exposure to ATs screening can help teachers and school counselors plan more effective learning supports. Nevertheless, despite its applicability, the use of the AQ-28 in Malaysia is still subject to several contextual limitations, such as:

Table 2: Strengths and Limitations of the AQ-28 for use in Malaysia

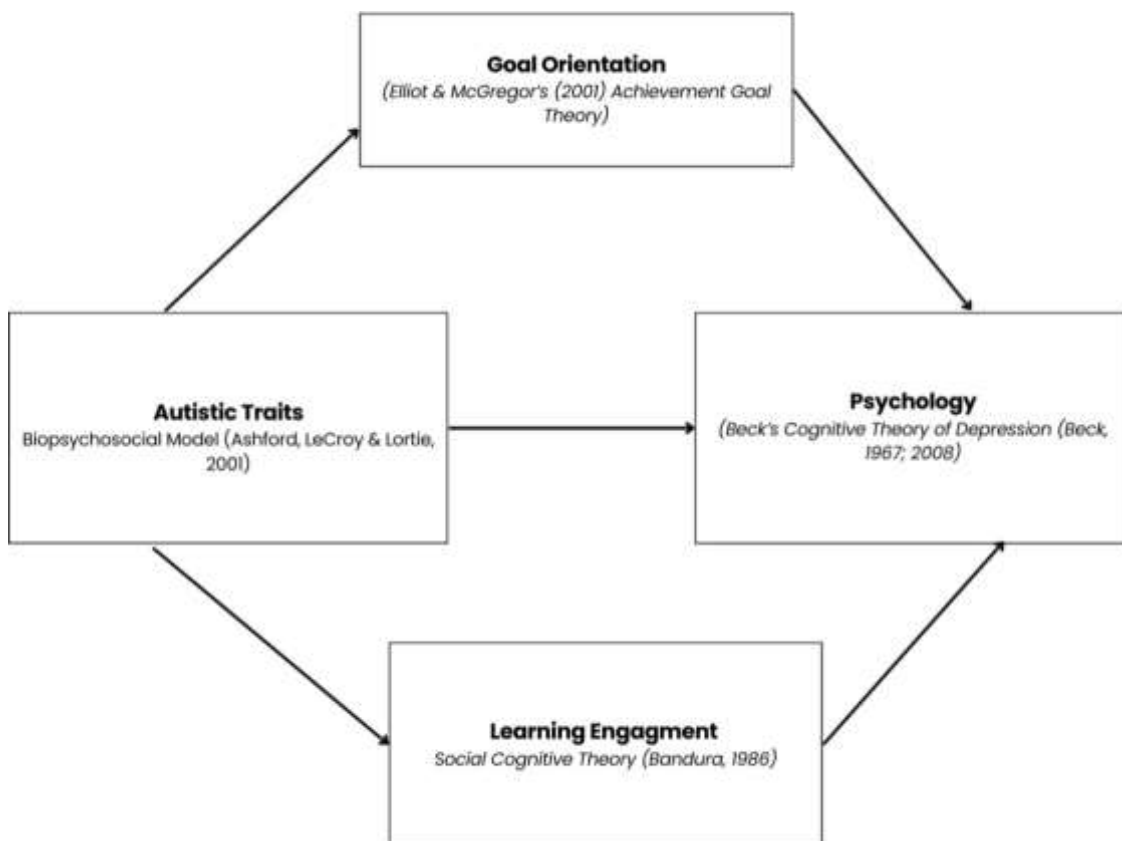
Strengths	Limitations
High reliability and validity across multiple domains	Cultural adaptation still in early stages
Efficient and quick to administer in school settings	Normative data for Malaysian adolescents still limited
Useful for non-clinical populations	May not capture the full complexity of autistic behaviors in collectivist cultures

The neurodiversity framework recognizes neurological variations such as autism as part of normal human variation rather than as a ‘problem’ that needs to be corrected (Singer, 1999). This approach supports responsive learning, planning of supportive interventions, and flexible teaching practices. An international study by Onyishi and Sefotho (2020) suggests that differentiated instruction and strengthening social skills can increase the engagement of neurodivergent students in mainstream classrooms.

The implementation of inclusive education in Malaysia is currently aligned with the Malaysian Education Blueprint 2013–2025, which sets a target to increase the participation rate of students with special needs in mainstream education to 75% by 2025 (KPM, 2021). However, actual implementation requires a deeper understanding of the behavioral variations and profiles of students with ATs in different types of schools, including boarding school. In conclusion, the availability of literature in Malaysia is still limited to the context of day schools and primary education. Studies examining ATs in boarding school settings are very limited even though students in these schools face very unique challenges. Therefore, it is important to conduct research that not only measures the prevalence of ATs, but also relates it to the academic, psychosocial and social adjustment of students in the boarding school context. By understanding the patterns of ATs in boarding school, schools, teachers, and policymakers can develop more targeted, inclusive, and long-term intervention strategies.

Based on the literature reviewed, this study proposes a conceptual framework that illustrates the relationship between ATs, as measured by the five domains of the AQ-28, and students' school adjustment in three dimensions: academic, social, and psychological. The framework reflects how each domain of ATs potentially affects students' ability to cope with the academic demands, social expectations, and emotional regulation required in a Malaysian boarding school context. Figure 1 below presents the conceptual framework of the study.

Figure 1: Conceptual Framework of the Relationship Between Autistic Traits and School Adjustment in Boarding Schools



Based on the figure above, ATs include biological, psychological and social factors that affect a student's cognitive and social functioning, such as difficulty in social interaction, rigidity in routine and sensitivity to environmental stimuli. Based on the Biopsychosocial Model (Ashford, LeCroy & Lortie, 2001), these characteristics can affect psychological well-being, especially when students are unable to adapt to social and academic pressures in the school environment. In addition, students with ATs may experience challenges in expressing their learning goals, which then can affect their tendency to develop adaptive goal orientations such as achievement or mastery goals.

Next, goal orientation plays an important role as a mediator in how students with ATs overcome academic and social challenges. Based on Achievement Goal Theory (Elliot & McGregor, 2001), students with positive goal orientations are more likely to remain motivated and actively engage in the learning process. However, if ATs disrupt emotional and psychological balance, as stated in Beck's Cognitive Theory of Depression (1967; 2008), it can reduce the level of learning engagement. In this context, psychological well-being functions as a mediating variable that explains how emotional stress and depression experienced by neurodivergent students may lead to a decline in learning engagement. This includes reduced student commitment, motivation and interaction in the classroom, as described in the Social Cognitive Theory (Bandura, 1986). Lastly, this study is expected to be an initial contribution towards mapping neurodiversity in the residential education system in Malaysia. By integrating theoretical models such as the Biopsychosocial Model, Achievement Goal Theory, Beck's Cognitive Theory and Social Cognitive Theory, this study seeks to explore the complex interplay between autistic traits, psychological well-being, goal orientation and learning engagement among students in boarding schools. A deeper understanding of these interrelationships can empower educators, counsellors and policymakers to design more inclusive, responsive and supportive learning environments that are thoughtfully tailored to the unique needs of neurodivergent students. Therefore, this study will address two research questions as follows:

- a) What is the distribution pattern of autistic traits among boarding school students in Malaysia?
- b) Which AQ-28 domains show the highest and lowest scores?

METHODOLOGY

This study used a quantitative method through a descriptive survey approach. The main instrument used was the Autism Quotient Short Malay version (AQ-28), which was adapted from the original version by Baron-Cohen et al. This instrument contains 28 items that assess the level of ASD based on five main domains: social skills, switching, routine, imagination and numbers and pattern. A total of 966 students from various boarding schools throughout Peninsular Malaysia participated in this study. Scores were calculated using a 4-point Likert scale. The internal reliability value by using Cronbach's Alpha was 0.85, indicating high validity and reliability. Scores were calculated using a 4-point Likert scale and the data were analyzed using SPSS version 27 software. Descriptive statistics were used to assess the mean, standard deviation and score distribution. Score distribution analysis allows for an understanding of the variation in students' ATs across the five main domains of the AQ-28.

Table 3: Number of Items by Domain (AQ-Short)

Domain	Numbers of Item
Social Skills	7
Switching	4
Routine	4
Imagination	8
Numbers and Patterns	5
Total Item	28

For the data collection procedure, the questionnaire was administered through printed forms conducted in collaboration with the counselor teacher and school coordinator. Respondents were given informed consent forms before answering. The data was anonymous and completely confidential. The data was then analyzed using SPSS version 27 software. Descriptive statistics were used to assess the mean, standard deviation and score distribution. Score distribution analysis allows for an understanding of the variation in students' ATs in the five main domains of the AQ-28.

RESULTS AND FINDING

The following are the research findings for the two objectives established in this study.

a) What is the distribution pattern of autistic traits among boarding school students in Malaysia?

The average AQ-28 score obtained was 62.66 ($SD = 6.94$), indicating the presence of varying levels of ATs among students. The findings also showed that there was a group of students who scored higher in the domains related to social difficulties and flexibility of thought, which could directly affect their ability to interact, adapt and actively participate in learning activities. This situation becomes more challenging when students have to adapt to a boarding environment with a tight schedule, communal life and high academic pressure. Students with high AT are likely to feel marginalized or experience emotional stress due to constraints in building social relationships and following the conventional learning tempo.

Table 4: Descriptive Analysis

	N	Minimum	Maximum	Mean	Std. Deviation
AQ Score	966	28.00	90.00	62.66	6.94

This study analyzed the distribution of ATs scores among boarding school students in Malaysia based on the overall AQ-28 score which was categorized into three levels: low, moderate, and high. This classification aims to identify the general pattern of autistic trait levels that exist in a highly structured school environment that emphasizes social interaction such as boarding schools. The results of the analysis showed that out of 966 students, 280 students (29.0%) were in the low category, 411 students (42.5%) in the moderate category, and 275 students (28.5%) in the high category. The moderate category was the largest group, indicating that almost half of the students had ATs that were in the middle level. Meanwhile, almost a third of the students had high levels of ATs, which could indicate the presence of certain challenges in terms of social engagement, communication, and adaptation to the intensive boarding environment.

Table 5: Distribution of ATs Levels of Boarding School Students

Level of Autistic traits	Number of Students	Percentage
Low	280	29.0 %
Moderate	411	42.5 %
High	275	28.5 %
Total	966	100 %

This distribution reflects the neurodiversity among boarding school students, who require a flexible and inclusive support system. Awareness of this diversity allows schools and teachers to plan more targeted teaching approaches, as well as build an environment that supports the academic and psychosocial well-being of all students.

b) Which AQ-28 domains show the highest and lowest scores?

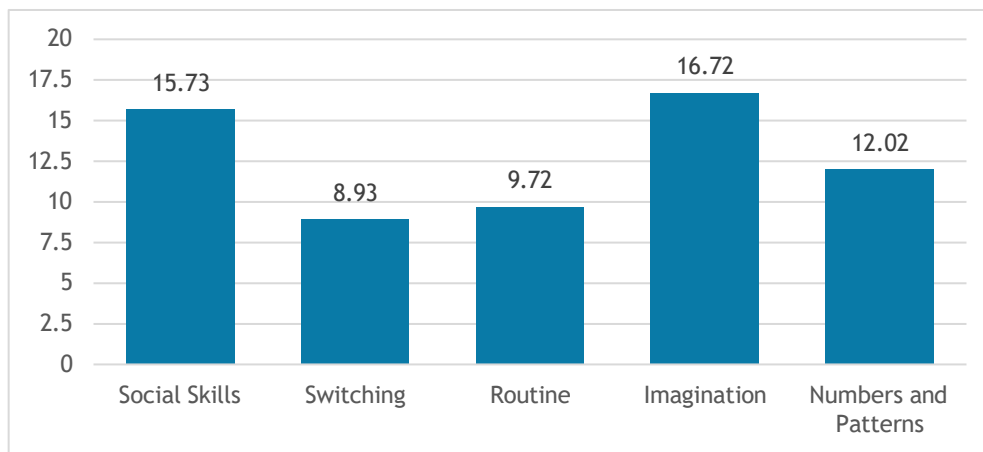
Next, this study used the Autism Spectrum Quotient – Short (AQ-28) Malay version to assess the pattern of ATs among boarding school students in Malaysia. Each domain reflects a different aspect of the autism spectrum that has the potential to impact students' academic and social engagement. The table below shows the descriptive analysis for each domain:

Table 5: Descriptive Analysis for each Domain

Domain	N	Minimum	Maximum	Mean	Std. Deviation
Social Skills	966	7.00	24.00	15.73	2.38
Switching	966	4.00	14.00	8.93	1.71
Routine	966	4.00	15.00	9.27	1.51
Imagination	966	8.00	27.00	16.72	2.62
Numbers and Patterns	966	5.00	20.00	12.02	2.66

The findings show that the imagination domain recorded the highest mean score of 16.72 ($SD = 2.62$). This indicates that the boarding schools students in this study showed more pronounced characteristics of social imagination deficits compared to other domains. This characteristic may involve difficulty in imagining other people's perspectives, playing symbolically, or creating complex social scenarios. On the other hand, the switching domain recorded the lowest mean score, which was 8.93 ($SD = 1.71$). This suggests that difficulties in changing focus or thinking from one task to another are less pronounced than other aspects, but still exist among some students. Meanwhile, other domains such as social skills ($M = 15.73$), numbers and patterns ($M = 12.02$) and routine ($M = 9.27$) were in the moderate range, indicating a diverse level of autistic characteristics in social aspects and structured behaviors.

Figure 2: Mean Scores Across AQ-28 Domains



Overall, the score patterns of these domains reflect the existence of neurodiversity in the boarding school student population. The implications of these findings are the need for support strategies that target aspects of social imagination while simultaneously monitoring difficulties in adjusting to routines and social interactions. Schools and teachers may consider different pedagogical approaches, social skills training, and the use of more visual and concrete learning materials to help students adapt to the complex and challenging boarding environment.

DISCUSSIONS, RECOMMENDATIONS AND CONCLUSIONS

The patterns of ATs identified among students indicate the need to adapt educational approaches that are more responsive to neurodiversity. The implementation of differentiated instruction, the development of social skills, and ongoing psychosocial support are among the important steps that need to be addressed by schools and policymakers. The findings of this study provide important insights into the distribution and specific characteristics of ATs among students in boarding schools in Malaysia. Using the AQ-28 as the assessment tool, the study revealed that a significant portion of students exhibited moderate (42.5%) to high (28.5%) levels of ATs, suggesting that autistic-like behaviors are not uncommon, even among high-performing student populations in structured and socially intensive environments like boarding school.

The high proportion of students in the moderate category aligns with previous studies that suggest ATs exist along a continuum within the general population, and are not exclusive to clinical diagnoses (Constantino & Todd, 2003). The presence of 28.5% of students in the high category warrants attention, as it may reflect underlying difficulties in areas such as social communication, adaptability, and sensory regulation, which are often challenged in structured, communal living settings (Baron-Cohen et al., 2001). In boarding schools where students are constantly exposed to peer interactions, high expectations, and routine-based schedules, students with high ATs may struggle with social integration, emotional regulation, or coping with rapid changes and transitions.

When examining the specific domains of the AQ-28, the imagination domain recorded the highest mean score. This suggests a greater tendency for social imagination deficits, including challenges in understanding others' perspectives, anticipating future events, and engaging in symbolic or pretend play (Westby, 2022). Such deficits may influence the students' ability to navigate complex social scenarios or predict outcomes in group-based tasks, which are common in boarding school settings. This also corresponds with research showing that impaired imagination is a key trait among individuals with higher autistic characteristics and is often associated with rigid thinking and difficulties in empathy (Chapple et al., 2023).

Conversely, the switching domain, which reflects cognitive flexibility, had the lowest mean score, indicating it was the least prominent difficulty among the students. This suggests that despite being in a structured environment, most students were able to shift attention or adapt cognitively from one task to another with relatively less difficulty. However, even mild impairments in this domain can affect multitasking or transitioning between academic and social demands, which are frequent in boarding school contexts (Best & Miller, 2009). The moderate scores in the domains of social skills, numbers and patterns, and routine highlight a mix of strengths and challenges. For instance, a relatively high score in social skills implies ongoing difficulties with initiating and maintaining interactions, while the moderate scores in routine and numbers and patterns suggest a preference for structured tasks and repeated behaviors, which may either facilitate academic performance or hinder adaptability.

Overall, the findings underscore the importance of recognizing neurodiversity within mainstream and elite educational institutions. Teachers and administrators should be trained to understand and support students with varying levels of ATs, regardless of clinical diagnosis. Proactive measures such as inclusive practices, peer mentoring, and emotional support programs can help these students thrive both academically and socially.

Conclusion

Inclusive education does not only mean placing students with special needs in mainstream classes, but also providing a system that is flexible and supports diverse learning styles and emotional needs. These findings can form the basis for more adaptive curriculum planning, teacher training, and the implementation of mental support programs that focus on neurodivergent students. This study demonstrates that AT exists among Malaysian boarding school students, and it has significant implications for their academic and social well-being. Therefore, the need to develop more inclusive and holistic educational strategies is urgent. By recognizing neurodiversity, boarding schools can become more inclusive, build healthy learning communities, and provide space for students to grow academically, socially, and emotionally.

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